RULES FOR CLASSIFICATION

Offshore units


Floating production, storage and loading units
FOREWORD

DNV GL rules for classification contain procedural and technical requirements related to obtaining and retaining a class certificate. The procedural and technical requirements are used as a contractual document and includes both requirements and acceptance criteria.
**CHANGES – CURRENT**

**General**
This document supersedes DNV-OSS-102, July 2014.

Text affected by the main changes in this edition is highlighted in red colour. However, if the changes involve a whole chapter, section or sub-section, normally only the title will be in red colour.

On 12 September 2013, DNV and GL merged to form DNV GL Group. On 25 November 2013 Det Norske Veritas AS became the 100% shareholder of Germanischer Lloyd SE, the parent company of the GL Group, and on 27 November 2013 Det Norske Veritas AS, company registration number 945 748 931, changed its name to DNV GL AS. For further information, see www.dnvgl.com. Any reference in this document to "Det Norske Veritas AS", "Det Norske Veritas", "DNV", "GL", "Germanischer Lloyd SE", “GL Group” or any other legal entity name or trading name presently owned by the DNV GL Group shall therefore also be considered a reference to "DNV GL AS".

**Main changes July 2015, entering into force 1 January 2016**

- **General**
  The revision of this document is part of the DNV GL merger, updating the previous DNV service specification into a DNV GL format including updated nomenclature and document reference numbering, e.g.:

  - Main class identification **1A1** becomes **1A**.
  - DNV replaced by DNV GL.
  - DNV-RP-A201 to DNVGL-CG-0168. A complete listing with updated reference numbers can be found on DNV GL’s homepage on internet.

  To complete your understanding, observe that the entire DNV GL update process will be implemented sequentially. Hence, for some of the references, still the legacy DNV documents apply and are explicitly indicated as such, e.g.: Rules for Ships has become DNV Rules for Ships.

- **Ch.1 Sec.1 Introduction**
  — Table 2: Definition of offshore installations has been updated.

- **Ch.1 Sec.3 Classification scope and notations**
  — [2.4] Cylindrical unit has been included as **Structural Design** notation.
  — [2.10.1]: Introduction of field specific notation.

- **Ch.2 Design and construction provisions**
  — Sec. 1 [4.2] and Sec. 2 [4.2] Including cylindrical unit as structural design alternative.

- **Ch.3 Sec.1 General provisions**
  — Table 1 and Table 2 have been corrected in line with Class systematics.

- **Ch.3 Sec.2 General requirements for structure and machinery surveys**
  — [4.3.9]: Description of follow up inspections for units FUI>1 has been updated.

- **Ch.3 Sec.3 Periodical survey extent for main class**
  — [2.1]: Removal of previous [2.1.3].
  — New [2.4.11] on hazardous area inspection.
  — Table 1 and Table 3 have been aligned with Table 2.
  — Table 5: Second row has been updated to 'All other units' to make it more general applicable.
  — [2.4.4] has been updated to align with IACS UR Z15 2.8.2.
  — In [2.2] and [4.2] previous [2.2.5] on tank level measurements has been removed.
  — In [3.2] previous [3.2.3] on thickness measurements for renewal survey has been removed.
— In [3.2] and [4.2] previous [3.2.5] and [4.2.17] on extension of thickness measurements have been removed.
— [4.2.4]: Description has been updated in line with general systematics.
— [4.2]: Previous [4.2.19] on testing of watertight doors has been removed.
— [4]: Table 8 and Table 9 have been aligned with Table 10 with regard to air pipes and ventilation.
— [4.4.4]: Updated by removing interpretation and updating guidance note.
— In [5.1] previous [5.1.2] has been deleted.
— In [5.2.1] reference to boiler and thermal oil heater survey has been removed.
— In [5.4] Previous [5.4.3] has been deleted.

- Ch.3 Sec.5 Periodical survey extent for service notations
  — Removal of previous clauses [2.3.12] and [3.3.23].

- Ch.3 Sec.6 Optional class notation surveys
  — [2]: Deletion of [2.8.1], [2.8.7] and [2.8.13]
  — [6]: Update descriptions wrt ventilation, ESD and communication systems

- Ch.3 Sec.7 Alternative survey arrangements
  — [3.2.2] has been updated by a reference to general survey requirements.

**Editorial corrections**

In addition to the above stated main changes, editorial corrections may have been made.
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CHAPTER 1 PRINCIPLES AND PROCEDURES FOR CLASSIFICATION

SECTION 1 INTRODUCTION

1 Introduction

1.1 General
This publication presents DNV GL’s Rules for Classification of Floating Production and Storage Units or Installations, stating the terms and procedures for assigning and maintaining classification, including listing of the applicable technical references to be applied for classification.

1.2 Organisation
These Rules are divided into three main chapters as follows:
— Ch.1: providing general information about classification principles and procedures
— Ch.2: providing design and construction requirements for the newbuilding phase
— Ch.3: providing requirements for maintenance of class in the operational phase.

1.3 Objects covered
These Rules cover classification of offshore objects of the following design designs:
— ship-shaped type
— column-stabilised type
— self-elevating type
— cylindrical type
— tension-leg type
— deep draught type.

for the following services:
— hydrocarbon production
— hydrocarbon storage and offloading
— hydrocarbon loading.

2 Definitions

2.1 Verbal forms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>shall</td>
<td>verbal form used to indicate requirements strictly to be followed in order to conform to the document</td>
</tr>
<tr>
<td>should</td>
<td>verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required</td>
</tr>
<tr>
<td>may</td>
<td>verbal form used to indicate a course of action permissible within the limits of the document</td>
</tr>
</tbody>
</table>


### 2.2 Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>approval or approved</td>
<td>denotes acceptance by DNV GL of documentation showing design solutions, arrangements and equipment that complies with the Rules</td>
</tr>
<tr>
<td>assessment</td>
<td>an act of assessing, appraising or evaluating a condition of a product, process or system</td>
</tr>
<tr>
<td>assigning class</td>
<td>originally signified designation of one of several classes to a unit based on its condition, ranging from good to bad</td>
</tr>
<tr>
<td></td>
<td>Today only the highest class is assigned, comprising the main class <strong>1A</strong> for mobile offshore units and <strong>OI</strong> for permanently placed installations, together with an obligatory additional class notation, e.g. <strong>Oil Production Unit</strong>, where applicable. Voluntary additional class notations may also be assigned covering special service, equipment or systems, e.g. <strong>PROD</strong> denoting a classed hydrocarbon production plant.</td>
</tr>
<tr>
<td>builder</td>
<td>signifies the party contracted to build a vessel in compliance with the Society’s rules</td>
</tr>
<tr>
<td>certificate</td>
<td>a document confirming compliance with the Society's rules or with other rules and regulations for which the Society has been authorized to act</td>
</tr>
<tr>
<td>certification</td>
<td>a service confirming compliance with applicable requirements on the date that the survey was completed</td>
</tr>
<tr>
<td>certification of materials and components (CMC)</td>
<td>the activity of ensuring that materials, components and systems used in vessels to be classed by the Society comply with the rule requirements</td>
</tr>
<tr>
<td></td>
<td>The scope of classification requires that specified materials, components and systems intended for the vessel are certified. Depending on the categorisation, certification may include both plan approval and survey during production and/or of the final product.</td>
</tr>
<tr>
<td>class</td>
<td>class is assigned to and will be retained by vessels complying with applicable requirements of the Society’s rules</td>
</tr>
<tr>
<td>classification</td>
<td>a service which comprises the development of independent technical standards for vessels - class rules and standards, and to verify compliance with the rules and standards throughout the vessels’ life</td>
</tr>
<tr>
<td>close-up examination</td>
<td>an examination where the details of structural components are within the close visual inspection range of the surveyor, i.e. preferably within reach of hand</td>
</tr>
<tr>
<td>coating conditions</td>
<td>— <strong>“GOOD”</strong>: Condition with only minor spot rusting.</td>
</tr>
<tr>
<td></td>
<td>— <strong>“FAIR”</strong>: Condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for <strong>POOR</strong> condition.</td>
</tr>
<tr>
<td></td>
<td>— <strong>“POOR”</strong>: Condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.</td>
</tr>
<tr>
<td>commissioning</td>
<td>a process of assuring that components, equipment and the systems are functioning in accordance with the functional requirements</td>
</tr>
<tr>
<td>concurrent surveys</td>
<td>surveys required to be concurrently completed shall have the same date of completion</td>
</tr>
<tr>
<td></td>
<td>A survey required to be carried out in conjunction with or carried out as part of another survey shall be completed on or before the completion of the other survey, however, within the time window for that survey.</td>
</tr>
<tr>
<td>condition of class (CC)</td>
<td>constitutes a requirement that specific measures, repairs or surveys shall be carried out within a specific time limit in order to retain class</td>
</tr>
<tr>
<td>condition on behalf of the flag administration (CA)</td>
<td>constitutes specific measures, repairs or surveys that shall be carried out within a specific time limit in order to retain the statutory certificate</td>
</tr>
<tr>
<td></td>
<td>A CA will be issued only when the Society has been authorised to carry out statutory surveys on behalf of the flag administration.</td>
</tr>
<tr>
<td>contract:</td>
<td>the specific agreement between DNV GL and the customer</td>
</tr>
<tr>
<td></td>
<td>It defines the extent of services requested by the customer, and is concerned with:</td>
</tr>
<tr>
<td></td>
<td>— the classification of vessels or installations, both new buildings and in operation</td>
</tr>
<tr>
<td></td>
<td>— statutory work carried out on behalf of national maritime authorities</td>
</tr>
<tr>
<td></td>
<td>— equipment and materials.</td>
</tr>
<tr>
<td>critical structural areas</td>
<td>areas that have been identified from calculations to require monitoring or from the service history of the subject vessel or from similar or sister vessels to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the vessel</td>
</tr>
</tbody>
</table>
### Table 2 Definitions (Continued)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>customer</td>
<td>signifies the party who has requested the Society’s service</td>
</tr>
<tr>
<td>designer</td>
<td>signifies a party who creates documentation submitted to the Society for approval or information</td>
</tr>
<tr>
<td>emergency towing</td>
<td>towing related to an emergency situation normally caused by failure of the units own propulsion (compare with normal towing as defined in (normal) towing)</td>
</tr>
<tr>
<td>exceptional circumstances</td>
<td>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</td>
</tr>
<tr>
<td>Flag administration</td>
<td>the maritime administration of a vessel’s country of registry</td>
</tr>
<tr>
<td>floating offshore installation</td>
<td>a buoyant construction engaged in offshore operations including drilling, production, storage or support functions, and which is designed and built for installation at a particular offshore location</td>
</tr>
<tr>
<td>guidance note</td>
<td>contain advice which is not mandatory for the assignment or retention of class, but with which the Society, in light of general experience, advises compliance</td>
</tr>
<tr>
<td>IACS member society</td>
<td>a classification society being a member of IACS</td>
</tr>
<tr>
<td>independent tank</td>
<td>self-supporting tank which does not form part of the vessel's hull and does not contribute to the hull strength</td>
</tr>
<tr>
<td>Independent gravity tank</td>
<td>a tank with design vapour pressure not exceeding 0.7 bar.</td>
</tr>
<tr>
<td>Pressure vessel</td>
<td>a tank with design gas or vapour pressure exceeding 0.7 bar.</td>
</tr>
<tr>
<td>interpretation</td>
<td>norms for fulfilling the associated principle requirements as defined by other regulatory bodies on matters which are left to the satisfaction of the flag administration or are vaguely worded</td>
</tr>
<tr>
<td></td>
<td>These do not preclude the use of other alternative solutions but these shall be documented and approved for compliance to the principal requirement equivalent to the original interpretation.</td>
</tr>
<tr>
<td>lay-up</td>
<td>a terminology used for vessels that are out of commission</td>
</tr>
<tr>
<td></td>
<td>In this state the offshore vessel may be at anchorage or permanently moored in a safe harbour.</td>
</tr>
<tr>
<td>LRFD methodology</td>
<td>load and resistance factor design methodology</td>
</tr>
<tr>
<td>manufacturer</td>
<td>signifies the entity that manufactures the material or product, or carries out part production that determines the quality of the material or product, or does the final assembly of the product</td>
</tr>
<tr>
<td>mechanical completion (MC)</td>
<td>verification that the components, equipment and the systems are constructed, installed and tested in accordance with applicable drawings and specifications and are ready for testing and commissioning in a safe manner</td>
</tr>
<tr>
<td>memorandum to owner (MO)</td>
<td>constitutes information related to the ship, its machinery and equipment or to rule requirements</td>
</tr>
<tr>
<td></td>
<td>A MO will be issued in relation to information that does not require any corrective action or survey.</td>
</tr>
<tr>
<td>mobile offshore unit</td>
<td>a buoyant construction engaged in offshore operations including drilling, production, storage or support functions, and which can be relocated without major dismantling or modification</td>
</tr>
<tr>
<td>offshore installation</td>
<td>a buoyant or non-buoyant construction engaged in offshore operations including drilling, production, storage or support functions, and which is designed and intended for use at a location for an extended period</td>
</tr>
<tr>
<td>overall examination</td>
<td>an examination intended to report on the overall condition of the structure</td>
</tr>
<tr>
<td>owner</td>
<td>signifies the registered owner or manager of the vessel or any other organization or person who has assumed the responsibility for operation of the vessel and who on assuming such responsibility has agreed to take over all the duties and responsibilities</td>
</tr>
<tr>
<td>position mooring</td>
<td>anchoring system for position keeping at the unit’s working location</td>
</tr>
<tr>
<td>plan approval</td>
<td>signifies a systematic and independent examination of drawings, design documents or records in order to verify compliance with the rules or statutory requirements</td>
</tr>
<tr>
<td></td>
<td>Plan approval will be carried out at the discretion of the Society, which also decides the extent and method of examination.</td>
</tr>
<tr>
<td>plan approval staff</td>
<td>personnel authorized to carry out plan approval and to conclude whether or not compliance has been met</td>
</tr>
</tbody>
</table>
prompt and thorough repair: a permanent repair completed at the time of survey to the satisfaction of the surveyor, therein removing the need for the imposition of any associated condition of class

quality audit: a systematic and independent examination to determine whether established work processes and quality systems are adhered to

quality system: signifies both the quality management system and established production and control procedures

quality survey plan (QSP): a plan that systematically identifies activities related to the classification project (e.g., construction, installation, testing, mechanical completion, pre-commissioning, testing and commissioning) and the extent of involvement each party (i.e., Yard's QC, Yards' QA, DNV GL and Owners [if desired]) will undertake. Such a plan needs to be submitted to the Society for approval prior to commencement of classification projects.

recognised classification society: a classification society which is a full or associate member of IACS

reliability: the ability of a component or a system to perform its required function under given conditions for a given time interval

representative tanks: those tanks which are expected to reflect the condition of other tanks of similar type and service and with similar corrosion protection systems. When selecting representative tanks account shall be taken of the service and repair history on board and identifiable critical and/or suspect areas.

retroactive requirement (RR): constitutes a class or statutory requirement that will enter into force for certain vessels in operation and under construction at a given date or an upcoming survey. The RR will specify the required actions to be taken in order to retain class or statutory certification. RR related to statutory certification will be issued only if the Society has been authorised to carry out statutory certification on behalf of the flag administration.

review: signifies a systematic examination of drawings, design documents or records in order to evaluate their ability to meet requirements, to identify any problems and to propose necessary actions

rope access personnel: specialized trained personnel who use climbing techniques to reach places not reachable by other workers

the rules: all rule requirements accepted by the appropriate approval body as basis for classification

sighting survey: a survey to confirm that the relevant construction or the equipment is in a satisfactory condition and, as far as can be judged, will remain so until the postponed survey has been carried out

significant repair: a repair where machinery is completely dismantled and re-assembled. Significant repairs will, furthermore, be cases of repairs after serious damage to machinery.

the Society: signifies DNV GL

safety systems: systems, including required utilities, which are provided to prevent, detect/warn of an accidental event/abnormal conditions and/or mitigate its effects

Interpretation:

1) The following should be considered as safety systems:
   - ESD, including blowdown where relevant
   - PSD
   - Fire & gas (F&G) detection
   - PA/GA
   - Fire-fighting systems
   - BOP incl. control system
   - Safety systems for essential or important services

2) Rule: Safety systems are normally considered as “on-demand” functions.

spaces: separate compartments including holds and tanks
Chapter 1  Section 1

statement of compliance  a document confirming compliance with specified requirements
Such documents may be issued by the Society in cases where it has not been authorised to certify compliance.

statutory certificates  IMO convention certificates issued on behalf of, or by, national authorities

statutory survey  survey carried out by or on behalf of a flag administration

substantial corrosion  extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75% of allowable margins, but within acceptable limits

survey  signifies a systematic and independent examination of a vessel, materials, components or systems in order to verify compliance with the rules and/or statutory requirements
Surveys will be carried out on the vessel, at the construction or repair site as well as at sub-suppliers and other locations at the discretion of the Society, which also decides the extent and method of control.

survey staff  personnel authorized to carry out surveys and to conclude whether or not compliance has been met

suspect areas  areas showing substantial corrosion and/or are considered by the surveyor to be prone to rapid wastage

temporary conditions  design conditions not covered by operating conditions, e.g. conditions during fabrication, mating and installation phases, dry transit phases

temporary equipment  equipment intended for use on installations and which is covered by class, requires hook-up to systems covered by class and/or is a significant deck load and/or may pose a risk for fire, explosion and escape routes

temporary mooring  anchoring in sheltered waters or harbours exposed to moderate environmental loads

tentative rules and standards  Apply to new fields to which DNV GL reserves the right to make adjustments during a period in order to obtain the purpose intended.

(normal) towing  drawing or pulling the unit by a chain or line using a tug boat
Normally towing is performed for units without any propulsion for (re-)location (compare with emergency towing as defined in emergency towing).

transit conditions  all wet vessel movements from one geographical location to another

transverse section  section which includes all longitudinal members such as plating, longitudinals and girders at the deck, side, bottom, inner bottom and hopper side plating, longitudinal bulkhead and bottom plating in top wing tanks, as applicable
For transversely framed vessels, a transverse section includes adjacent frames and their end connections in way of transverse sections.

Guidance note:
Adjacent frames include the frames located just forward and aft of the transverse section.

verification  a service that signifies a confirmation through the provision of objective evidence (analysis, observation, measurement, test, records or other evidence) that specified requirements have been met

vertical contract audit  an IACS audit which assesses the correct application of the quality system through audit of the process for a specific contract
The IACS QSCS (Quality System Certification Scheme) audit team is responsible for carrying out these audits.

vessel  in the context of these rules mean a mobile offshore unit (MOU)

witnessing  signifies attending tests or measurements where the surveyor verify compliance with agreed test or measurement procedures

WSD methodology  working stress design methodology
3 Normative references

3.1 Normative references
These Rules include references to other DNV GL and DNV documents and recognised codes and standards which shall be used in conjunction with the requirements given in this document for assignment of class.

3.2 DNV GL and DNV reference documents
Applicable DNV GL and DNV reference documents are listed in Table 3. See Sec.2 [1.2] for applicable editions.

Table 3 DNV GL and DNV reference documents

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNVGL-OS-A101</td>
<td>Safety principles and arrangement</td>
</tr>
<tr>
<td>DNVGL-OS-B101</td>
<td>Metallic materials</td>
</tr>
<tr>
<td>DNVGL-OS-C101</td>
<td>Design of offshore steel structures, general - LRFD method</td>
</tr>
<tr>
<td>DNVGL-OS-C102</td>
<td>Structural design of offshore ships</td>
</tr>
<tr>
<td>DNVGL-OS-C103</td>
<td>Structural design of column stabilised units - LRFD method</td>
</tr>
<tr>
<td>DNVGL-OS-C104</td>
<td>Structural design of self-elevating units - LRFD method</td>
</tr>
<tr>
<td>DNVGL-OS-C201</td>
<td>Structural design of offshore units - WSD method</td>
</tr>
<tr>
<td>DNVGL-OS-C301</td>
<td>Stability and watertight integrity</td>
</tr>
<tr>
<td>DNVGL-OS-C401</td>
<td>Fabrication and testing of offshore structures</td>
</tr>
<tr>
<td>DNVGL-OS-D101</td>
<td>Marine and machinery systems and equipment</td>
</tr>
<tr>
<td>DNVGL-OS-D201</td>
<td>Electrical installations</td>
</tr>
<tr>
<td>DNVGL-OS-D202</td>
<td>Automation, safety, and telecommunication systems</td>
</tr>
<tr>
<td>DNVGL-OS-D301</td>
<td>Fire protection</td>
</tr>
<tr>
<td>DNVGL-OS-E101</td>
<td>Drilling plant</td>
</tr>
<tr>
<td>DNVGL-OS-E201</td>
<td>Oil and gas processing systems</td>
</tr>
<tr>
<td>DNVGL-OS-E301</td>
<td>Position mooring</td>
</tr>
<tr>
<td>DNVGL-OS-E401</td>
<td>Helicopter decks</td>
</tr>
<tr>
<td>DNVGL-CG-0168</td>
<td>Plan approval documentation types – definitions</td>
</tr>
<tr>
<td>DNVGL-CG-0172</td>
<td>Allowable Thickness Diminution for Hull Structure</td>
</tr>
<tr>
<td>DNV Standard for Certification No. 2.22</td>
<td>Lifting Appliances</td>
</tr>
<tr>
<td>DNV Rules for ships</td>
<td>DNV Rules for Classification of Ships</td>
</tr>
</tbody>
</table>

3.3 Other references
Other normative references are given in Table 4. See Sec.2 [1.2] for applicable editions.

Table 4 Non-DNV normative references

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IACS</td>
<td>Shipbuilding and Repair Quality Standard, see <a href="http://www.iacs.org.uk">www.iacs.org.uk</a></td>
</tr>
</tbody>
</table>
4 Informative references

4.1 DNV GL and DNV informative references

The publications listed in Table 5 are referenced in the text of this document, and may be used as a source of supplementary services and information. See Sec.2 [1.2] for applicable editions.

Table 5 DNV informative references

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNVGL-RU-OU-0101</td>
<td>Offshore drilling and support units</td>
</tr>
<tr>
<td>DNVGL-RU-OU-0103</td>
<td>Floating LNG/ LPG production, storage and loading units</td>
</tr>
<tr>
<td>DNVGL-RU-OU-0104</td>
<td>Self-elevating units</td>
</tr>
<tr>
<td>DNVGL-SI-0166</td>
<td>Verification for Compliance with Norwegian Shelf Regulations</td>
</tr>
<tr>
<td>DNVGL-SI-0167</td>
<td>Verification for Compliance with UK Shelf Regulations</td>
</tr>
<tr>
<td>DNVGL-SI-0003</td>
<td>Verification for Compliance with US Coastal Shelf Regulations</td>
</tr>
<tr>
<td>DNV Classification Note 30.7</td>
<td>Fatigue Assessment of Ship Structures</td>
</tr>
<tr>
<td>DNV Standard for Certification No. 1.2</td>
<td>Type Approval</td>
</tr>
</tbody>
</table>

4.2 Other references

Other references are given in Table 6. See Sec.2 [1.2] for applicable editions.

Table 6 Other references

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>API RP 8B</td>
<td>Inspection, maintenance, repair, and re-manufacture of hoisting equipment</td>
</tr>
<tr>
<td>BS 5430-1</td>
<td>Periodic inspection, testing and maintenance of transportable gas containers (excluding dissolved acetylene containers). Specification for seamless steel containers of water capacity 0.5 litres and above</td>
</tr>
<tr>
<td>ISO 3166</td>
<td>Codes for the representation of names of countries and their subdivisions</td>
</tr>
<tr>
<td>ISO 4309</td>
<td>Cranes - Wire ropes - Care, maintenance, installation, examination and discard</td>
</tr>
<tr>
<td>ISO 9001</td>
<td>Quality management systems - Requirements</td>
</tr>
<tr>
<td>ISO 17359</td>
<td>Condition monitoring and diagnostics of machines - General guidelines</td>
</tr>
<tr>
<td>PD 5500</td>
<td>Specification for unfired fusion welded pressure vessels</td>
</tr>
</tbody>
</table>

5 Abbreviations

The abbreviations given in Table 7 are used in this standard.

Table 7 Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>In full</th>
</tr>
</thead>
<tbody>
<tr>
<td>API</td>
<td>American Petroleum Institute</td>
</tr>
<tr>
<td>BS</td>
<td>British Standard (issued by British Standard Institution)</td>
</tr>
<tr>
<td>CG</td>
<td>class guideline</td>
</tr>
<tr>
<td>DFF</td>
<td>design fatigue factors</td>
</tr>
<tr>
<td>DP</td>
<td>design pressure</td>
</tr>
<tr>
<td>DP</td>
<td>dynamic positioning</td>
</tr>
<tr>
<td>EDP</td>
<td>emergency disconnect package</td>
</tr>
<tr>
<td>ESD</td>
<td>emergency shut down</td>
</tr>
<tr>
<td>FMECA</td>
<td>failure mode effect and consequence analysis</td>
</tr>
<tr>
<td>FUI</td>
<td>fatigue utilisation index</td>
</tr>
<tr>
<td>HP</td>
<td>high pressure</td>
</tr>
<tr>
<td>IACS</td>
<td>The International Association of Classification Societies Unified rules, interpretations, guidelines and recommendations may be found on <a href="http://www.iacs.org.uk">www.iacs.org.uk</a>.</td>
</tr>
</tbody>
</table>
Table 7 Abbreviations (Continued)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>In full</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC</td>
<td>inspection category</td>
</tr>
<tr>
<td>IIP</td>
<td>in service inspection program</td>
</tr>
<tr>
<td>IMO</td>
<td>The International Maritime Organization</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organisation for Standardisation</td>
</tr>
<tr>
<td>LRFD</td>
<td>load and resistance factor design</td>
</tr>
<tr>
<td>LRP</td>
<td>lower riser package</td>
</tr>
<tr>
<td>MPI</td>
<td>magnetic particle inspection</td>
</tr>
<tr>
<td>NDT</td>
<td>non-destructive testing</td>
</tr>
<tr>
<td>OEM</td>
<td>original equipment manufacturer</td>
</tr>
<tr>
<td>OS</td>
<td>offshore standard</td>
</tr>
<tr>
<td>RBI</td>
<td>risk based inspection</td>
</tr>
<tr>
<td>RCM</td>
<td>reliability centred maintenance</td>
</tr>
<tr>
<td>RP</td>
<td>recommended practice</td>
</tr>
<tr>
<td>SCF</td>
<td>stress concentration factor</td>
</tr>
<tr>
<td>SWL</td>
<td>safe working load</td>
</tr>
<tr>
<td>UT</td>
<td>ultrasonic testing</td>
</tr>
<tr>
<td>WSD</td>
<td>working stress design</td>
</tr>
</tbody>
</table>
SECTION 2 CLASSIFICATION PRINCIPLES

1 The classification concept

1.1 Introduction

1.1.1 Classification provides assurance that a set of requirements laid down in rules established by DNV GL are met during design and construction, and maintained during operation of a vessel. Classification has gained worldwide recognition as representing an adequate level of safety and quality.

1.1.2 Classification implies an activity, in which a vessel is surveyed during construction on the basis of design approval, tested before being taken into service, and surveyed regularly during its whole operational life. The aim is to verify that the required safety standard is built in, observed and maintained.

1.1.3 Having assigned class, DNV GL will issue a classification certificate and enter the main particulars and details of class in the "Register of vessels classed with DNV GL".

1.2 Applicable rules

1.2.1 Rules and amendments accepted by the appropriate approval body will come into force when decided by the appropriate approval body. Unless stated otherwise, the coming into force date shall be six (6) months after the date of publication. Unless stated otherwise, the coming into force date for documents referenced by this OSS as technical basis for classification shall be six (6) months after the date of publication.

1.2.2 The applicable rules for assignment of class to a new vessel are those in force at the date (as given to the Society by the customer) when the contract between the owner and the builder is signed. Subsequent amendments not made mandatory according to [1.2.4] may be applied to objects under construction provided both builder and owner agree to such application.

1.2.3 In exceptional cases, where unacceptable service experience and/or theoretical findings clearly show that safety hazards may arise in connection with items covered by the existing rules, DNV GL may lay down supplementary requirements to maintain the overall safety standard reflected by the rules.

1.2.4 DNV GL will consider alternatives found to represent an overall safety standard equivalent to that of the rules. The alternative solution shall be adequately documented and will be reviewed for acceptance on the basis of relevant references set forth by DNV GL. Approval may be revoked if subsequent information indicates that the chosen alternative is not satisfactory. In cases where detailed requirements are not given in the rules, specific solutions or decisions approved by DNV GL and its surveyors shall be based on the principles of the rules, and shall give a safety standard equivalent to that of the rules.

1.2.5 The approval as required in [1.2.4] shall be based on an agreed scheme of analysis that is separately worked out and approved.

Guidance note:
For new technology, Recommended Practice DNV-RP-A203 can be a suitable basis for such scheme.

1.2.6 Upon request by the customer, DNV GL may consider the use of other recognised codes and standards as part of the basis for classification. Such agreed alternative arrangements shall be specified in the class agreement.

1.2.7 The Society may propose an approach to resolve the issue if detailed requirements are not given in the rules.

1.2.8 Exceptionally, if for some reason, it is impossible to comply with a rule requirement or to find a fully equivalent solution, then other solutions may be accepted by DNV GL provided the parties to the
classification contract all agree, and always provided that overall safety level is not jeopardised. The alternative solution shall be adequately documented and will be reviewed for acceptance on the basis of relevant references set forth by DNV GL. The solution shall be recorded in the "Appendix to the Classification Certificate".

1.2.9 In accordance with [1.2.4], DNV GL may consider the use of reliability methods as a means of documenting compliance to class requirements.

1.2.10 The Society reserves the exclusive right to interpret, decide equivalence or make exemptions to the rules.

1.2.11 The rules are an integral part of the Society’s classification service. The safety objectives inherent in the rules are achieved in conjunction with this service. Using the rules without the corresponding classification services may have the result that safety objectives are not met.

1.2.12 Periodical survey regulations for retaining class shall be according to the rules in force at the time of survey (given in Ch.3).

1.3 Basis for assignment of class

1.3.1 Having assigned a specific class implies that DNV GL:
— has been satisfied that the object meets the rule requirements for the particular class
— will verify, through a system of surveys, that the requirements stipulated for retention of class are complied with.

1.3.2 Prior to assigning class to an existing offshore object, it is in general to undergo all periodical surveys pertaining to the age and type of object.

1.3.3 When assigning class to a vessel which has not been built under supervision of DNV GL, but by another recognised classification society, DNV GL may on the basis of an overall safety consideration in connection with a design review and survey, give exemptions from rule requirements.

1.3.4 When assigning class to vessels of a series under construction to the classification of, or a design previously accepted by, a recognised classification society, DNV GL may on the basis of an overall safety consideration in connection with a design review give exemptions from DNV GL rule requirements, and base the survey on the design approval done by the other recognised society. A note to this effect may be included in the Appendix to the classification certificate.

1.3.5 When assigning class to a vessel registered in a flag state that undertakes approval and surveys of items covered by the rules, DNV GL may accept their decisions as basis of assigning class.

1.3.6 DNV GL may also accept decisions by the national authority with jurisdiction over the waters in which the vessel or installation is to operate (shelf state) as basis for assigning class.

1.3.7 When other recognised codes or standards is used as basis for assignment of class, an overall comparison with DNV GL rules shall be carried out to ensure that all aspects of safety are covered by a defined code or standard.

1.4 Basis for maintenance of class

The requirements for retention of class are found in Sec.4 [2]. In addition, classification is based on the following:

Valid statutory certificates

For flagged vessels and installations the statutory certificates of the applicable international conventions shall be valid at all times, and the surveys prescribed in the conventions shall be carried out within the time windows prescribed.

Maintenance of the vessel or installation and its equipment

It is assumed that the vessel, machinery installations and equipment are maintained at a standard complying with the requirements of the rules.
Installed systems or equipment carried on board in excess of the rule requirements, but otherwise covered by the rules, shall either be maintained in accordance with the rules, or be removed or disconnected in such a way as to ensure that the installed system or equipment cannot be used.

Handling of the vessel or installation

It is assumed that the vessel, machinery installations and equipment are adequately manned and competently handled. Class conditions regarding the use of the vessel shall be observed.

Recording of lightweight and centre of gravity

The data for lightweight and centre of gravity (C.o.G.) shall be continuously recorded and adjusted by the master for any items taken onboard or ashore during operation.

1.5 Documentation

1.5.1 All information that may influence the judgement, decisions and requirements of DNV GL for the purpose of classification, shall be made available to DNV GL. It is the customer’s responsibility to document or demonstrate compliance with the Society's rules. Information may be made available by submitting documents to the Society or by permitting surveys performed by the Society at the customer's premises, onboard the vessel or at the premises of the customer's sub-contractors.

1.5.2 The documentation forming the basis for classification is, at all times, to reflect the true conditions. Revisions of documents are therefore to be submitted to DNV GL to the extent such revisions may influence decisions and requirements relating to class.

1.5.3 The submitted documentation shall use SI-units (International System of Units) unless otherwise agreed.

1.6 Disclosure of information

1.6.1 DNV GL will not disclose any information received or reports made in connection with classification to any other than those entitled thereto or those having been given the right to receive information by legislation, court decision or by written permission by the owner.

Guidance note:

Table 4 indicates which parties will be entitled to various kinds of information.

---e-n-d---o-f---g-u-i-d-a-n-c-e---n-o-t-e---

1.6.2 DNV GL will not disclose information that can be considered as the property of another party except when this party's permission is given in writing.

1.6.3 Internal communication, notes, calculations etc. produced within DNV GL in connection with classification will not be disclosed to other parties.

1.6.4 Notwithstanding [1.6.1] to [1.6.3], the following parties will have access to such information:

— authorised representatives of the flag administration
— authorised audit teams performing audits in connection with certification of the Society.

1.6.5 Notwithstanding [1.6.1] to [1.6.3], the Society may disclose information requested by a court order, governmental body (including regional bodies) or other public investigation bodies that are authorised by a decree.

1.6.6 Information recorded in the Society's "Register of Vessels", will be published and/or released to any interested party.

1.6.7 The Society may at its discretion release to other classification societies information concerning relevant technical information on serious hull structural, ship machinery and system failures for the purpose of improving ship safety and protection of the marine environment. The owners will be informed accordingly.
Table 1 Disclosure of information

<table>
<thead>
<tr>
<th>Information in question</th>
<th>Owner</th>
<th>Flag administration</th>
<th>Port state authority/Coastal state authority</th>
<th>Insurance company *)</th>
<th>Builder or supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Newbuildings:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approved structure related drawings</td>
<td>Yes 1)</td>
<td>Upon request</td>
<td>No</td>
<td>No</td>
<td>Yes 1)</td>
</tr>
<tr>
<td>Approved system and component drawings</td>
<td>Yes 1)</td>
<td>Yes 1)</td>
<td>No</td>
<td>No</td>
<td>Yes 1)</td>
</tr>
<tr>
<td><strong>Vessels in operation:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class and statutory certificates issued by the Society</td>
<td>Yes</td>
<td>Yes</td>
<td>Upon request 3)</td>
<td>Yes 2)</td>
<td>N/A</td>
</tr>
<tr>
<td>Condition on behalf of the flag Administration (CA)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes 2)</td>
<td>N/A</td>
</tr>
<tr>
<td>Text of Conditions of Class (CC)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes 4)</td>
<td>N/A</td>
</tr>
<tr>
<td>Text of Condition on behalf of the flag Administration (CA)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes 4)</td>
<td>N/A</td>
</tr>
<tr>
<td>Survey reports</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes 1)</td>
<td>Yes 2)</td>
<td>N/A</td>
</tr>
<tr>
<td>Memorandum to Owner (MO)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes 1)</td>
<td>Yes 2)</td>
<td>N/A</td>
</tr>
<tr>
<td>Retroactive Requirement (RR)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes 1)</td>
<td>Yes 2)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Other information:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correspondence with Builder or owner</td>
<td>Yes 1)</td>
<td>Yes 1)</td>
<td>No</td>
<td>Yes 1)</td>
<td>Yes 1)</td>
</tr>
</tbody>
</table>

1) When accepted in writing by owner, builder or copyright holder, as applicable
2) When accepted in writing by owner or through special clause in insurance contract
3) Survey reports pertaining to a Port State Control (PSC) rectification survey can be given upon request from the PSC authority
4) Overdue Conditions of Class only
*) Insurance company means P&I Clubs and Hull and Machinery Underwriters
N/A Not applicable. However, certificates with possible related CC and MO will normally be received by the builder upon class assignment.

1.7 Access

1.7.1 For the purpose of verifying compliance with the rules, the customer shall whenever necessary provide the Society’s surveyors with safe access to the vessel and/or to their premises.

The premises and objects to be inspected shall as agreed be cleaned and prepared for inspection.

1.7.2 The customer shall provide flag authorities and authorised audit teams with safe access to the vessel and/or to their premises in order to audit the Society’s compliance with applicable rules, regulations and quality standards.

1.7.3 The Society reserves the right to decline to perform a requested service when inadequate access is provided or the safety of its surveyors may be compromised.

1.8 Calibration of equipment

Measuring and test equipment used by customers, the result of which may form the basis for the surveyor’s decisions, shall have a calibration status to an appropriate accuracy according to the rules or as accepted by the surveyor.
1.9 Service suppliers
Suppliers providing services on behalf of the customer, such as measurements, tests and maintenance of safety systems and equipment, the result of which may form the basis for the surveyor's decisions, shall be approved by the Society, according to criteria established by the Society.

1.10 Limitation of DNV GL's responsibility
The classification service is performed on the basic assumption that other parties involved (building yard, designers, manufacturers, sub-contractors, owners, etc.) fulfill their individual obligations. The classification service is not performed in substitution of other parties' role or obligations. DNV GL Surveyors will not substitute the essential role of Yard or Subcontractors Quality Control / Quality Assurance inspectors/ officers or other relevant personnel. Nothing contained herein or in any certificate, report or document issued in connection with or pursuant to these rules, shall relieve any designer, engineer, builder, manufacturer, yard, seller, supplier, owner, operator or other parties from any obligations or consequences of default whatsoever. In particular, compliance with the rules does not imply acceptance or commissioning of a vessel. This is the exclusive responsibility of the owner.

Any document issued by DNV GL in relation to surveys performed reflects the condition of the vessel at the time of survey. It is the responsibility of the owner to maintain the condition of the vessel as required by the rules between surveys.

2 Appeals

2.1 Decisions taken by the society
The customer may request in writing that a decision made by the Society shall be taken up for reconsideration. The expenses incurred shall be paid by the customer. However, if the earlier decision is revoked, the Society's expenses will be covered by the Society.

3 Statutory certification

3.1 General

3.1.1 The Society undertakes statutory certification on behalf of flag administrations when and to the extent the Society has been authorised to do so by the individual flag administration.

Statutory certification includes inter alia approval, survey and the issuance of statutory certificates. When the Society acts on behalf of a flag administration, the Society follows international statutory instruments, IACS Unified Interpretations and DNV GL Statutory Interpretations, and generally follows guidance issued by IMO in Circulars etc. unless the flag administration has instructed the Society otherwise.

3.1.2 It is assumed by the Society that required statutory surveys for vessels classed by the Society will be carried out by the Society or by officers of the flag administration itself and that statutory certificates will be issued by the Society or by the flag administration with the exceptions mentioned in [3.1.3] to [3.1.6]. The Society assumes the right to withdraw class if statutory certificates are not issued as described in this paragraph.

3.1.3 The Society may accept that Safety Management Certificates (ISM Code) are issued by a third party that has been authorised by the flag administration and complies with IMO Resolution A.739(18) and A.789(19).

3.1.4 The Society may accept that International Ship Security Certificates (ISPS Code) are issued by a third party that has been authorised by the flag administration and complies with MSC/Circ.1074.

3.1.5 The Society may accept that Cargo Ship Safety Radio Certificates (SOLAS) are issued by a third party that has been authorised by the flag administration.

3.1.6 For a dually classed vessel, where the Society has not been authorised by the flag administration to issue statutory certificates, the Society may accept that such certificates are issued by the dual class society provided the other class society is authorised by the flag administration.
3.2 Service suppliers
Where surveyors use the services of service suppliers in making decisions affecting statutory requirements, the suppliers shall be approved by either:

— the relevant flag administration
— duly authorised organisations acting on behalf of the flag administration
— an equipment supplier when explicitly described by IMO conventions, resolutions or circulars, or
— the Society.
SECTION 3 CLASSIFICATION SCOPE AND NOTATIONS

1 Scope of classification

1.1 General
The rules and referred standards define acceptance criteria for design, construction, survey and testing of vessels, their marine and machinery installations, systems and equipment, applicable to the newbuilding and operational phase.

1.2 Rule parts
1.2.1 These Rules state terms and procedures for assigning and maintaining class for oil production and/or storage units, as well as listing the applicable technical reference documents stipulating technical requirements for classification. These may be DNV GL offshore standards, other DNV GL standards and internationally recognised codes.

1.2.2 Ad hoc combination of codes or standards, different as described in the rules, should only be made after proper consideration of the compatibility of the documents, and only where safety and sound engineering practice can be justified. Such selective (piecemeal) application of a code or standard shall be verified.

1.3 Rule particulars
The rules with reference standards give requirements in the following areas:

<table>
<thead>
<tr>
<th>Hull and main structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>— strength</td>
</tr>
<tr>
<td>— materials and welding</td>
</tr>
<tr>
<td>— corrosion protection</td>
</tr>
<tr>
<td>— constructional fire protection</td>
</tr>
<tr>
<td>— weathertight and watertight integrity</td>
</tr>
<tr>
<td>— stability and floatability</td>
</tr>
<tr>
<td>— tank arrangement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marine and machinery installations and equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery installations and equipment, including their related auxiliary functions, with respect to strength and performance as applicable to the following main functions:</td>
</tr>
<tr>
<td>— power generation</td>
</tr>
<tr>
<td>— position keeping</td>
</tr>
<tr>
<td>— propulsion (as applicable)</td>
</tr>
<tr>
<td>— steering (if applicable)</td>
</tr>
<tr>
<td>— fire and flammable gas detection, fire protection and extinguishing</td>
</tr>
<tr>
<td>— drainage and bilge pumping</td>
</tr>
<tr>
<td>— ballasting</td>
</tr>
<tr>
<td>— emergency shutdown systems (as applicable).</td>
</tr>
<tr>
<td>Other machinery installations, regardless of their contribution to the main functions stated above, when located in enclosed hull compartments below the damage water line.</td>
</tr>
<tr>
<td>Other installations stated in the rules.</td>
</tr>
</tbody>
</table>

2 Class notations

2.1 General
Classed units will be given a class designation consisting of:

— construction symbol
— main character of class
2.2 Construction symbols

2.2.1 The symbol \( \text{\textbullet} \) will be given to units built under the supervision of DNV GL.

2.2.2 The symbol \( \text{\textbullet} \) will be given to units built under the supervision of a recognised classification society and later assigned class with DNV GL.

2.3 Main character of class

2.3.1 The notation 1A will be given to units with hull and marine machinery and equipment found to be in compliance with the basic (common) requirements of the applicable DNV GL offshore standards referred to in the rules.

2.3.2 The notation OI will be given to non self-propelled offshore installations intended for long term service at one offshore location with main structure, utility and safety systems found to be in compliance with the basic (common) requirements of the applicable DNV GL offshore standards referred to in the rules.

2.3.3 For OI main class there may be cases where the customer wishes to limit the scope of classification to selected areas and items only. Such special class arrangements may be acceptable provided it can be demonstrated that areas and items not covered by classification have, or will be, designed, constructed and maintained to an appropriate recognised standard. The involvement by DNV GL will be specified in the class agreement and reflected in the class notations for the installation.

2.4 Structural design notations

2.4.1 The structural design notation indicates the type of structural design. The notations currently in use are given in Table 1.

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column-stabilised</td>
<td>A structure dependent on the buoyancy of widely spaced columns for floatation and stability in all modes of operation.</td>
<td>Ch. 2 Sec. 1 and Ch. 2 Sec. 2</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>Deep Draught</td>
<td>A floating structure having a relatively deep draught to obtain high heave eigenperiod avoiding resonance responses. The structure can have single or multi-vertical columns, with or without moonpools.</td>
<td>Ch. 2 Sec. 1 and Ch. 2 Sec. 2</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>Self-elevating</td>
<td>A structure with hull of sufficient buoyancy for safe transport which is raised above sea surface on legs supported by the seabed during operation.</td>
<td>Ch. 2 Sec. 1</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>Ship-shaped</td>
<td>Monohull ship and barge structures having displacement hulls with or without propulsion machinery.</td>
<td>Ch. 2 Sec. 1</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>Cylindrical</td>
<td>A cylindrical shaped displacement hull with or without propulsion machinery.</td>
<td>Ch. 2 Sec. 1</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>Tension Leg</td>
<td>A buoyant structure connected to a fixed foundation by pretensioned tendons.</td>
<td>Ch. 2 Sec. 2</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>Mobile Offshore</td>
<td>A structure not properly characterised by the above notations.</td>
<td>Ch. 2 Sec. 1</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>Floating Offshore</td>
<td>A structure not properly characterised by the above notations.</td>
<td>Ch. 2 Sec. 2</td>
<td>Ch. 3</td>
</tr>
</tbody>
</table>

2.5 Service notations

2.5.1 Units constructed according to DNV GL rules for offshore classification, arranged for a particular service and found to be in accordance with the relevant requirements for such service, will be given a corresponding service notation.
2.5.2 Service notations currently in use are defined in Table 2.

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oil Production</strong></td>
<td>Vessel purpose production of oil</td>
<td>Installation</td>
<td>Permanently placed installation</td>
<td>Ch.2 Sec.3</td>
<td>Ch.3 Sec.5 [2]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit</td>
<td>Mobile offshore unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oil Storage</strong></td>
<td>Vessel purpose storage of oil</td>
<td>Installation</td>
<td>Permanently placed installation</td>
<td>Ch.2 Sec.4</td>
<td>Ch.3 Sec.5 [2]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit</td>
<td>Mobile offshore unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oil Loading</strong></td>
<td>Vessel purpose loading or unloading of oil</td>
<td>Installation</td>
<td>Permanently placed installation</td>
<td>Ch.2 Sec.4</td>
<td>Ch.3 Sec.5 [3]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit</td>
<td>Mobile offshore unit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.5.3 The service notations in Table 2 shall be considered mandatory for the relevant types of units.

2.5.4 Classification services related to LNG/LPG production and storage are presented in DNVGL OU-0103.

2.5.5 Units intended for both drilling and production service (FDPSO) shall comply with the requirements for production units in these Rules and for drilling units in DNV GL’s Rules for Drilling Units (DNVGL OU-0101). In case of conflicting requirements, the most stringent requirement will prevail.

2.6 Optional class notations related to special equipment and systems

2.6.1 Units having special equipment or systems found to satisfy specified class requirements will be given a corresponding additional class notation. Notations currently in use are given in Table 3.

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bow Loading</strong></td>
<td></td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>BWM</strong></td>
<td>Ballast Water Management</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>CLEAN/ CLEAN DESIGN</strong></td>
<td>Arrangements for controlling and limiting operational emissions and discharges</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>COMF</strong></td>
<td>Comfort class</td>
<td>Ch.2 Sec.6</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>CRANE</strong></td>
<td>Onboard crane</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>DPS</strong></td>
<td>Dynamic positioning system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>DYNPOS</strong></td>
<td>Dynamic positioning system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>E0</strong></td>
<td>Periodically unattended machinery space</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>ECO</strong></td>
<td>Machinery centralised operated</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>ESV</strong></td>
<td>Enhanced System Verification</td>
<td>Ch.2 Sec.6</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Additional fire protection</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>FMS</strong></td>
<td>Fatigue methodology for ship-shaped units</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>HELDK</strong></td>
<td>Helicopter deck</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>HMN</strong></td>
<td>Hull Monitoring System</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>ISDS</strong></td>
<td>Integrated Software Dependent System</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>LCS</strong></td>
<td>Loading computer system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>OPP-F</strong></td>
<td>Oil pollution prevention - fuel systems</td>
<td>Ch.2 Sec.6</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>OFFLOADING</strong></td>
<td>Crude Offloading system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>POSMOOR</strong></td>
<td>Position mooring system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>PROD</strong></td>
<td>Hydrocarbon production plant</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td><strong>Recyclable</strong></td>
<td>Inventory of Hazardous Materials Part 1</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
</tbody>
</table>
2.7 Optional class notations related to cold climate operation

2.7.1 Units designed or strengthened for operation within particular geographical or environmental areas found to be in accordance with relevant class rule requirements may be assigned a corresponding optional class notation.

2.7.2 Optional class notations related to cold climate service are given in Table 4.

2.7.3 Further details on notation qualifiers and application for different vessel types is given in Ch.2 Sec.6 [17].

Table 4 Class notations related to cold climate

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAT</td>
<td>Design ambient air temperature for material selection suitable for regular service during winter to Arctic or Antarctic waters</td>
<td>Ch.2 Sec.6 [17]</td>
<td>NA</td>
</tr>
<tr>
<td>ICE</td>
<td>Structural strength for navigation in ice</td>
<td>Ch.2 Sec.6 [17]</td>
<td>N/A</td>
</tr>
<tr>
<td>PC</td>
<td>Polar Class – structural strength for navigation in ice-infested polar waters</td>
<td>Ch.2 Sec.6 [17]</td>
<td>NA</td>
</tr>
<tr>
<td>WINTERIZED</td>
<td>Systems designed for operation in cold climate</td>
<td>Ch.2 Sec.6 [17]</td>
<td>Ch.3 Sec.6 [14]</td>
</tr>
</tbody>
</table>

2.8 Special feature notations

2.8.1 Special feature notations provide information regarding special design assumptions, arrangements or equipment which is not covered by other class notations.

2.8.2 Special feature notations currently in use are listed in Table 5.

Table 5 Class notations related to special features

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIS</td>
<td>Built for in-water survey</td>
<td>Ch.2 Sec.6 [21]</td>
<td>NA</td>
</tr>
<tr>
<td>INERT</td>
<td>Inert gas system</td>
<td>DNV Rules for ships Pt.5 Ch.3 Sec.11</td>
<td>NA</td>
</tr>
<tr>
<td>NON SELF-PROPELLED</td>
<td>Towing assistance will be required during transit</td>
<td>Ch.2 Sec.6 [21]</td>
<td>Ch.3 Sec.6 [17]</td>
</tr>
<tr>
<td>SELF-PROPELLED</td>
<td>Units with propulsion (applicable for self-elevating units only)</td>
<td>Ch.2 Sec.6 [21]</td>
<td>Ch.3 Sec.6 [17]</td>
</tr>
<tr>
<td>TMON</td>
<td>Tailshaft monitoring</td>
<td>Ch.2 Sec.6 [21]</td>
<td>Ch.3 Sec.6 [17]</td>
</tr>
</tbody>
</table>

2.8.3 Self-elevating units are considered to be non self-propelled unless specified with the special feature notation SELF-PROPELLED.

2.9 Notations related to restrictions

2.9.1 Limitations of scope

When, under [2.3.3], the customer for an OI classed installation wishes to limit the scope of classification to selected areas and items only, the parts of the installation which are covered by classification will be indicated in the classification certificate. The purpose of the notation Limitation of Class is to indicate such limitations, if applicable.
Example:

Structure: Classification is limited to cover main structure.

2.9.2 Service restrictions
Service restrictions or operational limits included in the design assumptions of a unit will be stated in the “Appendix to the classification certificate”, and/or on special signboards onboard.

2.9.3 Service restrictions and deviations from the rule requirements shall be addressed in a memo for owners (MO) informing them about the assumption for the class notation if the unit shall be operated outside the geographical areas or other boundaries agreed in the classification contract.

2.10 Area specific notations

2.10.1 Field specific design
Units designed for one specific location will be given the notation FIELD (….. ). The specific field is to be given in brackets. The notation is a confirmation that the design parameters for the environmental loads, used during design approval of the hull structure, are equal or above the actual values for the specified field of operation given in brackets.

Guidance note:
The notation is equally applicable to new builds and conversions.
Transits to the field should take into account the limitations of the applied design environmental loads.

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2.10.2 Compliance with coastal state legislation
When DNV GL is requested to carry out verification in accordance with coastal state regulations for the complete unit or parts of the unit, an additional notation may be assigned to the relevant class designations, consisting of the relevant coastal state code and the issue of coastal state regulations used as basis for verification in brackets, e.g.:

PROD(N).

2.10.3 Coastal state code notations currently in use, are listed in Table 6.

Table 6 Notations for coastal state verification

<table>
<thead>
<tr>
<th>Notation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Unit or Installation(N)</td>
<td>Verified for compliance with DNV GL's interpretation of relevant Norwegian shelf state requirements nce with DNV GL's interpretation of relevant Norwegian coastal state requirements.</td>
</tr>
<tr>
<td>Storage Unit or Installation(N)</td>
<td>Verified for compliance to US Coast Guard requirements for Gulf Of Mexico Outer Conentinantal Shelf</td>
</tr>
<tr>
<td>PROD(N)</td>
<td></td>
</tr>
<tr>
<td>Production Unit or Installation(US)</td>
<td>Verified for compliance with DNV GL’s interpretation of relevant UK coastal state requirements.</td>
</tr>
<tr>
<td>Storage Unit or Installation(US)</td>
<td></td>
</tr>
<tr>
<td>UKVS</td>
<td></td>
</tr>
</tbody>
</table>

2.10.4 For further information on procedures and scope of verification for coastal state requirements, see DNV GL Statutory Interpretations for coastal state compliance services listed in Table 5.

2.11 Combination of notations

2.11.1 Class notations shall be combined as follows:

* 1A < limitation of class, if any> <basic design notation> <service notation> <special equipment and systems notations> <special feature notations>

Example:

* 1A Column-stabilised Production Unit.

2.11.2 Ship-shaped units may also be assigned relevant class notations given in the DNV Rules for ships.
SECTION 4 ASSIGNMENT OF CLASS

1 Assignment of class - new vessels

1.1 General
A request for classification of a new vessel shall be submitted in writing by the customer. The Society reserves the right to decline a request for classification.

1.2 Requirements for builder or designer

1.2.1 Builders or designers unfamiliar to the Society shall provide the Society with evidence of their capability to successfully manage classification projects.

Guidance note:
Evidence may incorporate successful outcome of classification projects carried out for another IACS member society or successful outcome of design projects of similar nature.

1.2.2 Builders or designers shall instruct their subcontractors and suppliers of materials, components and systems that the Society’s rules apply and that the Society’s certificates shall be provided as and when required by the rules.

1.2.3 Welding of important structures, machinery installations and equipment shall be carried out by approved welders, with approved welding consumables and at welding shops approved by the Society. Requirements for approval of welding shops, welders, manufacturers of welding consumables, welding consumables and welding procedures are given in DNVGL-OS-C401 and by a series of detailed approval programmes.

1.2.4 The following documentation from the builder or designer (workshop and yard) and from subcontractors shall be submitted when requested by the Society:

— information related to the builder’s or designer’s quality control and quality management system
— information related to the builder’s procedures for managing materials that are excluded from use on board by class and/ or statutory requirements
— list of relevant subcontractors to the building yard
— list of relevant subcontractors to the manufacturer of systems and components to be delivered for the product, if applicable.

1.2.5 To assess compliance with the rules the Society may require additional documentation and carry out an assessment of yard’s processes, systems and personnel related to classification projects. The results of the assessment should be used as a basis to decide on the extent of the involvement of surveyors of the Society. The extent of verification should be clearly reflected in the Quality Survey Plan (QSP).

Guidance note:
A generic version of Quality Survey Plan (QSP) issued by the Society can be used as a model to develop an appropriate Quality Survey Plan for specific classification projects that should be submitted to the Society for approval before commencing activities in the project.

1.2.6 Calculations specified in the requirements shall be carried out by computer programs supplied by, or recognised by the Society. Programs applied where reliable results have been demonstrated to the satisfaction of the Society are regarded as recognised programs. Generally valid approvals for computer programs are, however, not given by the Society.

1.3 Applicable rules

1.3.1 The rules that apply for assignment of class to a new vessel are generally those in force at the date of “contract for construction”.

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The term *date of “contract for construction”* shall be construed as follows:

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 owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2) The date of “contract for construction” of a series of 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 owner and the shipbuilder. Vessels built under a single contract for construction are considered a “series of vessels” if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

   a) such alterations do not affect matters related to classification, or
   b) if the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

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 owner and the shipbuilder. The amendment to the contract is to be considered as a “new contract” to which 1 and 2 above apply.

4) If a contract for construction is amended to change the ship type, the date of “contract for construction” of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

(see IACS PR 29 Rev.4)

The Society may upon consideration and in agreement with the parties involved decide on the rules to be applied.

1.3.2 For a vessel in a series of identical vessels under construction to the class of, or of a design previously approved by another IACS member society, the Society may accept the design approved by that IACS member society provided a review by the Society has demonstrated that the design in principle meets the safety and reliability level of the Society’s rule requirements for main class.

1.3.3 Where requirements from international maritime conventions have been adopted in the Society’s rules, compliance with these requirements is mandatory.

1.3.4 For a vessel where the flag administration undertakes approval and surveys of items covered by the rules, the Society may accept their decisions as basis for assigning class, provided the Society’s requirements for main class are complied with. Necessary documentation, such as copies of approved plans, reports and other particulars approved by the flag administration shall be submitted.

1.3.5 Deviations from the rule requirements will not be accepted for:

   — requirements for structural strength, intact stability, machinery installations, steering appliances and electrical systems and equipment covered by main class
   — optional class notations.

1.3.6 For a vessel intended to be permanently moored on location for production and/or storage of hydrocarbons, the Society may accept decisions by the national administration with jurisdiction over the waters in which the vessel shall operate (the coastal or shelf state) as basis for assigning class.

1.3.7 When class is assigned on the basis of a design approved by another IACS member society, the flag administration or according to flag administration requirements or decisions by national authorities...
according to [1.3.4], [1.3.5] or [1.3.6], information to this effect shall be included in the “Appendix to the Class Certificate” (see [3.1.6]).

In case of class being assigned on the basis of flag administration requirements according to [3.1.6] an Memorandum to Owner shall also be issued (see [2.3.7]).

1.4 Plan approval

1.4.1 Documentation for classification shall be in accordance with the Nauticus Production System (NPS) DocReq. The DocReq is a compilation of all DNV GL’s documentation requirements related to plan approval. The purpose of the DocReq is to provide a basis to verify that selected, safety critical parts of the requirements of the applicable DNV GL rules and standards are complied with in the design of the vessel. A satisfactory document review is a prerequisite for assignment of DNV GL class and issue of statutory certificates. The document review shall be complemented by a review of the customer’s quality system and by surveys by the Society. The documentation requirements are based on standardized documentation types, which are defined in DNVGL-CG-0168.

1.4.2 Where subcontractors and suppliers are involved, the customer shall co-ordinate the submission of required plans and documents, as well as co-ordinate any approval comments given by the Society.

1.4.3 Documents subject to approval will be examined by the Society. The results of the examination will be stated in a letter of approval. Comments, conditions and limitations may be stated on the plans returned or in an accompanying letter.

1.4.4 The plan approval may be revoked at any time if subsequent information indicates that the solution was contrary to the Rules.

1.5 Survey during construction

1.5.1 When a vessel is built under the supervision of the Society, the Society will survey:
— that the construction and scantlings comply with the rule requirements and the approved plans, and that the required materials are used,
— that the materials, components and systems have been certified in accordance with the Rules
— that the work is carried out in compliance with the applicable rules and acceptable standards
— that satisfactory tests are carried out to the extent and in the manner prescribed by the Rules.

Guidance note:
IACS Recommendation No. 47 “Shipbuilding and Repair Quality Standard” - Part A: for New Construction - is regarded as an example of an acceptable standard.

1.5.2 The survey carried out at the construction site and/or at the sub-suppliers will be at the discretion of the Society and not intended to replace or substitute the essential activities by yards/manufacturers' QA/QC.

The scope of survey will be decided as specified in [1.2].

The survey at the customer’s premises may consist of a combination of visual inspections, tests, measurements and review of records.

1.5.3 The Society may base its methods and extent of examination on the quality system as implemented in the customer’s fabrication processes and as accepted by the Society and, if applicable, in combination with an agreed manufacturing survey arrangement.

1.5.4 The customer shall submit to the Society certificates for materials, components and systems installed in the vessel and as required by the Rules.

1.6 Installation of systems and equipment

1.6.1 Systems and equipment to be installed on newbuildings, which serves as a part of the main functions, shall in general be new.
Guidance note:
If second hand equipment complies with applicable rules for the newbuilding, it may upon special consideration be installed on newbuildings, provided the owner has given a written acceptance.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

1.6.2 The extent of participation in the mechanical completion activities by the Society should be clearly identified in the Quality Survey Plan (QSP) submitted by the customer and accepted by the Society. The extent of participation shall be limited to ensuring compliance with the requirement of Classification Rules and applicable statutory requirements.

1.7 Testing and commissioning

1.7.1 Where specified by the rules, testing shall be carried out in the presence of a surveyor, and related requirements for test programmes shall be observed.

1.7.2 A test programme for harbour and sea trials shall be prepared by the customer and accepted by the Society. The programme shall specify systems and components to be tested, and the testing procedure. The Society may, in order to verify rule compliance, request additional tests and/or data to be recorded.

1.7.3 Procedures for Pre-commissioning, testing and commissioning for all the systems onboard that are covered by the scope of classification shall be prepared by the customer and accepted by the Society.

1.7.4 The tests shall give evidence as to satisfactory operation and performance in accordance with the rules. When testing control and safety systems, failure modes shall be simulated as realistically as possible.

1.7.5 The extent of participation by the Society should be clearly identified in the Quality Survey Plan (QSP) submitted by the customer and accepted by the Society only to ensure compliance with the requirement of Classification Rules and applicable statutory requirements.

2 Assignment of class - existing vessels

2.1 General
A request for class entry of an existing vessel shall be submitted in writing by the customer. The Society reserves the right to accept or decline an application for class entry.

2.2 Applicable rules
Applicable rules for vessels at class entry are given in Sec.5 [2.1].

2.3 Design approval

2.3.1 Before a vessel, which has not been built under the supervision of the Society, is surveyed for assignment of class, the information required in [1.4.1] shall, in general, be submitted for plan approval. For a vessel classed with another IACS member society, the submitted information may be reduced to plans showing the main scantlings and arrangements of the actual hull and machinery installations.

2.3.2 The extent of plan approval for a vessel, which has been classed, or which was previously classed with a non-IACS member society, will be specified in each case.

2.3.3 For a vessel that has been built under the supervision of another IACS member society, the Society may on the basis of an overall consideration and survey, exempt the vessel from rule requirements.

2.4 Class entry survey

2.4.1 Prior to assigning class to an existing vessel, that vessel shall, as a minimum, undergo the surveys pertaining to the age and type of the vessel. The scope of survey will in each separate case be decided by the Society.

2.4.2 Before assigning class, the flag administration will be notified about the class entry. The flag administration may decide that an extended scope of surveys has to be carried out.
3 The class certificate

3.1 General

3.1.1 When satisfied that all requirements corresponding to the class in question have been met, the surveyor will recommend that class is assigned and issue an interim class certificate or the class certificate.

3.1.2 Class may be assigned with Conditions of Class.

3.1.3 The interim certificate will be replaced by a full term class certificate when the Society has confirmed that applicable requirements have been met.

3.1.4 The class certificate is valid provided conditions for retention of class are complied with, as follows:

— for a new vessel: to a date not exceeding 5 years from the date of class assignment
— for an existing vessel: to a date not exceeding 5 years from the expiry date of the existing certificate
— for an existing vessel taken into class: to a date not exceeding 5 years from the date of class assignment
  or, if the Society accepts the periodical surveys credited by the previous classification society, until the expiry date of the class certificate of the previous classification society
— for an interim class certificate: to a date not exceeding 15 months from assignment of class.

3.1.5 Upon request, declarations confirming compliance with the rules may be issued for hull, machinery or specific class notations provided the Society's main class has been assigned.

3.1.6 An "Appendix to the Class Certificate" will be issued stating assumptions for the assignment of class and restrictions regarding the use of the vessel which were established or assumed at the time of assignment of class.

3.1.7 In case of classification of an existing ship not built under the supervision of the Society, or classification of an existing ship previously classed by the Society, the surveyor will issue the certificate of interim class when he is satisfied that the applicable survey requirements have been met.

3.1.8 When the administration of the Society has examined the surveyor's report and submitted documentation, and is satisfied that the requirements corresponding to the class in question have been met, the class will be assigned and a classification certificate will be issued.

Provided the conditions for retention of class are fulfilled and unless the class has been withdrawn in writing at an earlier stage, the class certificate will be valid for 5 years.

3.2 Late commissioning

If the vessel is not immediately commissioned upon completion of the construction, but is laid up for a period, the vessel may be accepted for entry into service upon application by the owner. The vessel may be subject to a condition survey before entering into service.

The extent and scope of survey will depend on the time period laid up and conservation measures taken.

Provided the hull and machinery is found in all respects free from deterioration, subsequent periodical surveys will date from the time of the condition survey.

4 The register of vessels

4.1 General

4.1.1 When a vessel has been assigned class, its main particulars and details of the class assigned will be entered in the Society’s "Register of Vessels". In addition to the class notations, appropriate data related to identification, flag, ownership and other particulars will also be entered.

4.1.2 The class assignment date is entered in the "Register of Vessels". For vessels built under the supervision of the Society, the due date for the periodical surveys will be calculated from this date. For vessels built under the supervision of another classification society, the due date for the periodical surveys will depend upon the existing periodical survey schedule defined by the previous classification society.
SECTION 5  RETENTION OF CLASS

1  Conditions for retention of class

1.1  General requirements

1.1.1  The vessel shall be adequately manned, and the hull, machinery, systems and equipment shall be competently handled at all times.

1.1.2  Operation of the vessel shall comply with the assumptions and conditions stated in the “Appendix to the Class Certificate” and in applicable operating manuals.

1.1.3  The vessel, its hull structure, machinery, systems and equipment shall be maintained at a standard complying with the requirements of the rules (see also [1.3]).

1.1.4  Installed systems and equipment carried onboard in excess of the minimum required for main class shall either be maintained to applicable standards, or be removed or disconnected in such a way as to ensure that the installed system or equipment cannot be used.

Installed diving systems are subject to special provisions as given in Pt.6 Ch.1 Sec.4 and Pt.7 Ch.1 Sec.6 [9] in the DNV Rules for ships. These provisions include transferable diving systems installed temporarily.

1.1.5  Temporary systems and equipment shall comply with relevant requirements in accordance with the assigned class notations of the unit.

1.1.6  The statutory certificates required by applicable international conventions and/or national legislation shall be valid at all times and shall be issued by the Society, the flag administration itself, or by a third party approved by the flag administration, within the limitations set out in Sec.2 [3].

1.2  The customer’s obligations

1.2.1  In order to retain a vessel’s class with the Society, the customer shall:

— at all times, ensure that the vessel is maintained to the rule standard
— submit complete and correct information related to the vessel and its use, which is of significance to the Society for its assessment of the condition of the vessel in relation to the rules
— ensure that the vessel is competently handled
— subject the ship to unscheduled surveys when deemed necessary by the Society
— rectify deficiencies and carry out any Conditions of Class or Retroactive Requirement specified by the Society
— subject the vessel to surveys as required by the rules, and provide the necessary facilities for safe execution of surveys
— submit complete and correct information on the ownership and management of the vessel, addresses and corresponding administrative information pertinent to the register of vessels
— submit correct information on the registration of the vessel
— keep onboard and ashore a set of as-built drawings/documentation including subsequent alterations/conversions
— pay all fees and expenses due to the Society. The owner has, together with managers, charterers and operators, a joint and several liability for any such fees and expenses. If a request for services is made by any other party than the owner, that party will, in addition to the owner, be responsible for the payment of the relevant fees
— notify the Society when the vessel is laid up or otherwise taken out of service for a period of more than 3 months.

1.2.2  If the hull structure, machinery, systems or equipment covered by classification sustain damage to such an extent that it may be presumed to lead to a Condition of Class (see [2.3]), the Society shall immediately be informed. The vessel shall be surveyed in the first port of call or according to instructions from the Society.
The survey shall be of an extent considered necessary by the attending surveyor for ascertaining the extent of the damage.

1.2.3 In case inspections by port or flag authorities reveal deficiencies related to certificates issued by DNV GL, the customer shall immediately notify the Society.

1.3  Maintenance

1.3.1 The customer shall ensure that the vessel, its hull structure, machinery, systems and equipment at all times is properly maintained.

Guidance note:
Maintenance of the hull structure, machinery, systems and equipment is normally to be in accordance with applicable recognised standards in the industry or in accordance with procedures recommended by the manufacturer.

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1.3.2 The vessel shall have implemented a maintenance system. The maintenance system shall ensure that:

— inspections and maintenance are carried out at defined intervals
— any defect is reported with its possible cause, if known
— appropriate correction or repair action is taken
— records of these activities are maintained.

1.3.3 Replacement components and systems shall be delivered with certificates and documentation as required by the rules for the original component or system.

2  Classification society involvement

2.1  Applicable rules

2.1.1 Vessels built under the supervision of the Society shall in general be maintained and repaired in compliance with the rules to which it was constructed, except in cases mentioned in [2.6.2].

2.1.2 For vessels built under the supervision of another IACS member society, the Society’s rules in force at the same date as those enforced by the other society will be applied. If such date is not known the Society’s rules in force at the “date of build” will be applied.

2.1.3 For vessels other than those covered by [2.1.1] and [2.1.2], the Society’s rules for new vessels in force at the time of entry into class will be applied.

2.1.4 Amendments to the rules may be made retroactive.

2.1.5 In cases where rule amendments are made applicable to existing vessels at the first annual, intermediate or renewal survey after a specified date, or after the vessel reaches a specified age, the expiry date of the related survey time window shall determine when the rule amendments become effective.

2.2  Surveys

2.2.1 The objective of a survey shall be to ascertain that the vessel, its hull structure, machinery, systems and equipment are in compliance with the rules and suitable for continued safe and reliable operation.

2.2.2 A survey may consist of a combination of visual inspections, audits, measurements, functional testing, non-destructive testing and review of maintenance and other relevant records.

2.2.3 The minimum extent of prescribed periodical surveys are given in Ch.3. The Society may increase the extent of a survey when deemed necessary in order to ascertain the condition of the vessel.
2.3 Conditions and memoranda

2.3.1 A Condition of Class (CC) will be imposed for the following:

— repairs and/or renewals related to damage, defect or breakdown that are sufficiently serious to affect Classification (e.g. grounding, structural damages, machinery damages, wastage over the allowable limits etc.)
— supplementary survey requirements
— temporary repairs.

Guidance note:
When the Society has been authorised to carry out a statutory survey, a Condition on behalf of the flag Administration (CA) will be imposed for specific measures, repairs or surveys that should be carried out within a specific time limit in order to retain the statutory certificate.

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2.3.2 The Society will issue a CC when deemed necessary to carry out examinations in order to ascertain whether damage, a defect or a deficiency has been sustained or is imminent.

2.3.3 A CC may contain the following:

— a description of the deficiency, defect, damage or the examination required
— required action
— due date for the required action to be completed
— possible temporary requirements imposed until the required action has been completed.

Alternatively the CC may refer to a survey report for above details.

An approved repair method may be recommended as part of the required action.

2.3.4 If a CC seriously affects the vessel's safety and reliability, immediate action will be required. Otherwise a time limit will be given for the action to be completed.

2.3.5 A CC will be deleted when the Society, through a survey or received information, has been satisfied that requested action has been satisfactory completed.

2.3.6 For information related to the ship, its machinery and equipment or to rule requirements, the Society may issue an Memorandum to Owner (MO). A MO may supplement information given otherwise, e.g. in the Appendix to the class certificate or the Society’s "Register of Vessels".

2.3.7 An MO may be used in the following cases:

— exemptions from rule requirements
— accepted deviations from rule requirements
— limitations on the use of the ship or its equipment
— defects or deficiencies of no concern to class
— deleted class notations
— equipment in excess of class requirements disused
— information related to agreed survey arrangements.

2.3.8 Outstanding findings may be recorded as a CC or an MO. They will be given in writing at completion of surveys. Findings may also be communicated verbally during the course of surveys. Findings that have been corrected before the survey has been completed will not be recorded as CC.

2.3.9 The Society may at any time modify a CC or MO if considered appropriate. The owner will be notified accordingly.

2.3.10 CC or MO are recorded in the vessel's class status from where they will be deleted when no longer valid. The owner will be notified accordingly.

2.3.11 The owner will be informed of Retroactive Requirements (RR).
2.4 Survey reports and survey status

2.4.1 The surveyor will prepare to the customer reports on surveys carried out.

2.4.2 Survey reports may contain the following information, to the extent applicable in each case:

- types of surveys carried out
- certificates issued, endorsed or extended
- damage, defects and/or deficiencies observed
- confirmation that repairs have been completed and accepted by the surveyor
- CC issued or deleted
- MO issued or deleted
- RR issued or deleted.

2.4.3 The Society will make class status reports available to customers on the Society’s Internet website, see Sec.2 [1.6].

2.4.4 Any document issued by the Society in relation to surveys performed reflects the condition of the vessel at the time of the survey only.

2.5 Damage and repairs

2.5.1 Repairs shall in general be carried out in such a way that the original design and scantlings are restored. Possible design modifications or reduced scantlings based on current rules which are less stringent than those originally enforced, shall be approved by the Society before the repairs are carried out.

2.5.2 Repairs to the hull structure, machinery, systems or equipment covered by the rules shall be carried out by qualified personnel and in compliance with applicable rules, with good engineering practice and under the supervision of a surveyor.

Guidance note:
Guidelines for hull repairs can be found in Classification Note No. 72.1.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

2.5.3 Repairs as stipulated in [2.5.2] may be carried out without the attendance of a surveyor (e.g. during voyage) provided a repair plan is accepted by the Society in advance. A surveyor shall be called for acceptance of such repairs when completed.

2.6 Conversions and alterations

2.6.1 Conversions or alterations of vessels shall in general comply with the rules applicable at the time of class assignment. If current rules are less stringent than those originally in force, then the current rules may be applied.

2.6.2 When conversion or alteration involves modification which:

- substantially alters the dimensions or carrying capacity of the vessel (e.g. ≥ 5% change in the unit’s displacement), or
- changes the type of vessel, or
- changes the main class of the vessel,

the Society will decide on the rules to be applied.

2.6.3 If the hull structure, machinery, systems or equipment shall be converted or altered, the changes shall be documented and be approved in the same manner as for new vessels.
Guidance note:
Alterations to the hull structure, machinery, systems and equipment made possible by amendments of the applicable rules may be undertaken provided the general safety and reliability level required for retention of class will be maintained.

---end---of---guidance---note---

2.6.4 Conversion or alterations shall take place under the supervision of a surveyor.

2.7 Temporary equipment

2.7.1 The Society shall be informed before the installation of temporary equipment as defined in Sec.1 [2.2].

2.7.2 Temporary equipment covered by class scope shall be approved and certified in line with [1.1.5].

2.7.3 For temporary equipment outside class scope, it shall be confirmed that placement of this equipment on board does not negatively affect the safety of the unit.

Guidance note:
For the consideration, the following is typically to be considered:
— escape ways shall not been blocked
— the fire and gas system covers the temporary equipment, the equipment is covered by the ESD logic
— the equipment’s load is within deck load limits
— the definition of hazardous areas takes into account the temp. equipment
— the interface to other systems covered by main class does not negatively affect their availability.
— the equipment has proper sea fastening

---end---of---guidance---note---

3 Endorsement and renewal of the class certificate

3.1 Endorsement of the class certificate

3.1.1 The class certificate will be endorsed upon satisfactory completion of annual, intermediate and renewal surveys for main class.

The class certificate will not be endorsed unless the following has been dealt with and accepted by the Society:
— overdue periodical class surveys
— overdue continuous survey items
— overdue Conditions of Class
— overdue Retroactive Requirement.

Guidance note:
In the case where an overdue survey is related to an optional class notation, the class certificate may be endorsed provided the relevant optional class notation is suspended.

---end---of---guidance---note---

3.1.2 When the class certificate is endorsed at completion of renewal surveys, the surveyor may extend its validity as necessary but not more than to a date 5 months after the completion date, or after the expiry date of the class certificate, whichever comes first.

3.1.3 In the case where postponement of the renewal survey has been granted upon the customer’s written request, the surveyor will endorse the class certificate and extend its validity, but not more than 3 months beyond the expiry date of the class certificate.

3.1.4 In the case where the main class annual survey is commenced prior to the defined time window, the survey must be completed not more than 6 months after the date of commencement. In such cases the certificate will be endorsed for advancement of anniversary date (due date) for the subsequent annual surveys.
3.2 Renewal of the class certificate

3.2.1 A new class certificate will replace the existing class certificate when renewal survey has been satisfactory completed and the Society is satisfied that the requirements for retention of class have been met.

3.2.2 The new class certificate will be valid to a date not exceeding 5 years from:

- the expiry date of the existing certificate when the renewal survey has been completed within 3 months before the expiry date of the existing certificate, or
- the expiry date of the existing certificate when the renewal survey has been completed after the expiry date of the existing certificate, or
- the completion date of the renewal survey when the renewal survey has been completed more than 3 months before the expiry date of the existing certificate, or
- the completion date of the renewal survey when the renewal survey has been commenced more than 15 months before the expiry date of the existing certificate.

3.2.3 In cases where postponement of a renewal survey has been granted, the new class certificate will be valid to a date not exceeding 5 years from the expiry date of the existing certificate before the extension was granted.

3.2.4 In cases where the renewal survey is carried out concurrently with a conversion as defined in [2.6.2], the validity of the new certificate will be 5 years from the date of completion of the conversion, if so decided by the Society.

3.2.5 For certain vessels the certificate validity and survey intervals may be reduced by the Society.

4 Suspension and withdrawal of class

4.1 General

4.1.1 Class may be withdrawn at any time if the Society finds it justified.

4.1.2 The Society may suspend or withdraw a vessel's class where the conditions for retention of class, have been violated (see [1]).

4.1.3 The decision to suspend or withdraw a vessel's class is made by the Society. However, in cases of automatic suspension, see [4.2.1] and [4.2.2], no individual evaluation is made.

Suspension or withdrawal of class may take effect immediately or after a specified period of time. In special cases, the suspension or withdrawal of class may be made with retroactive effect (see [4.2.5]).

4.1.4 If the violation only affects requirements related to optional class notations, the suspension or withdrawal may be limited to these class notations only.

4.1.5 When class is suspended or withdrawn the Society will:

- notify the customer in writing
- notify the flag administration
- make an entry to this effect in the Society’s "Register of Vessels"
- make the information publicly available.

In the cases of class suspension, a time limit will be given for when the class will be withdrawn.
4.2 Suspension of class

4.2.1 The class will automatically be suspended with immediate effect if the renewal surveys for hull, machinery, systems and equipment related to main class are not completed before the expiry date of the class certificate, and no postponement has been granted or unless the vessel is under attendance for completion of the survey.

4.2.2 If the annual or intermediate surveys for main class are not completed within 3 months from the anniversary date of the class certificate, the class is automatically suspended with immediate effect, unless the vessel is under attendance for completion of the survey.

4.2.3 The Society may decide to suspend a vessel's class if the vessel is deemed to be unable to continue safe and reliable operation, e.g. as a result of a major casualty.

4.2.4 If any outstanding debt owed to the Society is not paid within a notified date, the Society may suspend the vessel's class with immediate effect.

4.2.5 In addition to the conditions laid down in [4.2.1], [4.2.2] and [4.2.3], a vessel's class may be suspended with immediate effect in cases where:

— repair of deficiencies has not been carried out or otherwise dealt with in an appropriate manner, or
— repair of deficiencies has not been surveyed and accepted by the surveyor,
— other requirements imposed by the Society.

4.2.6 Class will not be automatically suspended according to [4.2.1] or [4.2.2] whilst a vessel is laid up, provided the requirements in Ch. 3 for lay-up surveys are complied with.

4.3 Reinstatement following class suspension

4.3.1 If the overdue surveys leading to class suspension as given in [4.2.1], [4.2.2] and [4.2.3] or requirements as given in [4.2.5] are carried out within the specified time, the class will be reinstated provided the following is met:

a) The result of the survey is such that all observed deficiencies are satisfactory rectified. The Society may after consideration accept that minor deficiencies are pending to be carried out.

b) No overdue periodical surveys or overdue Conditions of Class at that time.

4.3.2 The Society reserves the right to decline an application for reinstatement of class.

4.3.3 When the class is reinstated, the Society will confirm this in writing to the customer and to the flag administration.

4.4 Withdrawal of class

4.4.1 The class will be withdrawn at the customer's request.

4.4.2 If the overdue surveys specified in [4.2.1], [4.2.2] and [4.2.3] or required repairs as given in [4.2.5] are not carried out within the specified time after the class suspension, the Society will withdraw the vessel's class.

4.4.3 When a vessel leaves port or starts operation without having rectified a condition of class which was required to be dealt with before leaving port, the class will be withdrawn with immediate effect.

4.4.4 If the Society becomes aware that a vessel continues operation with serious damage or defects in violation of class requirements, the class may be withdrawn with effect from the time this became known to the Society. The class withdrawal may be made retroactive.

4.4.5 When it is considered that a customer’s failure to comply with rule requirements is sufficiently serious or fraudulent the withdrawal of class may, at the discretion of the Society, be extended to include other vessels controlled or operated by the same customer.

4.4.6 If the outstanding debt owed to the Society is not paid within a notified date, the Society may withdraw the vessel's class with one month's written notice. This also applies when the obligation to pay rests with a yard or with the vessel's previous owners. In special cases a shorter notice may be given.
4.4.7 If the customer makes a general assignment for the benefit of his creditors or if any proceedings are commenced in court or any order or judgement is given by any court for liquidation, winding up of the customer, the Society may withdraw the class with immediate effect.

4.4.8 For vessels having statutory certificates issued by third parties, except in those cases defined in Sec.2 [3.1], the class may be withdrawn.

4.5 Re-assignment of class following class withdrawal

4.5.1 In all other cases than that given in [4.4.1], and if the circumstances leading to withdrawal of class no longer exist, a vessel's may be re-assigned class upon written request. The extent of survey will in such instances be decided by the Society.

4.5.2 The Society reserves the right to decline an application for re-assignment of class.

4.5.3 A new class certificate will be issued when the survey has been satisfactory completed and the Society is satisfied that the requirements for retention of class have been met.

4.5.4 When the vessel is re-assigned class, the Society will confirm this in writing to the customer and to the flag administration and make the information publicly available.

5 Change of owner or manager

5.1 General

5.1.1 A vessel shall retain class when transferred to another owner or manager. The previous customer shall give the Society immediate notice, in writing, of such transfers. Obligations according to the rules shall remain with the previous customer until the Society is in receipt of such notice, in writing. See [1.2].

5.1.2 Class notations and survey arrangements based on certification of the management of operations will be deleted automatically when the management of a vessel is transferred.

6 Force majeure

If due to force majeure, the vessel is not in port or in sheltered waters when surveys become overdue the Society may allow the vessel to sail, in class, directly to an agreed discharge port and then, if necessary, in ballast to an agreed repair facility at which the survey can be completed. In this context the “Force Majeure” means damage to the vessel, unforeseen inability of surveyors to attend the vessel due to governmental restrictions on right of access or movement of personnel, unforeseen delays in port or inability to discharge cargo due to unusually lengthy periods of severe weather, strikes, civil strife, acts of war or other force majeure.
SECTION 6 CERTIFICATION OF MATERIALS, COMPONENTS AND SYSTEMS

1 General

1.1 General

1.1.1 The scope of classification requires that specified materials, components and systems intended for the vessel are certified according to the rules. The objective of certification shall ensure that materials, components and systems used in vessels to be classed by the Society comply with the rule requirements. Certification normally includes both plan approval and survey during production of the final product (see [2.2] and [2.3]).

1.1.2 The applicable chapters of the rules define the extent of the certification that is required for classification.

1.2 Requirements for manufacturer

1.2.1 Manufacturers of materials, components and systems of categories not covered by Sec.4 [1.2] shall be considered for approval according to criteria established by the Society, as applicable.

1.2.2 Quality control of materials, components and systems, shall be traceable and documented in writing. Further, quality control shall be carried out by qualified personnel at facilities and with equipment suitable for that control.

2 The classification involvement

2.1 General

2.1.1 Certification of materials, components and systems will be documented by the following types of documents:

1) **DNV GL Product Certificate (VL):**
   - A document signed by a surveyor of the Society stating:
     - conformity with rule requirements
     - that tests are carried out on the certified product itself
     - that tests are made on samples taken from the certified product itself
     - that tests are performed in presence of the surveyor or in accordance with special agreements.

2) **DNV GL Type Approval Certificate (TA):**
   - A document validated and signed by a surveyor of the Society stating:
     - conformity with rule design requirements.

3) **EU Mutual Recognition Type Approval Certificate:**
   - A document validated and signed by a surveyor of a recognised organisation (RO) within EU stating:
     - conformity with the commonly agreed design requirements for Mutual Recognition as laid down in the individual RO's governing documents.

   **Guidance note:**
   These certificates are normally mutually accepted by all EU RO's.

   Covers only agreed components. These are at any time listed in the overview of Type Approval for Mutual Recognition on the DNV GL Internet.

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4) **Works Certificate (W)**
   - A document signed by the manufacturer stating:
5) Test Report (TR)
A document signed by the manufacturer stating:

— conformity with rule requirements
— that tests are carried out on samples from the current production.

The applicable chapters and sections of the rules specify which of the above mentioned documents are required.

2.1.2 Where the rules require works certificate or test report, the surveyor may at any time require the tests to be carried out in his presence and/or that the surveyor check elements of the production control.

2.1.3 For identification and traceability, certified products shall be marked in accordance with the description given in the product certificate and as specified by the applicable chapters of the rules.

2.1.4 For certain components and systems the certification will be based on defined internationally acceptable standards and certification schemes as defined in applicable chapters of the rules. Compliance with the requirements of the standard shall be documented as required by that standard.

2.1.5 To ensure an efficient, cost effective and correct certification process, a certification agreement shall normally be established between the Society and the manufacturer of NV certified products. Such agreement may be part of a manufacturing survey arrangement (see [2.5]) and shall include information on the procedures for plan approval and survey and to specify information that shall be transferred between the customer and the Society.

2.2 Plan approval

2.2.1 The plan approval of materials, components and systems shall either be on a case by case basis or follow the procedure for type approval, see [2.3].

2.2.2 When the case by case procedure is used, documentation of the design shall be submitted for approval for each application as required in the applicable chapters of the rules.

2.2.3 A plan approval letter or design verification report will be issued by the Society when compliance with the requirements for the design has been confirmed.

2.3 Type approval

2.3.1 Type approval is a procedure for plan approval. Type approval can be applied to:

— products
— groups of products
— systems
— retention survey.

This procedure should normally be used for approval of standard designs.

2.3.2 The type approval procedure may consist of the following elements:

— plan approval
— initial survey
— type testing
— issue of a type approval certificate.

The type approval procedure used by the Society is described in DNV Standard for Certification No. 1.2.
2.3.3 When the type approval procedure is used, the following shall be submitted for approval as required in type approval programmes and the applicable chapters of the rules:

— documentation of the design
— results of type testing normally witnessed by a surveyor.

A type approval certificate will be issued by the Society when compliance with the design requirements is confirmed. The type approval certificate has a validity of 2 or 4 years depending on type of material, component or system for which the certificate is issued.

2.3.4 For certain products and systems as defined in applicable chapters of the rules, only type approval is required. For these products and systems no survey is required, i.e. no product certificate is required.

2.3.5 For certain products and systems as defined in the applicable chapters of the rules, type approval is a mandatory procedure for plan approval.

2.3.6 Products and systems manufactured for stock shall normally be type approved.

2.3.7 For type approved products, where the basis for approval is the rules of the Society, plans and technical descriptions of the product need not be submitted for approval for each vessel unless otherwise stated as a condition on the type approval certificate. In such cases only the arrangement or system plans, interface plans and those plans mentioned on the type approval certificate shall be submitted for approval.

2.4 Survey

2.4.1 The survey of materials, components and systems shall either be on a case by case basis or on the basis of an established manufacturing survey arrangement (MSA), see [2.5].

2.4.2 When the case by case procedure is used, the survey shall be performed on the basis of approved design documentation for the actual application and as required in the applicable DNV GL Offshore Standards. Compliance with the approved design documentation and applicable requirements will be documented by certificates as required in the applicable chapters of the rules.

2.4.3 When the survey is based on an MSA, the survey shall be performed on the basis of approved design documentation, applicable rule requirements and in accordance with requirements and procedures laid down in the MSA. Compliance with the approved design documentation and applicable requirements shall be documented by certificates as specified in the MSA and/or as required in the applicable chapters of the rules.

2.5 Manufacturing survey arrangement

2.5.1 When the procedures and processes of a manufacturer’s quality system meet the requirements of the rules, a manufacturing survey arrangement (MSA) may be established with the manufacturer as an alternative to the survey described in the applicable rule chapters.

2.5.2 The MSA shall be described in a document stating the requirements, scope, acceptance criteria, documentation and the roles of the Society and the manufacturer in connection with the survey.

2.5.3 When it is agreed through an MSA that the majority of the required surveys and tests are completed without the presence of a surveyor, it is required that the manufacturer has in operation a quality system certified by an accredited certification body to ISO 9001, or equivalent.

2.5.4 When establishing an MSA, an initial assessment of the manufacturer’s ability to control product quality and to comply with the scope, requirements and criteria laid down in the MSA will be performed. The extent and frequency of periodical assessments of the manufacturer will be included in the MSA.

2.5.5 A MSA is normally given a validity of 4 years. When the MSA is based on a certified quality system, the MSA automatically becomes invalid if the quality system certificate no longer is valid.
3 Suspension and withdrawal of certificates

3.1 General

3.1.1 A product certificate, type approval certificate or approval of manufacturer certificate may be suspended or withdrawn at any time if the Society finds it justified.

3.1.2 The decision to suspend or withdraw a certificate is made by the Society. Suspension or withdrawal of a certificate may take effect immediately or after a specified period of time. In special cases, the withdrawal of a certificate may be made with retroactive effect.

3.1.3 When a certificate is suspended or withdrawn the Society will:

— notify the customer in writing
— make the information publicly available.

In the cases of suspension, a time limit will be given for when the certificate will be withdrawn.
SECTION 7 LEGAL PROVISIONS

1 Liability and jurisdiction

1.1 Limited liability

1.1.1 If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million.

1.1.2 The above limitation of liability shall also apply to the relevant Flag administration, for any services provided hereunder on behalf of such Flag administration, to the same extent as it applies to the Society.

1.1.3 A person relying on any work subject to the Rules cannot bring any claims in excess of the above limitation of liability against the Society and/or the Flag Administration and nothing herein shall be construed as granting a party the right to cumulate or aggregate this limitation of liability. Further, said person undertakes to pay to the Society any sums awarded against the Flag Administration in respect of claims, losses, damages, costs, expenses and liabilities, and shall save, indemnify, defend and hold harmless the Society in every respect, if a claim is brought against the Flag Administration in breach of this obligation.

1.1.4 In this provision the “Society” shall mean the DNV GL as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of DNV GL.

1.2 Use by other parties

These rules are under the sole ownership rights and copy-rights of the Society. It is prohibited by anyone else than the Society to offer and/or perform classification or other services, wholly or partly, on the basis of and/or pursuant to these rules. The Society is not responsible for the consequences arising from the possible un-authorised use of the Rules by others.

1.3 Governing law

These rules, the classification of the vessel and the relationship between DNV GL and other parties shall be governed by Norwegian law.

1.4 Venue

Any dispute arising in relation to or as a consequence of these rules shall only be resolved by the courts of Norway, the Municipal Court of Oslo being the proper venue.
CHAPTER 2 DESIGN AND CONSTRUCTION PROVISIONS

SECTION 1 DESIGN AND CONSTRUCTION REQUIREMENTS FOR 1A MOU MAIN CLASS

1 General

1.1 Introduction

1.1.1 This section identifies design and construction requirements common to all types of mobile offshore units. Units complying with these requirements will be assigned a main character of class 1A followed by a description of the basic design concept of the unit, e.g. column-stabilised unit.

1.1.2 The following discipline areas are covered within main class:

— safety principles and arrangement
— materials
— hull design and fabrication
— temporary mooring and towing
— stability, watertight and weathertight integrity
— marine and machinery systems and equipment
— electrical systems and equipment
— instrumentation and telecommunication systems
— fire protection.

1.1.3 Systems and structures will be certified or classified based on the following main activities:

— design approval
— certification of materials and components
— survey during construction and installation
— survey during commissioning.

Further description of activity procedures are given in Ch.1 Sec.4.

1.1.4 The requirements of this section are given as:

— references to standards, codes and rules containing technical requirements which shall be complied with for assignment of main class
— supplementary requirements which shall be applied in conjunction with the technical reference documents for assignment of class
— requirements for certification of materials and components.

1.2 Technical reference documents

1.2.1 Technical requirements are given by reference to selected:

— DNV GL offshore standards
— DNV GL class guidelines
— DNV GL recommended practices
— other DNV rules and standards
— internationally recognised codes and standards.

1.2.2 The technical reference documents which shall be applied are given in the following subsections and are summarised in Table 2.
1.3 General assumptions

1.3.1 Any deviations, exceptions and modifications to the design codes and standards given as reference documents shall be documented and approved by DNV GL.

1.3.2 Where referred codes and standards call for the extent of inspections and tests to be agreed between contractor, manufacturer and customer, the resulting extent is to be agreed with DNV GL.

DNV GL may accept alternative solutions found to represent an overall safety level equivalent to that stated in the requirements of this document or the referred standards.

2 Safety principles and arrangement

2.1 General

Safety principles and arrangement include the following discipline areas:

— design principles, including generic accidental loads
— arrangement; including segregation of areas and location of plants and equipment
— escape and evacuation.

2.2 Design principles

The requirements given in DNVGL-OS-A101 Ch.2 Sec.1, shall be complied with.

2.3 Arrangement

Arrangement of the unit shall be in accordance with the requirements of DNVGL-OS-A101 Ch.2 Sec.2.

2.4 Escape and evacuation

Escape and evacuation shall be in accordance with DNVGL-OS-A101 Ch.2 Sec.5.

3 Materials

3.1 Technical requirements

Materials for:

— rolled steel for structural applications, boilers and pressure vessels
— steel tubes, pipes and fittings
— steel forgings
— steel castings
— aluminium alloys

shall comply with the requirements given by DNVGL-OS-B101 unless otherwise stated in the relevant technical reference documents.

3.2 Supplementary classification requirements

3.2.1 Certification requirements for materials are given in DNVGL-OS-B101 Ch.3.

3.2.2 Rolled, forged or cast elements of steel and aluminium for structural application shall be supplied with DNV GL’s material certificates in compliance with the requirements given in DNVGL-OS-B101.
4 Structural design

4.1 Scope

4.1.1 Class scope on structural design common to all type of mobile offshore units and all services covers the following aspects:

- hull incl. superstructure
- crane pedestals (Pedestal below slewing ring)
- attachment of helideck support structure
- foundation and support for heavy equipment (equipment where the static forces exceed 50 kN or resulting static bending moments at deck exceed 100 kNm).

Additional elements relevant for specific service are listed in the subsequent sections.

4.1.2 Excluded from the scope are

- ice and soil conditions
- earthquake and other environmental events defined by an annual probability equal or lower than to $10^{-4}$.

4.1.3 Transit conditions are included in the structural design scope of work. Temporary conditions are not included unless specifically specified. See definitions in Ch.1 Sec.1 [2].

4.2 Technical requirements

Structural design shall comply with the following design codes and approved either on the principles of the Working Stress Design (WSD) method or the LRFD methodology depending on hull shape as listed in Table 1.

Table 1 Overview of structural design requirements and methods

<table>
<thead>
<tr>
<th>Hull Shape</th>
<th>WSD</th>
<th>LRFD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship shaped</td>
<td>DNVGL-OS-C102</td>
<td>DNVGL-OS-C102, Sec.13</td>
</tr>
<tr>
<td>Column stab</td>
<td>DNVGL-OS-C201</td>
<td>DNVGL-OS-C103</td>
</tr>
<tr>
<td>Self-elevating</td>
<td>DNVGL-OS-C201</td>
<td>DNVGL-OS-C104</td>
</tr>
<tr>
<td>Cylindrical</td>
<td>DNVGL-OS-C101</td>
<td>DNVGL-OS-C101</td>
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<tr>
<td>Tension leg</td>
<td>DNVGL-OS-C201</td>
<td>DNVGL-OS-C105</td>
</tr>
<tr>
<td>Deep draught</td>
<td>DNVGL-OS-C201</td>
<td>DNVGL-OS-C106</td>
</tr>
</tbody>
</table>

5 Fabrication and testing of offshore structures

5.1 Technical requirements

Requirements for:

- welding procedures and qualification of welders
- fabrication and tolerances
- testing
- corrosion protection systems

shall be in accordance with DNVGL-OS-C401.

Guidance note:
The term “Purchaser” in this standard should be understood as DNV GL.

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5.2 Supplementary classification requirements

Classification procedures specifically related to fabrication and testing of offshore structures are given in DNVGL-OS-C401 Ch.3.
6 Stability and watertight/weathertight integrity

6.1 Technical requirements

6.1.1 Requirements for:
— intact and damaged stability
— watertight integrity
— freeboard
— weathertight closing appliances
shall be in accordance with DNVGL-OS-C301.

6.1.2 If onboard computers for stability calculations are installed, these systems shall be approved in accordance with requirements in DNV Rules for ships Pt.6 Ch.9.

7 Position keeping and towing

7.1 General

7.1.1 Depending on type of unit, main class stipulates requirements for:
— Position keeping
— temporary mooring
— towing.

Guidance note:
The above includes both normal and emergency towing. For the definitions of these and temporary mooring (as opposed to positioning mooring) see Ch.1 2.2.

7.1.2 When requested by the Owner or if required by flag administrations, DNV GL can perform certification of the complete mooring equipment according to the POSMOOR notation or the relevant national regulations.

7.2 Position keeping

7.2.1 For ship-shaped and column-stabilised units, the additional class notation POSMOOR or DYNPOS-AUTR is mandatory.

7.2.2 For deep draught types, the additional class notation POSMOOR is mandatory.

7.2.3 Certification requirements for equipment shall be as given in DNVGL-OS-E301 Ch.3.

7.3 Temporary mooring

7.3.1 Self propelled units shall have an arrangement for temporary mooring. Ship-shaped units shall have an arrangement complying with the DNV Rules for ships, Pt.3 Ch.3 Sec.3, other structural designs shall have an arrangement complying with DNVGL-OS-E301 Ch.3.

7.3.2 For units with the additional class notation POSMOOR, the requirements for temporary mooring are normally covered within this notation.

7.3.3 For units with the additional class notations DYNPOS-AUTR and DYNPOS-AUTRO and for non-self propelled units, the installation of temporary mooring arrangement is not required as a condition for classification.

7.4 Towing

7.4.1 Ship shaped units with propulsion shall have towing arrangement according to DNV Rules for ships Pt.3 Ch.3 Sec.5ts, other structural designs shall have an arrangement according OS-E301 Ch.2.
7.4.2 The fittings for normal towing may also be used for emergency towing.

7.4.3 For units with the additional class notations DYNPOS-AUTR and DYNPOS-AUTRO, towing arrangements may take into account the specific thrust capabilities of the units as described in DNVGL-OS-E301 Ch.2 Sec.4 [16].

7.5 Supplementary classification requirements

7.5.1 Classification procedures specifically related to mooring and towing are given in DNVGL-OS-E301 Ch.3.

7.5.2 Certification requirements for equipment are given in DNVGL-OS-E301 Ch.3.

8 Marine and machinery systems and equipment

8.1 Technical requirements
Requirements for marine and machinery systems and equipment include:
— general piping design, fabrication and testing
— pumps, valves and pipe connections
— ballast, bilge and drainage systems
— air, overflow and sounding pipes
— cooling, feed water and condensation systems
— lubricating oil, fuel oil and thermal oil systems
— hydraulic, steam and pneumatic systems
— heating, ventilation and air conditioning systems
— propulsion and auxiliary machinery including thrusters
— boilers, pressure vessels and incinerators
— anchoring and mooring equipment
— steering, jacking gear and turret machinery

and shall be designed, manufactured, tested and installed in accordance with DNVGL-OS-D101.

8.2 Supplementary classification requirements

8.2.1 Classification procedures specifically related to marine and machinery systems and equipment are given in DNVGL-OS-D101 Ch.3.

8.2.2 Certification requirements for equipment are given in DNVGL-OS-D101 Ch.3.

9 Electrical systems and equipment

9.1 Technical requirements
Electrical systems and equipment include:
— system design
— switchgear and control gear assemblies
— rotating machinery
— static converters
— cables
— miscellaneous equipment
— installation and testing
— A.C. supply systems
— electric propulsion

and shall be designed, manufactured, tested and installed in accordance with DNVGL-OS-D201.
9.2 Supplementary classification requirements

9.2.1 Classification procedures specifically related to electrical systems and equipment are given in DNVGL-OS-D201.

9.2.2 Certification requirements for equipment are given in DNVGL-OS-D201.

10 Automation, safety and telecommunication systems

10.1 Technical requirements
Instrumentation and telecommunication systems and equipment include:

— design principles and system design
— computer based systems
— component design and installation
— environmental conditions
— user interface

and shall be designed, manufactured, tested and installed in accordance with DNVGL-OS-D202.

10.2 Supplementary classification requirements
Classification procedures specifically related to instrumentation and telecommunication systems are given in DNVGL-OS-D202 Ch.3.

Certification requirements for equipment are given in DNVGL-OS-D202 Ch.3.

11 Fire protection

11.1 Technical requirements
Fire protection includes:

— passive fire protection
— active fire protection
— fire fighting systems
— fire and gas detection systems

and shall be designed, manufactured, tested and installed in accordance with DNVGL-OS-D301 Ch.2 Sec.1 to Sec.5.

11.2 Supplementary classification requirements

11.2.1 Classification procedures specifically related to fire protection are given in DNVGL-OS-D301 Ch.3.

11.2.2 Certification requirements for equipment are given in DNVGL-OS-D301 Ch.3.

12 Preparation for surveys and inspections on location

12.1 General

12.1.1 It is advised that operational survey and inspection aspects are taken into consideration at the design and construction stages.

12.1.2 The following matters will be taken into consideration for acceptance of surveys to be carried out on location:

— arrangement for underwater inspection of hull, propellers, thrusters, rudders and openings affecting seaworthiness
— marking of the hull
— means for blanking off all openings including side thrusters
— use of corrosion resistant materials for shafts
— use of glands for propeller and rudder
— accessibility of all tanks and spaces for inspection
— corrosion protection of hull or structure
— maintenance and inspection of thrusters
— measurement of wear in the propulsion shaft and rudder bearings
— testing facilities of all important machinery.

**Guidance note:**
The underwater body should be marked in such a way that the surveyor can identify the location of any damages found. One acceptable way of preparing ship-shaped hulls for underwater inspection is described in the following.

Transverse and longitudinal reference lines of minimum length 300 mm and minimum width 25 mm should be applied as marking. The marks should be made permanent by welding or otherwise and painted in contrast colour.

Markings should normally be placed as follows:
— at flat bottom in way of intersections of tank bulkheads or watertight floors and girders
— at unit’s sides in way of the positions of transverse bulkheads (the marking need not be extended more than 1 m above the bilge plating)
— the intersection between tank top and watertight floors in way of the unit’s sides
— all openings for sea suctions and discharges.
— letter/number codes may conveniently be applied on the shell for identification of tanks, sea suctions and discharges.

Markings should be adequately documented.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

**12.1.3** In addition to the above ship shaped units can apply for the class notation **BIS** for in water survey of the bottom (see DNV Rules for ships Pt.3 Ch.1 Sec.1 D).

**13 Summary of technical reference standards**
Technical standards which shall be applied for assignment of main character of class for floating production and storage units are summarised in Table 2.

Table 2  Technical reference standards for main character of class (1A MOU)

<table>
<thead>
<tr>
<th>Technical item</th>
<th>Reference standard</th>
<th>Applicable parts or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY PRINCIPLES AND ARRANGEMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design principles</td>
<td>DNVGL-OS-A101</td>
<td>Ch.2 Sec.1: Design Principles and Accidental loads</td>
</tr>
<tr>
<td>Arrangement</td>
<td></td>
<td>Ch.2 Sec.2: Arrangement</td>
</tr>
<tr>
<td>Escape and evacuation</td>
<td></td>
<td>Ch.2 Sec.5: Escape and Communication</td>
</tr>
<tr>
<td>MATERIALS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metallic materials</td>
<td>DNVGL-OS-B101</td>
<td></td>
</tr>
<tr>
<td>STRUCTURAL DESIGN (select type as appropriate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship-shape structure</td>
<td>DNVGL-OS-C102</td>
<td>LRFD and WSD methodology</td>
</tr>
<tr>
<td>Column-stabilised type structure</td>
<td>DNVGL-OS-C103</td>
<td>LRFD methodology</td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C201</td>
<td>WSD methodology</td>
</tr>
<tr>
<td>Self-elevating type structure</td>
<td>DNVGL-OS-C104</td>
<td>LRFD methodology</td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C201</td>
<td>WSD methodology</td>
</tr>
<tr>
<td>HULL FABRICATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabrication, including welding and NDT</td>
<td>DNV Rules for Ships Pt.2 Ch.3 Sec.7</td>
<td>For ship-shaped units</td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C401</td>
<td>For self-elevating and semi-submersible units</td>
</tr>
</tbody>
</table>
### Table 2  Technical reference standards for main character of class (1A MOU)  (Continued)

<table>
<thead>
<tr>
<th>Technical item</th>
<th>Reference standard</th>
<th>Applicable parts or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STABILITY AND WATERTIGHT INTEGRITY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stability, watertight integrity, freeboard and weathertight closing appliances</td>
<td>DNVGL-OS-C301</td>
<td>Covers all types of structures</td>
</tr>
<tr>
<td><strong>POSITION KEEPING AND TOWING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary mooring, towing</td>
<td>DNV Rules for ships Pt.3 Ch.3 Sec.3</td>
<td>Ship-shaped units</td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-E301</td>
<td>All other types of units</td>
</tr>
<tr>
<td><strong>MARINE AND MACHINERY SYSTEMS AND EQUIPMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piping design, manufacturing and testing; platform piping systems; machinery piping systems; machinery and mechanical equipment</td>
<td>DNVGL-OS-D101</td>
<td>All sections</td>
</tr>
<tr>
<td><strong>ELECTRICAL SYSTEM EQUIPMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical systems including switchgear and controlgear assemblies, rotating machinery, static convertors, cables, installation, testing, and electric propulsion</td>
<td>DNVGL-OS-D201</td>
<td>All sections</td>
</tr>
<tr>
<td><strong>AUTOMATION, SAFETY AND TELECOMMUNICATION SYSTEMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumentation systems including design principles, system design, computer based systems, component design and installation, and user interface</td>
<td>DNVGL-OS-D202</td>
<td>Ch.2: Sec. 1: Design principles Sec. 2: System design Sec. 3: Additional requirements for computer based systems Sec. 4: Component design and installation Sec. 5: User Interface</td>
</tr>
<tr>
<td><strong>FIRE PROTECTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire protection including passive fire protection, active fire protection, fire fighting systems, fire and gas detection systems</td>
<td>DNVGL-OS-D301</td>
<td>Ch.2: Sec.1: Passive Fire Protection Sec.2: Active Fire Protection of Specific Areas Sec.3: Fire Fighting Systems Sec.4: Fire and Gas Detection Systems Sec.5: Miscellaneous Items</td>
</tr>
</tbody>
</table>
SECTION 2 DESIGN AND CONSTRUCTION REQUIREMENTS FOR OI FLOATING OFFSHORE INSTALLATION MAIN CLASS

1 General

1.1 Introduction

1.1.1 Permanently placed non self-propelled floating offshore installations may be classed as offshore installations according to OI main class as an alternative to 1A MOU main class given in Sec.2.

1.1.2 All types of floating offshore installations complying with the requirements of this section may be assigned a main character of class OI followed by a description of the basic design concept of the installations, for example column-stabilised offshore installation.

1.1.3 The following discipline areas are covered within main class:

— safety principles and arrangement
— materials
— hull design and construction
— mooring
— stability, watertight and weathertight integrity
— utility systems and equipment related to marine and safety functions
— electrical systems and equipment related to marine and safety functions
— instrumentation and telecommunication systems related to marine and safety functions
— fire protection.

1.1.4 Systems and structures will be certified or classified based on the following main activities:

— design approval
— certification of materials and components
— survey during construction and installation
— survey during commissioning and start-up.

Further description of activity procedures are given in Ch.1 Sec.4.

1.1.5 The requirements of this section are given as:

— references to standards, codes and rules containing technical requirements which shall be complied with for assignment of main class
— supplementary requirements which shall be applied in conjunction with the technical reference documents for assignment of class
— requirements for certification of materials and components.

1.2 Technical reference documents

1.2.1 Technical requirements are given by reference to selected:

— DNV GL offshore standards
— DNV GL class guidelines
— DNV GL recommended practices
— other DNV GL rules and standards
— internationally recognised codes and standards.

1.2.2 The technical reference documents which shall be applied are given in the following subsections and are summarised in Table 2.

1.2.3 If the customer for specific reasons should desire to employ codes and standards other than those
referred to and recommended by DNV GL, DNV GL is prepared to accept such alternatives based on fitness for purpose. When agreed such codes and standards shall be specified in the class agreement, with reference to the relevant revision of the codes and standards that shall apply.

1.3 General assumptions

1.3.1 Any deviations, exemptions and modifications to the design codes and standards given as reference documents shall be documented and approved by DNV GL.

1.3.2 Where referred codes and standards call for the extent of inspections and tests to be agreed between contractor, manufacturer and customer, the resulting extent is to be agreed with DNV GL.

1.4 Certification of materials and components

1.4.1 Materials and components shall be certified according to their safety criticality. Detailed requirements are given in Ch.3 of the relevant DNV GL offshore standards.

1.4.2 Alternatively, DNV GL is prepared to accept materials and components for OI main class based on review and audits of documented verification schemes according to national authority regulations or recognised codes and standards covering the areas of classification.

2 Safety principles and arrangement

2.1 General

Safety principles and arrangement include the following discipline areas:

— design principles, including generic accidental loads
— arrangement; including segregation of areas and location of plants and equipment
— escape and evacuation.

2.2 Design principles

The requirements given in DNVGL-OS-A101 Ch.2 Sec.1 shall be complied with.

2.3 Arrangement

Arrangement of the installation shall be in accordance with the requirements of DNVGL-OS-A101 Ch.2 Sec.2.

2.4 Escape and evacuation

Escape and evacuation shall be in accordance with DNVGL-OS-A101 Ch.2 Sec.5.

3 Materials

3.1 Technical requirements

Materials for:

— rolled steel for structural applications, boilers and pressure vessels
— steel tubes, pipes and fittings
— steel forgings
— steel castings
— aluminium alloys.

shall comply with the requirements given by DNVGL-OS-B101 unless otherwise stated in the relevant technical reference documents or specially agreed according to [1.2.3].
3.2 Supplementary classification requirements

3.2.1 Certification requirements for materials are given in DNVGL-OS-B101 Ch.3.

3.2.2 Rolled, forged or cast elements of steel and aluminium for structural application shall be supplied with DNV GL's material certificates in compliance with the requirements given in DNVGL-OS-B101.

4 Structural design

4.1 Scope

4.1.1 Class scope on structural design common to all type of mobile offshore units and all services covers the following aspects:

— hull incl. superstructure
— crane pedestals (Pedestal below slewing ring)
— attachment of helideck support structure
— foundation and support for heavy equipment (equipment where the static forces exceed 50 kN or resulting static bending moments at deck exceed 100 kNm).

Additional elements relevant for specific service are listed in the subsequent sections.

4.1.2 Excluded from the scope are:

— ice and soil conditions
— earthquake and other environmental events defined by an annual probability equal or lower than to 10^{-4}.

4.1.3 Transit conditions are included in the structural design scope of work. Temporary conditions are not included unless specifically specified. See definitions in Ch.1 Sec.1 [2].

4.2 Technical requirements

Structural design shall comply with the following design codes and approved either on the principles of the Working Stress Design (WSD) method or the load resistance factor design (LRFD) methodology depending on hull shape as listed in Table 1.

Table 1 Overview of structural design requirements and methods

<table>
<thead>
<tr>
<th>Hull Shape</th>
<th>WSD</th>
<th>LRFD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship shaped</td>
<td>DNVGL-OS-C102</td>
<td>DNVGL-OS-C102, Sec.13</td>
</tr>
<tr>
<td>Column stab</td>
<td>DNVGL-OS-C201</td>
<td>DNVGL-OS-C103</td>
</tr>
<tr>
<td>Self-elevating</td>
<td>DNVGL-OS-C201</td>
<td>DNVGL-OS-C104</td>
</tr>
<tr>
<td>Cylindrical</td>
<td>DNVGL-OS-C101</td>
<td>DNVGL-OS-C101</td>
</tr>
<tr>
<td>Tension leg</td>
<td>DNVGL-OS-C201</td>
<td>DNVGL-OS-C105</td>
</tr>
<tr>
<td>Deep draught</td>
<td>DNVGL-OS-C201</td>
<td>DNVGL-OS-C106</td>
</tr>
</tbody>
</table>

5 Fabrication and testing of offshore structures

5.1 Technical requirements

Requirements for:

— welding procedures and qualification of welders
— fabrication and tolerances
— testing
— corrosion protection systems

shall be in accordance with DNVGL-OS-C401.
5.2 Supplementary classification requirements
Classification procedures specifically related to fabrication and testing of offshore structures are given in DNVGL-OS-C401 Ch.3.

6 Stability and watertight integrity

6.1 Technical requirements

6.1.1 Requirements for:
— intact and damaged stability
— watertight integrity
— freeboard
— weathertight closing appliances
shall be in accordance with DNVGL-OS-C301.

6.1.2 If onboard computers for stability calculations are installed, these systems shall be approved in accordance with requirements in DNV Rules for ships Pt.6 Ch.9.

7 Position keeping and towing

7.1 General
For floating offshore installations of the ship-shaped, column-stabilised and deep draught types, the additional class notation POSMOOR is mandatory.

7.2 Supplementary classification requirements
Certification requirements for equipment shall be as given in DNVGL-OS-E301 Ch.3.

8 Utility systems and equipment

8.1 Technical requirements
Requirements for utility systems and equipment include:
— general piping design, fabrication and testing
— pumps, valves and pipe connections
— ballast, bilge and drainage systems
— air, overflow and sounding pipes
— hydraulic, steam and pneumatic systems
— heating, ventilation and air conditioning systems
— pressure vessels and incinerators
— turret machinery, as applicable
and shall be designed, manufactured, tested and installed in accordance with DNVGL-OS-D101.

Guidance note:
Recognised codes and standards which can be applied for piping and equipment are listed in DNVGL-OS-D101.
8.2 Supplementary classification requirements

8.2.1 Classification procedures specifically related to utility systems and equipment are given in DNVGL-OS-D101 Ch.3.

8.2.2 Certification requirements for equipment are given in DNVGL-OS-D101 Ch.3.

9 Electrical systems and equipment

9.1 Technical requirements

9.1.1 Electrical systems and equipment include:

— system design
— switchgear and controlgear assemblies
— rotating machinery
— static converters
— cables
— miscellaneous equipment
— installation and testing
— A.C. supply systems

as far as relevant for supplying marine (e.g. ballasting, bilge, mooring), fire fighting and emergency services.

9.1.2 The electrical systems shall be designed, manufactured, tested and installed in accordance with DNVGL-OS-D201.

9.2 Supplementary classification requirements

9.2.1 Classification procedures specifically related to electrical systems and equipment are given in DNVGL-OS-D201.

9.2.2 Certification requirements for equipment are given in DNVGL-OS-D201.

10 Automation, safety and telecommunication systems

10.1 Technical requirements

Instrumentation and telecommunication systems and equipment include:

— design principles and system design
— computer based systems
— component design and installation
— environmental conditions
— user interface

and shall be designed, manufactured, tested and installed in accordance with DNVGL-OS-D202 Ch.2 Sec.1 to 5.

10.2 Supplementary classification requirements

Classification procedures specifically related to instrumentation and telecommunication systems are given in DNVGL-OS-D202 Ch.3.

Certification requirements for equipment are given in DNVGL-OS-D202 Ch.3.
11 Fire protection

11.1 Technical requirements
Fire protection includes:
— passive fire protection
— active fire protection
— fire fighting systems
— fire and gas detection systems

and shall be designed, manufactured, tested and installed in accordance with DNVGL-OS-D301 Ch.2 Sec.1 to Sec.5.

11.2 Supplementary classification requirements
11.2.1 Classification procedures specifically related to fire protection are given in DNVGL-OS-D301 Ch.3.
11.2.2 Certification requirements for equipment are given in DNVGL-OS-D301 Ch.3.

12 Preparation for surveys and inspections on location
For preparations for surveys and inspections on locations see Sec.1 [12].

13 Summary of technical reference standards
Technical standards which shall be applied for assignment of main character of class for floating offshore installations are summarised in Table 2.

Table 2 Technical reference standards for OI main class (Floating Offshore Installation)

<table>
<thead>
<tr>
<th>Technical item</th>
<th>Reference standard</th>
<th>Applicable parts or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY PRINCIPLES AND ARRANGEMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design principles</td>
<td>DNVGL-OS-A101</td>
<td>Ch.2 Sec.1: Design Principles and Accidental loads</td>
</tr>
<tr>
<td>Arrangement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escape and evacuation</td>
<td></td>
<td>Ch.2 Sec.5: Escape and Evacuation</td>
</tr>
<tr>
<td>MATERIALS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metallic materials</td>
<td>DNVGL-OS-B101</td>
<td></td>
</tr>
<tr>
<td>STRUCTURAL DESIGN (select type as appropriate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship-shape structure</td>
<td>DNVGL-OS-C101 DNVGL-OS-C102</td>
<td></td>
</tr>
<tr>
<td>Column-stabilised type structure</td>
<td>DNVGL-OS-C101 DNVGL-OS-C103 DNVGL-OS-C201</td>
<td>LRFD methodology WSD methodology</td>
</tr>
<tr>
<td>Self-elevating type structure</td>
<td>DNVGL-OS-C101 DNVGL-OS-C104 DNVGL-OS-C201</td>
<td>LRFD methodology WSD methodology</td>
</tr>
<tr>
<td>HULL FABRICATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabrication, including welding and NDT</td>
<td>DNV Rules for Ships Pt.2 Ch.3 Sec.7 DNVGL-OS-C401</td>
<td>For ship-shaped units For self-elevating and semi-submersible units</td>
</tr>
<tr>
<td>STABILITY AND WATERTIGHT INTEGRITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stability, watertight integrity, freeboard and weather-tight closing appliances</td>
<td>DNVGL-OS-C301</td>
<td>Covers all types of structures</td>
</tr>
</tbody>
</table>
### Table 2  Technical reference standards for OI main class (Floating Offshore Installation) (Continued)

<table>
<thead>
<tr>
<th>Technical item</th>
<th>Reference standard</th>
<th>Applicable parts or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POSITION KEEPING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offshore mooring system</td>
<td>DNVGL-OS-E301 or API RP 2SK</td>
<td>Ship-shaped, column-stabilised and deep-draught units or installations</td>
</tr>
<tr>
<td><strong>ELECTRICAL SYSTEM EQUIPMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical systems including switchgear and controlgear assemblies, rotating machinery, static converters, cables, installation, testing, and electric propulsion</td>
<td>DNVGL-OS-D201</td>
<td>All sections</td>
</tr>
<tr>
<td><strong>AUTOMATION, SAFETY AND TELECOMMUNICATION SYSTEMS</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Instrumentation systems including design principles, system design, computer based systems, component design and installation, and user interface | DNVGL-OS-D202 | Ch.2:  
Sec.1: Design principles  
Sec.2: System design  
Sec.3: Additional requirements for computer based systems  
Sec.4: Component design and installation  
Sec.5: User Interface |
| **FIRE PROTECTION** | | |
| Fire protection including passive fire protection, active fire protection, fire fighting systems, fire and gas detection systems | DNVGL-OS-D301 | Ch.2:  
Sec.1: Passive Fire Protection  
Sec.2: Active Fire Protection of Specific Areas  
Sec.3: Fire Fighting Systems  
Sec.4: Fire and Gas Detection Systems  
Sec.5: Miscellaneous Items |
CHAPTER 2  SECTION 3

SECTION 3  SUPPLEMENTARY REQUIREMENTS FOR SERVICE NOTATION OIL PRODUCTION UNIT OR OIL PRODUCTION INSTALLATION

1  General

1.1  Introduction

1.1.1  This section identifies design and construction requirements for assignment of service notation Oil Production Unit or Oil Production Installation.

1.1.2  The requirements in this section are supplementary to those for main class 1A as stated in Sec.1 for notation Oil Production Unit and OI in Sec.2 for notation Oil Production Installation.

2  Safety principles and arrangement

2.1  General

Service notation Oil Production Unit or Oil Production Installation specifies additional requirements for:

— arrangement
— area classification
— shutdown
— escape, evacuation and communication.

2.2  Arrangement

Production units or installations shall comply with DNVGL-OS-A101.

2.3  Area classification

Production units or installations shall comply with DNVGL-OS-A101 Ch.2 Sec.3 and Sec.7.

2.4  Emergency shutdown

Production units or installations shall comply with DNVGL-OS-A101 Ch.2 Sec.4 and Sec.7.

2.5  Escape, evacuation and communication

Production units or installations shall comply with DNVGL-OS-A101 Ch.2 Sec.7.

3  Structural design

3.1  General

The structural strength shall be as required for the main class taking into account necessary strengthening of supporting structures for equipment applied in and forces introduced by the production facilities and operation. In addition to the elements as listed in Sec.1 [4.1], this includes:

— process area foundations
— turret or submerged turret structures.

3.2  Supplementary technical requirements

The items listed in [3.1] shall comply with the relevant sections of DNVGL-OS-C101 and:

— DNVGL-OS-C102 for ship-shaped units or installations
— DNVGL-OS-C103 for column-stabilised units or installations
4 Marine and machinery and utility systems

4.1 General
Service notation Oil Production Unit or Oil Production Installation specifies additional requirements for:
- piping arrangements
- ventilation in hazardous areas
- turret machinery
- use of gas and crude oil for auxiliary boilers and turbines.

4.2 Supplementary technical requirements
The items listed in [4.1] shall comply with the relevant sections of DNVGL-OS-D101.

5 Instrumentation and telecommunication systems

5.1 Supplementary technical requirements
Production units and installations shall comply with DNVGL-OS-D202 Ch.2 Sec7.

6 Fire Protection

6.1 General
Service notations Oil Production Unit or Oil Production Installation specifies additional requirements for:
- passive fire protection
- fire water systems
- active fire protection of specific areas
- fire detection and alarm systems
- gas detection.

6.2 Supplementary technical requirements
Production units or installations shall comply with DNVGL-OS-D301 Ch.2 Sec.7.

7 Industrial equipment

7.1 General

7.1.1 Production related systems and equipment which are installed in enclosed hull compartments below the damage water line shall be included in the scope of classification.

7.1.2 The items specified in [7.1.1] shall comply with relevant requirements given in DNVGL-OS-E201.
SECTION 4 SUPPLEMENTARY REQUIREMENTS FOR SERVICE NOTATION OIL STORAGE UNIT OR OIL STORAGE INSTALLATION

1 General

1.1 Introduction

1.1.1 This section identifies design and construction requirements for assignment of service notations Oil Storage Unit or Oil Storage Installation.

1.1.2 The requirements in this section are supplementary to those for main class 1A as stated in Sec.1 for notation Oil Storage Unit and OI in Sec.2 for notation Oil Storage Installation.

1.1.3 Storage units also intended for transportation of crude oil shall comply with the DNV Rules for ships, Pt.5 Ch.3.

2 Safety principles and arrangement

2.1 General

Service notations Oil Storage Unit and Oil Storage Installation specifies additional requirements for:

- arrangement
- area classification
- shutdown
- escape, evacuation and communication.

2.2 Supplementary technical requirements

Supplementary technical requirements are given in DNVGL-OS-A101 Ch.2 Sec.3, Sec.4 and Sec.8.

3 Structural design

3.1 General

The structural strength shall be as required for the main class taking into account necessary strengthening of supporting structures for equipment applied in and forces introduced by the production facilities and operation. In addition to the elements as listed in Sec.1 [4.1], this includes:

- turret or submerged turret structures, as applicable.

3.2 Supplementary technical requirements

3.2.1 The items listed in [3.1] shall comply with the relevant sections of DNVGL-OS-C101 and:

- DNVGL-OS-C102 for ship-shaped units.

3.2.2 A loading instrument suitable for the intended service shall be installed on ship-shaped storage units/ installations.

The instrument shall be approved in accordance with requirements in DNV Rules for ships Pt.6 Ch.9.

4 Marine and machinery or utility systems and equipment

4.1 General

Service notations Oil Storage Unit and Oil Storage Installation specifies additional requirements for:

- liquid cargo transfer and stripping
- liquid cargo storing, segregation and treatment
— venting, inerting, gas freeing and vapour emission control
— oil discharge control
— crude oil washing system
— ventilation in hazardous areas
— turret machinery.

4.2 Supplementary technical requirements
The items listed in [4.1] shall comply with the relevant sections of DNVGL-OS-D101.

5 Automation, safety and telecommunication systems
Supplementary technical requirements are given in DNVGL-OS-D202 Ch.2 Sec.8.

6 Fire protection

6.1 General
Service notations Oil Storage Unit or Oil Storage Installation specifies additional requirements for:
— passive fire protection
— fire water systems
— active fire protection of specific areas
— fire detection and alarm systems
— gas detection.

6.2 Supplementary technical requirements
Supplementary technical requirements are given in DNVGL-OS-D301 Ch.2 Sec.8.

7 Preparation for surveys and inspections on location
It is advised that operational survey and inspection aspects are taken into consideration at the design and construction stages. See Ch.2 12 for details.
SECTION 5 SUPPLEMENTARY REQUIREMENTS FOR SERVICE NOTATION OIL LOADING UNIT OR INSTALLATION

1 General

1.1 Introduction

1.1.1 This section identifies design and construction requirements for assignment of service notations Oil Loading Unit or Oil Loading Installation.

1.1.2 The requirements in this section are supplementary to those for main class 1A as stated in Sec.1 for notation Oil Loading Unit and OI in Sec.2 for notation Oil Loading Installation.

1.2 Design requirements

To achieve the service notation Oil Loading Unit or Oil Loading Installation, the unit has to be designed, constructed and documented according to DNVGL-OS-E403 - Offshore Loading Buoys.
SECTION 6  OPTIONAL CLASS NOTATIONS

1  Introduction

1.1  General

1.1.1  This section identifies design and construction requirements for assignment of additional class notations relating to system, equipment and special facility installations.

1.1.2  Units fitted with systems and/or special features complying with relevant requirements of this section may be assigned class notations as described.

1.2  Technical reference documents

1.2.1  Technical requirements are given by reference to selected:

— DNV GL offshore standards
— DNV GL recommended practices
— other DNV GL rules and standards
— DNV GL Class Guidelines
— internationally recognised codes and standards.

1.2.2  The technical reference documents which shall be applied are given in the following subsections and summarised in Table 12.

1.3  General assumptions

1.3.1  DNV GL may accept alternative solutions found to represent an overall safety level equivalent to that stated in the requirements of this document or referred standards.

1.3.2  The requirements stated in this section for additional class notations shall be regarded as supplementary to those given for assignment of main class and relevant service notations.

2  Position mooring system

2.1  General

2.1.1  POSMOOR notation may be assigned to units fitted with single or spread point mooring systems in accordance with the requirements of this section.

2.1.2  Objective
The notation ensures reliability and safety of the mooring system and equipment.

2.1.3  Scope
The notation covers the following aspects:

— environmental conditions and loads
— mooring system analysis
— thruster assisted mooring
— mooring equipment
— tests.
2.2 Application

2.2.1 The notation is complemented with the qualifiers as described in Table 1.

Table 1 POSMOOR class notations

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSMOOR</td>
<td>Position mooring system</td>
<td>&lt;none&gt;</td>
<td>Passive position mooring system according the technical requirements of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DNVGL-OS-E301 Ch.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V</td>
<td>Mooring system designed for positioning in vicinity of other structures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TA</td>
<td>Thruster assisted mooring system dependent on manual remote thrust control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ATA</td>
<td>Thruster assisted mooring system dependent on automatic remote thrust control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>Remaining thruster capacity after loss of most significant redundancy group</td>
</tr>
</tbody>
</table>

2.2.2 The qualifiers (A) or (V) can be combined with the other qualifiers.

2.2.3 The qualifier R can be combined with TA and ATA (to resp. TAR and ATAR).

2.3 Technical requirements

2.3.1 The technical requirements of DNVGL-OS-E301 shall be complied with for assignment of the POSMOOR notations.

2.3.2 Alternatively POSMOOR notations may be granted based on compliance with the safety factors given in API RP 2SK.

2.4 Certification of materials and components

Certification of equipment shall be in accordance with DNVGL-OS-E301 Ch.3.

3 Dynamic positioning systems

3.1 General

3.1.1 The following notations may be assigned to units with dynamic positioning systems:

Table 2 Dynamic position class notations

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS</td>
<td>Dynamic positioning system</td>
<td>(A)</td>
<td>Annual survey required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>Without redundancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>With an independent joystick back-up and a position reference back-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>With redundancy in technical design and with an independent joystick back-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>With redundancy in technical design and with an independent joystick back-up</td>
</tr>
</tbody>
</table>

| DYNPOS         | Dynamic positioning system | (A)      | Annual survey required                                                      |
|                |                        | AUT       | With an independent joystick back-up and a position reference back-up       |
|                |                        | AUTR      | With redundancy in technical design and with an independent joystick back-up |
|                |                        | AUTRO     | With redundancy in technical design and with an independent joystick back-up |
|                |                        | AUTS      | Without redundancy                                                          |
|                |                        | ER        | Redundancy in technical design                                              |
3.1.2 Objective
The objective of the notations is to ensure the availability of dynamic positioning with various grades of redundancy in line with the IMO MSC/Circ.645 “Guidelines for vessels with dynamic positioning systems”.

3.1.3 The two notation series differ in their specific requirements and in general the DYNPOS-series notations are requiring a higher degree of availability and robustness as compared to the DPS-series notations. The detailed differences are outlined in the specific requirements given in this chapter.

3.1.4 Scope
The dynamic positioning system includes requirements for the following subsystems, control panels and back-up systems which are necessary to dynamically position the unit:

- power system
- controller
- measuring system
- thruster system
- remote thrust control
- control panels.

3.1.5 These rules do not include requirements or recommendations in regard to the vessels operation or other characteristics.

3.2 Technical requirements
3.2.1 Technical requirements for the dynamic positioning notations shall be in accordance with the DNV Rules for ships Pt.6 Ch.7.

3.2.2 Technical requirements for DYNPOS-ER are given in DNV Rules for ships Pt.6 Ch.26.

3.2.3 For DPS notations granted through class entries, see DNV Rules for ships Pt.6 Ch.7.

3.3 Certification of materials and components
The certification of equipment shall be in accordance with DNV Rules for ships Pt.6 Ch.7.

4 Single point mooring (SPM)
4.1 General
4.1.1 General
The additional class notation SPM applies to units fitted with equipment enabling them to be moored to single point moorings.

4.1.2 Objective
The objective of the notation is to document that the vessel is equipped for single point mooring.

4.1.3 Scope
The notation covers the following elements:

- bow chain stoppers and fairleads
- position of pedestal rollers
- winches
- materials.

4.1.4 Application
The requirements cover the parts of OCIMF’s Recommendations for equipment employed in the mooring of ships at single point moorings, applicable for ship-shaped offshore units or installations.
4.2 Technical requirements
The requirements of the DNV Rules for ships, Pt.5 Ch.3 Sec.15, shall be complied with.

4.3 Certification of materials and components
A DNV GL product certificate shall be provided for the bow chain stopper and bow fairlead

4.3.1 Wich and capstand and pedestal roller (if fitted) shall be provided with documentation of max. SWL from manufacturer (works certificate):

5 Crude offloading system

5.1 General

5.1.1 General
Units or installations equipped with a crude offloading system in accordance with the requirements of this section, may be assigned a class notation OFFLOADING.

5.1.2 Objective
The notation’s objective is to ensure safe and reliable operation of the offloading system, in special to prevent:
— personnel injury
— significant release of hydrocarbons
— significant mechanical damage.

5.1.3 Scope
The notation covers the following elements:
— offloading hose
— hose reels
— disconnect and release
— relevant piping
— control station.

5.1.4 Application
The notation is applicable for all different units as covered by these Rules.

5.2 Technical requirements
The technical requirements of DNVGL-OS-E201 Ch.2 Sec.12 shall be followed.

5.3 Certification of materials and components
Procedures and requirements for classification including certification of equipment shall be in accordance with DNVGL-OS-E201 Ch.3.

6 Bow loading

6.1 General

6.1.1 General
The additional notation BOW LOADING applies to units having a bow loading arrangement satisfying the requirements of [6.2].

6.1.2 Objective
The notation’s objective is to ensure safe and reliable bow loading arrangements.
6.1.3 Scope
The notation covers requirements for:
- materials
- arrangement
  The requirements cover the parts of OCIMF’s Recommendations for equipment
- control and monitoring
- safety installations
- operation manual.

6.1.4 Application
The notation is applicable for all different units as covered by these Rules.

6.2 Technical requirements
The requirements of the DNV Rules for ships, Pt.5 Ch.3 Sec.14, shall be complied with as applicable.

6.3 Certification of materials and components
The requirements of the DNV Rules for ships, Pt.5 Ch.3 Sec.14, shall be complied with as applicable.

7 Submerged turret loading

7.1 General

7.1.1 General
The additional notation STL applies to units or installations having a submerged turret loading arrangement satisfying the requirements of [7.2].

7.1.2 Objective
The notation’s objective is to ensure safe and reliable submerged turret loading arrangements.

7.1.3 Scope
The notation covers requirements for:
- materials
- arrangement
- control and monitoring
- safety installations
- operation manual.

7.1.4 Application
The notation is applicable for all different units as covered by DNVGL-OS-102.

7.2 Technical requirements
The requirements of the DNV Rules for ships, Pt.5 Ch.3 Sec.14, shall be complied with as applicable.

7.3 Certification of Materials and components
The requirements of the DNV Rules for ships, Pt.5 Ch.3 Sec.14, shall be complied with as applicable.

8 Hydrocarbon production plant

8.1 General
Units or installations fitted with offshore hydrocarbon production facilities in compliance with DNV GL requirements may be assigned class notation PROD.
8.2 Technical requirements
The requirements for production plants are stated in DNVGL-OS-E201.

8.3 Certification of materials and components

8.3.1 Procedures and requirements for classification including certification of equipment shall be in accordance with DNVGL-OS-E201 Ch.3.

8.3.2 Manufacturers of materials, components and equipment for PROD class shall, prior to construction is started, provide the Society with evidence of their capability to successfully carry out fabrication with adequate quality.

Guidance note:
Evidence may incorporate successful outcome of construction projects of similar nature.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

9 Helicopter decks

9.1 General

9.1.1 Units fitted with erected landing platforms for helicopters or landing areas arranged directly on decks or top of deckhouses may be given the class notation HELDK together with qualifiers as defined in Table 3.

9.1.2 Objective
The objective of the HELDK notation is to ensure the safety and reliability of helicopter deck structure and ship safety in relation with helicopter operations and hangar facilities.

9.1.3 Scope
The scope of the notations is dependent on the qualifiers as listed in Table 3.

Table 3 HELDK class notation

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HELDK</td>
<td>Helicopter deck</td>
<td>&lt;none&gt;</td>
<td>Structure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S</td>
<td>Additional requirements to ship safety.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
<td>Additional requirements to helicopter safety.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>Additional requirements to helicopter facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(N)</td>
<td>Evaluated with respect to requirements for operation on the Norwegian Continental Shelf (NCS)</td>
</tr>
</tbody>
</table>

9.1.4 Application
The application of the different qualifiers is restricted as follows:

— The qualifier H can only be applied together with the qualifier S.
— The qualifier F can only be applied together with the qualifiers SH.
— The qualifier (N) can only be applied together with qualifiers SH or SHF.

9.2 Technical requirements
Technical requirements for HELDK shall comply with DNVGL-OS-E401 Ch.2, as applicable:

— Sec.1 to Sec.4 for notation HELDK
— Sec.5 Additional requirements for qualifier S
— Sec.6 Additional requirements for qualifier H
— Sec.7 Additional requirements for qualifier F.

For additional requirements for qualifier (N) see DNVGL-SI-0166 Ch.2 Sec.9.
9.3 Certification of materials and components
There are no additional requirements regarding certification.

10 Crane installations

10.1 General

10.1.1 Objective
The objective of the CRANE notation is to define technical requirements for on-board permanent installed cranes.

10.1.2 Scope
In addition to certification of the crane, the following is covered:
— supporting structure for the crane, (strengthening of deck structure, pedestal etc.)
— devices for locking crane in parked position (unit at sea)
— the crane itself with respect to safety and functioning.

10.1.3 Application
The CRANE notation may be given to units with permanently installed cranes.

10.1.4 For units intended for lifting as main service reference is also made to the service notation Crane Unit described in Sec.5.

10.2 Technical requirements
The requirements given in the DNV Rules for ships, Pt.6 Ch.1 Sec.3, shall be complied with for assignment of class notation CRANE.

10.3 Certification of materials and components
The crane(s) covered by class notation CRANE shall be delivered as DNV GL certified in accordance with DNV Standards for Certification No. 2.22 Lifting Appliances.

11 Additional fire protection

11.1 General

11.1.1 Units with additional fire safety measures in accommodation spaces and machinery spaces may be assigned class notation F. The various qualifiers are related to areas subjected to additional fire protection as given in Table 4.

11.1.2 Objective
The F notation aims at increased fire protection through preventive measures as well as measures for reducing the consequences of fire.

11.1.3 Scope
The scope of the notation covers arrangement, structural and active fire protection, fire fighting systems and firefighter’s outfit.

11.1.4 Application
The qualifiers can be applied individual or in combination.

Table 4 Class notations for additional fire protection

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Additional fire protection</td>
<td>A</td>
<td>Accommodation space</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>Machinery space</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>Cargo space</td>
</tr>
</tbody>
</table>

DNV GL AS
11.2 Technical requirements
The requirements as stated in the DNV Rules for ships, Pt.6 Ch.4, shall be complied with for assignment of the class notations.

11.3 Certification of materials and components
There are no additional certification requirements.

12 Loading computer

12.1 General

12.1.1 Units having installed a system integrated systems developed to assist the master as a decision aid when the ship has been subjected to damage and consequent flooding may be given the class notation LCS-DC.

The letters are denoting Loading Computer System-Damage Control.

12.1.2 Objective
The objective of the notation is to ensure the correct calculating of damage stability following a collision, grounding or other incidents causing flooding.

12.1.3 Scope
A loading computer system designed for this purpose is assumed to consist of the following main parts:

— level sensors in all spaces which enables sounding of flooded compartments
— draught readings sensors to read draughts of the ship fore, midship (port and starboard) and aft
— a loading computer system, located on the navigation bridge (and safety centre, if located in a separate space from the navigation bridge), able to calculate the stability based on the input provided by the sensors.

12.2 Technical requirements
The requirements of the DNV Rules for ships Pt.6 Ch.9 Sec.4 shall be complied with as applicable.

12.3 Certification of materials and components
The certification covers the loading computer system and the software installed.

13 Periodically unattended machinery space

13.1 General

13.1.1 Units where all machinery in the engine room necessary for performance of main functions have been fitted with instrumentation and automation systems in compliance with this sub-section, may be assigned class notation E0 or ECO.

13.1.2 Objective
The class notation E0 denotes that the safety of the ship in all sailing conditions, including when manoeuvring and alongside, is equivalent to that of a ship whose machinery spaces are attended.

The class notation ECO denotes that the ship is equipped with instrumentation and automation equipment and systems enabling the continuous supervision of its machinery from a centralised control station.

13.1.3 Scope
The scope of the notation covers:

— engine control system
— alarm system
— safety system
13.2 Technical requirements

13.2.1 Assignment of class notations E0 and ECO is based on compliance with the DNV Rules for ships, Pt.6 Ch.3, with qualifications given in [13.2.2].

13.2.2 References to the DNV Rules for ships, Pt.4 Ch.10 (fire protection) shall be replaced with DNVGL-OS-D301 for unit application.

13.3 Certification of materials and components

Certification requirements are given in the DNV Rules for ships.

14 Hull monitoring system

14.1 General

14.1.1 Units equipped with instrumentation system for monitoring hull behaviour in accordance with the requirements of this section may be assigned class notation HMON as given in the DNV Rules for ships, Pt.6 Ch.11.

14.1.2 Objective

The system will give warning when stress levels and the frequency and magnitude of accelerations approach levels which require corrective action.

14.1.3 Scope

The owner shall decide how the hull monitoring system should be configured, i.e. which features to be included and how the measured and processed data shall be used.

14.1.4 Application

See DNV Rules for ships, Pt.6 Ch.11 for qualifier definitions.

14.2 Technical requirements

Assignment of HMON class notations is based on compliance with the DNV Rules for ships, Pt.6 Ch.11.

15 Fatigue methodology for ship-shaped units

15.1 General

15.1.1 Ship shaped units may be assigned class notation FMS.

15.1.2 The requirement for FMS notation is an addition to the fatigue strength requirements for classification. The FMS notation has been introduced for owners or operators who require additional fatigue safety by using a detailed fatigue methodology for the structures, with increased focus of fatigue critical details during new building phase. The increased safety level will reduce the risk of disruption during production due to repair of fatigue damage.

15.1.3 FMS notation is based on minimum 20 year design fatigue life as default. If the design fatigue life is specified differently, the specified design fatigue life will be included in brackets, e.g. FMS(30). The environmental data for the transit and offshore sites, which form the basis for the design, will be specified in the “Appendix to the Classification Certificate”.

15.1.4 The FMS notation covers design, fabrication and operation of the unit. The specific methodology for design and fabrication are included in the DNVGL-RP-C206 “Fatigue Methodology for Offshore Ships”. Inspection in the operational phase will be included in the in-service inspection program (IIP). The IIP can be based on a risk based approach.
15.2 Technical requirements
Assignment of class notation FMS is based on compliance with requirements in DNVGL-RP-C206.

16 Noise, vibration and comfort rating notations

16.1 General

16.1.1 Units arranged and equipped with the aim to reduce the impact of noise or vibration may be assigned for the following additional class notations as given below.

Table 5 Class notations related to noise and vibration

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMF</td>
<td>Requirements for noise, vibration and indoor climate</td>
<td>C(crn)</td>
<td>Indoor climate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V(crn)</td>
<td>Noise and vibration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>crn</td>
<td>comfort rating number, 1, 2 or 3, where 1 is best.</td>
</tr>
<tr>
<td>VIBR</td>
<td>Vibration level criteria for machinery, components, equipment and structure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16.1.2 Objective
The objective of COMF is to reduce the impact of noise and vibration related to comfort on board may be assigned for the following additional class notations

16.1.3 The objective of VIBR is to reduce the risk of failure in machinery, components and structures onboard units, caused by excessive vibration.

16.1.4 Scope
The scope of COMF covers noise, vibration and indoor climate as reflected by the qualifiers listed in Table 5.

16.1.5 The scope of VIBR covers

— machinery components and equipment
— structure in compartments where machinery, components and equipment are situated close to the propeller(s).

16.1.6 Application
Units arranged and equipped with the aim to reduce the impact of noise and vibration related to comfort on board may be assigned for the following additional class notations:

— COMF-V(crn), where crn is a comfort rating number which quantifies the comfort rating of noise and vibration for the unit
— COMF-C(crn), where crn is a comfort rating number which quantifies the comfort rating of the indoor climate for the unit, or
— COMF-V(crn)C(crn).

16.2 Technical requirements

16.2.1 The requirements of the DNV Rules for ships Pt.6 Ch.33 shall be complied with as applicable for the notation COMF.

16.2.2 The requirements of the DNV Rules for ships Pt.6 Ch.15 shall be complied with as applicable for the notation VIBR.

16.3 Certification requirements
There are no additional requirements for certification.
17 Cold climate notations

17.1 General

17.1.1 Units designed or strengthened for operation within particular geographical or environmental areas found to be in accordance with relevant class rule requirements may be assigned corresponding optional class notation as specified in detail in the remaining of this sub-section.

17.1.2 Objective

The objective of the notations ICE and PC is to ensure enough strength for navigation and operation in ice infested waters.

The objective of the notation WINTERIZED is to ensure operational availability of marine systems in cold climate conditions.

17.1.3 Scope

The notations ICE and PC cover requirements related to structural strength and are further detailed in [17.2].

The notation WINTERIZED include additional requirements for systems as further detailed in [17.3].

17.1.4 Application

The different notations and their related qualifiers are further detailed in Table 6 and Table 7.

17.2 Structural strength

17.2.1 Column stabilised units

Column stabilised units strengthened for navigation and/or operation in defined ice conditions in accordance with this sub-section may be assigned class notations as described in Table 6.

Table 6  ICE class notations for column stabilised units

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICE-T</td>
<td>Navigation in Ice with the assistance of icebreakers when necessary</td>
<td>(1A)</td>
<td>Intended for navigating in difficult ice conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1B)</td>
<td>Intended for navigating in moderate ice conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1C)</td>
<td>Intended for navigating in light ice conditions</td>
</tr>
<tr>
<td>ICE-L</td>
<td>Operation in ice</td>
<td></td>
<td>Intended for operation in ice determined based on defined ice-conditions, ice detection and ice management systems, operational and emergency procedures</td>
</tr>
</tbody>
</table>

17.2.2 Technical requirements for ICE-T are given in DNVGL-OS-C103 App.E or DNVGL-OS-C201 App.E.

17.2.3 Technical requirements for ICE-L shall as far as relevant and practicable be based on DNV Rules for ships, Pt.5 Ch.1 Sec.3 Ice Strengthening for the Nordic Baltic and Pt.5 Ch.1 Sec.8, Polar Class notations PC-6 and PC-7.

17.2.4 These rules do not consider aspects related to the operation of onboard equipment in cold climate. It is recommended that column-stabilised units intended to navigate and operate in cold climate environments for longer periods comply with the requirements as given in DNVGL-OS-A201 on Cold Climate (see [17.3]).

17.2.5 Ship-shaped units

Ship-shaped units strengthened for navigation in defined ice conditions in accordance with this sub-section may be assigned class notations as described in Table 7.
17.2.6 Technical requirements for **DAT** are given in DNV Rules for ships Pt.5 Ch.1 Sec.7.

17.2.7 Technical requirements for **ICE** are given in DNV Rules for ships Pt.5 Ch.1 Sec.4.

17.2.8 Technical requirements for **PC** are given in DNV Rules for ships Pt.5 Ch.1 Sec.8.

17.3 Winterized

17.3.1 The table below list the different qualifiers for the **WINTERIZED** notation.

### Table 8 Class notation Winterized

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winterized</td>
<td>Operation in cold climate</td>
<td><strong>Basic</strong></td>
<td>Operation occasionally in cold climate for short periods</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Cold</strong></td>
<td>Operation in cold climate regularly or for an extended period of time, though not necessarily in ice-infested waters</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Polar</strong></td>
<td>Operation in extreme cold climate of the polar regions year-round, typically in ice-infested waters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>((t_w))</td>
<td><strong>Extreme Low Ambient Air Temperature in °C</strong></td>
</tr>
</tbody>
</table>

17.3.2 Application

For qualifier **Basic**, a relevant **Ice Class** notation is mandatory if intended to operate in ice-infested waters.

17.3.3 For qualifier **Cold**, a relevant **Ice Class** notation is mandatory if intended to operate in ice-infested waters.

17.3.4 For qualifier **Polar**, a relevant **Ice Class** notation and class notation **Clean** are mandatory.

17.3.5 Additional details are given in DNVGL-OS-A201 Ch.3.

---

**Table 7 ICE class notations for ship shaped units.**

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICE</td>
<td>Navigation in ice – baltic ice classes</td>
<td><strong>1A</strong>*</td>
<td>normally capable of navigating in difficult ice conditions without the assistance of icebreakers</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>1A</strong></td>
<td>capable of navigating in difficult ice conditions, with the assistance of icebreakers when necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>1B</strong></td>
<td>capable of navigating in moderate ice conditions, with the assistance of icebreakers when necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>1C</strong></td>
<td>capable of navigating in light ice conditions, with the assistance of icebreakers when necessary</td>
</tr>
<tr>
<td>PC</td>
<td>Polar Class - navigation in ice-infested polar waters</td>
<td><strong>1</strong></td>
<td>Year-round operation in all polar waters</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2</strong></td>
<td>Year-round operation in moderate multi-year ice conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3</strong></td>
<td>Year-round operation in second-year ice which may include multi-year ice inclusions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>4</strong></td>
<td>Year-round operation in thick first-year ice which may include old ice inclusions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>Year-round operation in medium first-year ice which may include old ice inclusions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>6</strong></td>
<td>Summer / autumn operation in medium first-year ice which may include old ice inclusions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>7</strong></td>
<td>Summer / autumn operation in thin first-year ice which may include old ice inclusions</td>
</tr>
</tbody>
</table>
17.3.6 Technical requirements
The technical requirements are given in DNVGL-OS-A201 Ch.2.

17.3.7 Certification requirements
The certification requirements are given in DNVGL-OS-A201 Ch.3 Sec.2.

18 Environmental notations

18.1 General
Table 9 provides an overview of the environmental related notations.

Table 9 Class notations related to environment

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BWM</td>
<td>Ballast Water Management</td>
<td>E</td>
<td>Ballast water management system based on Exchange</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>Ballast water management system on Treatment</td>
</tr>
<tr>
<td>CLEAN</td>
<td>Arrangements for controlling and limiting operational emissions and discharges</td>
<td>&lt;none&gt;</td>
<td>Basic operational requirements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DESIGN</td>
<td>Additional operational requirements. Design requirements for protection against accidents and for limiting their consequences.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tier III</td>
<td>For vessels complying with the NOx emission requirements of Tier III according to MARPOL Annex VI, Regulation 13</td>
</tr>
<tr>
<td>OPP</td>
<td>Oil Pollution Preventive system</td>
<td>F</td>
<td>fuel oil system</td>
</tr>
<tr>
<td>Recyclable</td>
<td>Safe and Environmentally Sound Recycling of Ships</td>
<td></td>
<td>Covering the development of Inventory of Hazardous Materials Part 1</td>
</tr>
<tr>
<td>VCS</td>
<td>Vapour control systems</td>
<td>1</td>
<td>Basic installation (meeting IMO MSC/Circ.585)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>VCS-1 + overfill alarm (meeting USCG CFR 46 part 39)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>VCS-2 + installation for onboard vapour processing</td>
</tr>
</tbody>
</table>

18.2 Objective

18.2.1 The class notation BWM describes a ballast water management system in line with the International Convention for the Control and Management of Ship’s Ballast Water and Sediments as adopted by IMO 13 February 2004.

18.2.2 The class notation CLEAN identifies the basic requirements for controlling and limiting operational emissions and discharges. The class notation CLEAN DESIGN identifies additional requirements for controlling and limiting operational emissions and discharges. In addition, this notation specifies design requirements for protection against accidents and for limiting their consequences.

18.2.3 The objective of OPP-F is to prevent oil pollution by specifying additional preventive measures for the fuel oil system.

18.2.4 The objective of RECYCLABLE is to document early compliance with the requirements for IHM set forth by the IMO Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships.

18.2.5 The objective of VCS is to define criteria which apply to shipboard systems for control of vapour emissions from liquid cargoes.

18.3 Technical requirements

18.3.1 BWM
The requirements given in the DNV Rules for ships, Pt.6 Ch.18, shall be complied with for assignment of the class notation BWM following the different qualifiers as specified.
18.3.2 CLEAN DESIGN
The requirements given in the DNV Rules for ships, Pt.6 Ch.12, shall be complied with for assignment of the class notations CLEAN/CLEAN DESIGN with the deviations as given in 18.3.3.

18.3.3 For the application of CLEAN DESIGN for offshore units, the requirement for NAUT-AW or NAUT-OSV(A) can generally be waived based on an assumption of the lower navigational risk due to the operational pattern of the unit (i.e. most of time in a fixed location).

The requirement to oil tank protection as a distance to bottom shell plating may also be waived under certain conditions but shall be evaluated on a case-by-case basis.

18.3.4 OPP-F
For OPP-F The requirements given in the DNV Rules for ships, Pt.6 Ch.1 Sec.5, shall be complied with for assignment of the class notations.

18.3.5 RECYCLABLE
The requirements given in the DNV Rules for ships, Pt.6 Ch.27, shall be complied with for assignment of the class notation RECYCLABLE

18.3.6 VCS
The requirements given in the DNV Rules for ships, Pt.6 Ch.10, shall be complied with for assignment of the class notation VCS.

19 Enhanced system verification

19.1 General

19.1.1 The notation ESV indicates that specified onboard system have been subject to enhance system verification.

19.1.2 Objective
The objective is to analyse the specified target system by use of one or more verification methods as described in these rules in order to provide objective evidence of acceptable functionality and quality according to stated requirements.

Guidance note:
Application of any enhanced system verification should provide an additional broader and/or deeper and/or earlier verification of the applicable requirements when compared to normal classification test activities required for the target system(s).

---e-n-d---o-f---g-u-i-d-a-n-c-e---n-o-t-e---

19.1.3 Scope
The requirements apply to marine and offshore systems and cover test and verification methods that may be utilized to assist in verification of functionality and performance of such systems.

19.1.4 Application
The target systems available for enhanced system verification methods in the ESV notation are specified in Table A1 of the DNV Rules for ships Pt.6 Ch.22 Sec.1.
Any combination of selected systems can be made.

19.1.5 The ESV notation can only be applied for systems covered by classification through main class and additional class notation assigned the unit.

19.1.6 The applied verification method is showed in the notation string as listed in the table below.

19.1.7 The verification methods are aligned to be applied in conjunction with classification activities of systems at e.g. type approval, manufacturing survey, onboard testing, and on sea trial in order to provide additional evidence of expected and required functionality.
19.2 Technical requirements
There are not additional technical requirements to the target system.

19.3 Certification requirements
There are not additional certification requirements to the target system.

20 Integrated software dependent systems

20.1 General

20.1.1 Units built and tested in compliance with the requirements of DNVGL-OS-D203 may be assigned one of the optional class notations for integrated software-dependent systems shown in Table 11.

20.1.2 Objective
The objective of ISDS is to reduce the risk for delays in new-build projects and modification projects, as well as for downtime and accidents caused by software in the operation phase.

20.1.3 Scope
The systems covered by the notation are to be specified and are as shown by the given qualifiers. The selection of systems is listed in DNVGL-OS-D203 Ch.3 Sec.1 Table 1.

The scope of DNV GL’s involvement depends on the confidence level specified.

20.1.4 Application
Any combination of selected systems can be made.

20.1.5 ISDS can only be applied for systems as covered by classification through main class and other additional class notations.

20.1.6 Unless otherwise agreed the confidence levels of DNVGL-OS-D203 Ch.3 Sec.1 Table 1 apply.

20.2 Technical requirements
There are no additional technical product requirements.

20.3 Certification requirements
There are no additional certification requirements.

21 Special feature notations

21.1 General
Special feature notations provide information regarding special design assumptions, arrangements or equipment which is not covered by other class notations. Requirements related to special feature notations currently in use are described in this sub-section.
21.2 Special feature notation NON-SELFPROPELLED

21.2.1 Objective
To indicate the specific propulsion and steering arrangements for independent transits.

21.2.2 Scope
For NON-SELFPROPELLED units the design scope for steering gear, tailshaft and thrusters for propulsion may be adjusted in accordance with the intended use (e.g. for DYNPOS-AUTS, POSMOOR, as auxiliary installation, or not used at all).

For SELF PROPELLED units the design scope includes steering gear, tailshaft and thrusters for propulsion.

21.2.3 Application
The notation NON-SELFPROPELLED is applicable for any vessel type and service objective exempt for self-elevating units. The notation is not applicable for units with a main notation OI.

The SELF PROPELLED notation is applicable for self-elevating units with propulsion and steering.

21.3 Tailshaft monitoring – TMON

21.3.1 Objective
The objective of TMON is to extend the sterntube and propeller shaft survey interval.

21.3.2 Scope
The notation describes the monitoring of the sterntube in order to give sufficient information to evaluate the operation conditions for bearings, seals and shaft.

21.3.3 Application
TMON is applicable for conventional propulsion shafts with oil lubricated sterntube bearing.

21.3.4 Technical requirements
The technical requirements from DNV Rules for ships Pt.4 Ch.4 Sec.1 E300 apply.

21.3.5 Certification requirements
There are no specific certification requirements.

21.4 Special feature notation BIS

21.4.1 Objective
The BIS notation indicates that the ship is prepared for in-water survey.

21.4.2 Scope
The BIS notation covers:

– On board documentation
– Marking of ship’s side and bottom
– Rudder, tailshaft and thrusters.

21.4.3 Application
Units prepared for in-water survey during building may be given the notation BIS.

21.4.4 Technical requirements
The technical requirements in the DNV Rules for ships, Pt.3 Ch.1 Sec.1 D, shall be complied with.

21.4.5 Certification requirements
There are no additional certification requirements.
## 22 Summary of reference documents for additional class notations

Rules and standards which shall be applied for assignment of system and special facility class notations are summarised in [Table 12](#).

### Table 12 Summary of reference documents for system and special facility notations

<table>
<thead>
<tr>
<th>Notation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOW LOADING</td>
<td>DNV Rules for ships, Pt.5 Ch.3, Sec. 14</td>
</tr>
<tr>
<td>BWM</td>
<td>DNV Rules for ships, Pt.6 Ch.18</td>
</tr>
<tr>
<td>CLEAN/ CLEAN DESIGN</td>
<td>DNV Rules for ships, Pt.6 Ch.12 Sec.1</td>
</tr>
<tr>
<td>COMF</td>
<td>DNV Rules for ships Pt.6 Ch.33</td>
</tr>
<tr>
<td>CRANE</td>
<td>DNV Rules for ships Pt.6 Ch.1 Sec.3</td>
</tr>
<tr>
<td>DYNPOS</td>
<td>DNV Rules for ships Pt.6 Ch.7</td>
</tr>
<tr>
<td>DYNPOS-ER</td>
<td>DNV Rules for ships Pt.6 Ch.26</td>
</tr>
<tr>
<td>DPS</td>
<td>DNV Rules for ships Pt.6 Ch.7</td>
</tr>
<tr>
<td>ESV</td>
<td>DNV Rules for ships Pt.6 Ch.22</td>
</tr>
<tr>
<td>E0 / ECO</td>
<td>DNV Rules for ships Pt.6 Ch.3</td>
</tr>
<tr>
<td>F</td>
<td>DNV Rules for ships Pt.6 Ch.4</td>
</tr>
<tr>
<td>FMS</td>
<td>DNVGL-RP-C206 “Fatigue Methodology of Offshore Ships”</td>
</tr>
<tr>
<td>HELDK</td>
<td>DNVGL-OS-E401</td>
</tr>
<tr>
<td>HMON (...)</td>
<td>DNV Rules for ships Pt.6 Ch.11</td>
</tr>
<tr>
<td>ICE</td>
<td>DNV Rules for ships Pt.5 Ch.1 Sec.3</td>
</tr>
<tr>
<td>ISDS</td>
<td>DNVGL-OS-D203</td>
</tr>
<tr>
<td>LCS-DC</td>
<td>DNV Rules for ships Pt.6 Ch.9 Sec.4</td>
</tr>
<tr>
<td>OFFLOADING</td>
<td>DNVGL-OS-E201, Ch.12</td>
</tr>
<tr>
<td>OPP-F</td>
<td>DNV Rules for ships Pt.6 Ch.1 Sec.5</td>
</tr>
<tr>
<td>POSMOOR</td>
<td>DNVGL-OS-E301</td>
</tr>
<tr>
<td>PROD</td>
<td>DNVGL-OS-E201</td>
</tr>
<tr>
<td>Recyclable</td>
<td>DNV Rules for ships Pt.6, Ch.27</td>
</tr>
<tr>
<td>SPM</td>
<td>DNV Rules for ships Pt.5 Ch.3 Sec.15</td>
</tr>
<tr>
<td>STL</td>
<td>DNV Rules for ships Pt.5 Ch.3 Sec.14</td>
</tr>
<tr>
<td>VCS</td>
<td>DNV Rules for ships Pt.6 Ch.10 Sec.1</td>
</tr>
<tr>
<td>VIBR</td>
<td>DNV Rules for ships Pt.6 Ch.15 Sec.1</td>
</tr>
<tr>
<td>WINTERIZED</td>
<td>DNVGL-OS-A201</td>
</tr>
</tbody>
</table>
CHAPTER 3 CLASSIFICATION IN OPERATION

SECTION 1 GENERAL PROVISIONS

1 Introduction

1.1 General

1.1.1 This chapter states the principles and requirements for retention of class to units covered by the provisions of these Rules. Requirements are applicable to main class, service notations and additional class notations unless otherwise stated.

1.1.2 The extent of periodical surveying is presented in Sec.3 and Sec.4 for main class, Sec.5 for additional service notations and Sec.6 for additional system and facility notations.

1.1.3 Self-elevating units are to be surveyed as described in DNVGL-RU-OU-0104 Pt.7. For those being self-propelled, the survey of the propulsion systems is as given in this chapter.

1.1.4 A Memo to Owner (MO) shall be issued stating approved changes to survey procedures and acceptance criteria, if any. Technical basis for approved changes shall be stated.

1.1.5 DNV GL will develop and maintain an In-service Inspection Program (IIP) which will contain the structural items to be surveyed to satisfy the requirements of main class, excluding any additional class notations. The IIP constitutes the formal basis for surveying structural items under main class and shall be completed to the satisfaction of attending surveyor before renewal survey can be credited.

1.2 Survey pre-planning and record keeping

1.2.1 A specific survey program for renewal surveys and continuous surveys must be worked out in advance of the renewal survey by the owner in cooperation with the classification society. The survey program in written format. The IIP is the structural part of the program (ref. Sec.3 [1.2]).

1.2.2 Plans and procedures for underwater surveys (or underwater inspection in lieu of dry-docking survey) are to be submitted for review in advance of the survey and made available on board. These should include drawings or forms for identifying the areas to be surveyed, the extent of hull cleaning, non-destructive testing locations (including NDT methods), nomenclature, and for the recording of any damage or deterioration found. Submitted data, after review by the Society, will be subject to revision if found to be necessary in light of experience.

1.2.3 Accessibility and facilities for surveys on location

Annual and special surveys may be carried out on location based on approved procedures outlined in a maintenance system and survey arrangement, without interrupting the function of the unit or installation. See Ch.2 12 for matters which will be taken into consideration for acceptance of surveys to be carried out on location.

1.3 Alternative survey arrangements

Alternative survey arrangements may be accepted as an option to applicable periodical surveys for main class. More details are given in Sec.7.

1.4 Surveys performed by approved companies

Parts of the periodical surveys may be carried out by companies approved by DNV GL. More details are given in Sec.8.
2 Periodical surveys

2.1 General

2.1.1 All units shall be subjected to periodical surveys in accordance with requirements of this chapter in order to confirm that the hull, machinery, equipment and systems remain in satisfactory condition and in compliance with approval or accepted standards.

2.1.2 Periodical surveys will belong to one of the following categories according to the level of survey requirements:

- annual survey
- intermediate survey
- complete survey.

The survey required in conjunction with issuance of a new class certificate is denoted:

- renewal survey.

The following specific surveys may be scheduled according to one or more of the above categories:

- bottom survey.
- propulsion/positioning thruster survey
- boiler survey (including steam generator survey)
- thermal oil heater survey
- survey of optional class notations (voluntary class notations).

2.1.3 Periodical surveys shall be carried out at prescribed intervals and within applicable time windows. A survey may be split in different parts, commenced and progressed within the time window provided all the requirements of the survey are completed by the end of the time window.

The main class intermediate survey cannot serve as commencement of the next renewal survey.

For concurrent surveys (see Table 1) the time window may be limited by that of the other survey.

2.1.4 The due date of a periodical survey will be established depending upon the survey interval, measured from one of the following events, whichever is relevant:

- date of class assignment
- date of commissioning
- due date of the previous corresponding survey
- date of completion of the previous corresponding survey
- date of completion of a major conversion.

A survey may be commenced prior to the defined time window at owner’s request. In such a case the due date of subsequent surveys will be adjusted accordingly.

2.1.5 For certain units the survey intervals may be reduced, e.g. for units with new or novel design or with systems or items exposed to abnormal rate of wear or failure.

2.1.6 The scope of survey may be extended when compliance with applicable rules cannot be satisfactorily confirmed based on extent of surveys as given, or when the surveyor suspects that the unit is not maintained or handled in accordance with the basis for retention of class.

2.2 Postponement of periodical surveys

2.2.1 Except for annual and intermediate surveys for main class, the Society may accept to postpone periodical surveys upon special consideration in each separate case. Postponement of main class renewal survey may be considered only in exceptional circumstances.

2.2.2 Postponement of main class renewal survey shall not exceed 3 months. Postponement of periodical surveys will not affect the surveys next due date.
2.2.3 Postponement of the renewal survey may be granted only upon the owner's written request. Such a request shall be received by the Society well in advance of the expiry date of the classification certificate. A postponement of the renewal survey shall normally be based on satisfactory result from a sighting survey.

2.3 Survey of units out of commission

2.3.1 Units which have been out of commission, e.g. laid up, for a period of at least 12 months, shall be surveyed and tested before re-entering service. The extent of the surveys and tests will be considered in each case depending upon:

— the time the unit has been out of commission
— the maintenance and preservative measures taken during lay-up
— the extent of surveys carried out during the time out of commission.

As a minimum, function testing to confirm the satisfactory operation of the machinery installation shall be carried out. All overdue surveys shall be completed prior to re-entering service.

2.3.2 During lay-up, units shall be subjected to annual survey.

The extent of the annual survey will be reduced compared to main class annual survey, but shall cover watertight integrity, bilge system, fire hazard and equipment in use.

2.4 Survey Schedules

2.4.1 Annual survey schedule is as follows:

— The due date in general corresponds to the anniversary date of the class assignment or the expiry of the previous classification certificate if different.
— The survey shall normally be carried out within a time window of 3 months on either side of the due date.
— In case a main class annual survey is commenced prior to the defined time window, the survey must be completed not more than 6 months after the date of the survey commencement. In such cases the anniversary dates for the subsequent annual surveys will be advanced, corresponding to a date not later than 3 months after the completion date of the commencement survey just carried out.
— An additional main class annual survey may be required when the anniversary date has been advanced.

Annual surveys shall be performed each year, also those years where an intermediate, complete or renewal survey is performed. Survey requirements applicable for annual surveys are therefore not repeated for corresponding intermediate, complete or renewal surveys.

2.4.2 Intermediate survey schedule is as follows:

— The due date shall normally correspond to the date 2.5 years after the expiry date of the previous class certificate.
— The survey shall normally be carried out within a time window of 9 months on either side of the due date.
— The main class intermediate survey shall be completed concurrently with the second or third main class annual survey in each period of the classification certificate.
— The same surveys and thickness measurements of tanks or spaces cannot be credited towards both intermediate and renewal survey. Units that are re-commissioned after being laid-up may be specially considered.

2.4.3 Complete surveys are denoted:

— Complete survey (2.5 years), or
— Complete survey (5 years), or
— Complete survey (15 years).

Complete survey schedule is as follows:

— The due date corresponds to 2.5 years, 5 years or 15 years interval.
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— The survey shall normally be carried out within a time window of 9 months before and 6 months after the due date.
— Survey required to be concurrent with the renewal survey shall be completed no later than at the completion of the renewal survey.

2.4.4 Renewal survey schedule is as follows:
— The due date is set at 5 years interval and corresponds to the expiry date of the classification certificate.
— The survey shall normally be completed within a time window of 3 months before the due date.
— The survey may be commenced at the fourth annual survey or between the fourth and fifth annual surveys.
— In case the survey is commenced more than 15 months before the expiry date of the classification certificate, the due date of the survey will be advanced to a date not later than 15 months after the completion date of the commencement survey.
— The renewal survey shall be completed concurrently with the last main class annual survey in each period of the classification certificate.
— The same surveys and thickness measurements of tanks or spaces can not be credited towards both intermediate and renewal survey. Units that are re-commissioned after being laid-up may be specially considered.

2.4.5 Bottom survey schedule is as follows:
a) The due date is set at intervals in accordance with the following:
   — two bottom surveys are required during each five-year period of the classification certificate
   — the interval between any two successive bottom surveys is in no case to exceed 36 months.
b) The survey shall be carried out on or before the due date.
   Time window is not applicable.
c) One bottom survey shall be carried out in conjunction with the renewal survey, i.e. not more than 15 months prior to the expiry date of the classification certificate.

2.4.6 Survey of geared and podded thrusters for propulsion or dynamic positioning are scheduled according to complete survey (5 year). Podded thrusters shall also have an annual survey.

2.4.7 Boiler and steam drum/steam separator survey schedule is as follows:
— The due date is set at intervals in accordance with the following:
— Two boiler surveys are required during each five-year period of the classification certificate.
— The interval between any two successive boiler surveys is in no case to exceed 36 months.

During each boiler internal survey, the adjustment of the safety valves will be assessed by a DNV GL surveyor.
(see IACS UR Z18)
— The survey shall be carried out on or before the due date. Time window is not applicable.
— One boiler survey shall be carried out in conjunction with the renewal survey, i.e. not more than 15 months prior to the expiry date of the classification certificate.

Units more than 8 years old and retaining the original fitting of a single unit, the main boiler shall be surveyed annually (full scope) and within the annual survey schedule.

2.4.8 Thermal oil heater survey schedule as in [2.4.7].
### 2.5 Class notations

**2.5.1** Optional class notations where specific surveys have been defined are listed in Table 1.

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Survey type</th>
<th>Conjunction with main class survey</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEAN</td>
<td>Arrangements for controlling and limiting operational emissions and discharges</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [15]</td>
</tr>
<tr>
<td>CRANE</td>
<td>On board crane</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [9]</td>
</tr>
<tr>
<td>DPS</td>
<td>Dynamic positioning system</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [3]</td>
</tr>
<tr>
<td>DYNPOS</td>
<td>Dynamic positioning system</td>
<td>Annual</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>E0</td>
<td>Periodically unattended machinery space</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [11]</td>
</tr>
<tr>
<td>ECO</td>
<td>Machinery centralised operation</td>
<td>Annual</td>
<td>Annual</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Additional fire protection</td>
<td>Complete (2.5 years)</td>
<td>Intermediate and renewal</td>
<td>Sec.6 [10]</td>
</tr>
<tr>
<td>HELDK</td>
<td>Helicopter deck</td>
<td>Complete (5 years)</td>
<td>Renewal</td>
<td>Sec.6 [8]</td>
</tr>
<tr>
<td>HMON</td>
<td>Hull monitoring system</td>
<td>Annual</td>
<td>Renewal</td>
<td>Sec.6 [12]</td>
</tr>
<tr>
<td>ISDS</td>
<td>Integrated Software Dependent Systems</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [16]</td>
</tr>
<tr>
<td>LCS</td>
<td>Loading computer system</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [13]</td>
</tr>
<tr>
<td>POSMOOR</td>
<td>Position mooring system</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [2]</td>
</tr>
<tr>
<td>PROD</td>
<td>Production system</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [3]</td>
</tr>
<tr>
<td>Recyclable</td>
<td>Inventory of Hazardous Materials Part 1</td>
<td>Complete (5 years)</td>
<td>Renewal</td>
<td>Sec.6 [15]</td>
</tr>
<tr>
<td>TMON</td>
<td>Tailshaft monitoring</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [17]</td>
</tr>
<tr>
<td>VIBR</td>
<td>Vibration level limitation</td>
<td>Complete (5 years)</td>
<td>Renewal</td>
<td>Sec.6 [13]</td>
</tr>
<tr>
<td>Winterized</td>
<td>Operation in cold climate</td>
<td>Annual</td>
<td>Renewal</td>
<td>Sec.6 [14]</td>
</tr>
</tbody>
</table>
2.5.2 Class notations for which no survey requirement is defined, e.g. because the class notation is design related only, are listed in Table 2.

**Table 2 Class notations without survey requirements**

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIS</td>
<td>Built for in-water survey</td>
</tr>
<tr>
<td>COMF</td>
<td>Requirements for noise, vibration and indoor climate</td>
</tr>
<tr>
<td>DAT</td>
<td>Design ambient air temperature suitable for regular service during winter to Arctic or Antarctic waters</td>
</tr>
<tr>
<td>FMS</td>
<td>Fatigue methodology for ship-shaped units</td>
</tr>
<tr>
<td>ICE</td>
<td>Navigation in ice</td>
</tr>
<tr>
<td>OPP-F</td>
<td>Oil pollution prevention - fuel systems</td>
</tr>
<tr>
<td>PC</td>
<td>Polar Class - navigation in ice-infested polar water</td>
</tr>
<tr>
<td>POLAR</td>
<td>Arctic ice rules</td>
</tr>
<tr>
<td>SPM</td>
<td>Single point mooring</td>
</tr>
<tr>
<td>STL</td>
<td>Submerged turret loading</td>
</tr>
</tbody>
</table>
SECTION 2 GENERAL REQUIREMENTS FOR STRUCTURE AND MACHINERY SURVEYS

1 General

1.1 Preparation for survey

1.1.1 The owner shall provide the necessary facilities for safe execution of surveys.

1.1.2 For overall and close-up examination, means shall be provided to enable the surveyor to examine the structure in a safe and practical way, see [2.1].

2 Hull and equipment

2.1 Conditions for survey and access to structures

2.1.1 In preparation for survey and to allow for a thorough examination, all spaces shall be cleaned including removal from surfaces of all loose accumulated corrosion scale. In tanks where soft or semi-hard coatings have been applied, representative areas and those areas where it is obvious that further close-up examination is required shall be cleaned for inspection.

Guidance note:
Spaces should be sufficiently clean and free from water, scale, dirt, oil residues etc. to reveal corrosion, deformation, fractures, damage, or other structural deterioration. However, those areas of structure whose renewal has already been decided need only be cleaned and descaled to the extent necessary to determine the limits of the renewed areas. For more detailed information with regard to a tank where soft coatings have been applied, see IACS recommendation No. 44.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---
If neither of the above conditions are met, then staging or “other equivalent means” of access shall be provided for the survey of the under deck areas.

The use of rafts or boats alone does not preclude the use of boats or rafts to move about within a tank during a survey.

**Guidance note:**
Reference is made to IACS Recommendation No. 39 – Guidelines for the use of Boats or Rafts for Close-up surveys.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

**Guidance note:**
Use of remote inspection technique methods to facilitate the required internal examinations, including close-up examinations and thickness measurements, may be specially considered by the Society. The methods applied shall provide the information normally obtained from a survey carried out by the surveyor.

In order to verify the results, confirmatory close-up examinations and thickness measurements at selected locations should be carried out by the surveyor, not using the remote inspection technique method.

Proposals for use of remote inspection technique methods should be submitted to the Society for acceptance in advance of the survey.

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**2.1.5** A survey planning meeting shall be held prior to the commencement of any renewal and intermediate surveys between the attending surveyor(s), the owner’s representative in attendance and the thickness measurement / NDT company representative, where involved.

**2.2 Survey extent**

**2.2.1** The survey consists of examination, measurements and testing as required for different survey categories with the aim to ensure that the hull structure, hull equipment and piping are in satisfactory condition with respect to corrosion, deformation, fractures, damage or other structural deterioration.

**2.2.2** When examination or overall examination is required the structure or object is visually examined from a significant distance. In such cases the general maintenance, the condition of protective coating, rust deposits, leakages and structural detachments and damage may be observed and the surveyor may extend the survey as considered necessary.

**2.2.3** When close-up examination is specified by the rules or required by the surveyor the structure or object is visually examined from a distance normally within reach of hand. The surveyor may extend the close-up examination as deemed necessary taking into account the maintenance of the spaces under survey, the condition of the corrosion prevention system and where spaces have structural arrangements or details which have suffered defects in similar spaces or on similar units according to available information.

**2.2.4 Thickness measurements**

Thickness measurements, for general assessment and recording of corrosion pattern, shall be taken of those structural members subject to close-up examination as specified by the requirements relevant for the survey or as given in [2.2.5].

**2.2.5** The surveyor may require thickness measurements in any portion of the structure where signs of wastage are evident or in areas where wastage is normally found. The surveyor may extend the scope of the thickness measurements if considered necessary.

**2.2.6** When thickness measurements are specified by the rules or required by the surveyor the measurements shall be carried out to an extent sufficient to determine both general and local corrosion levels.

Thickness measurements shall be carried out by a qualified company approved by the Society and witnessed by a surveyor (see also Sec.8 on Services by approved companies). This requires the surveyor to be on board, while the measurements are taken, to the extent necessary to control the process.

Where it is required to carry out thickness measurements of structures subject to close-up examination, these measurements shall be carried out simultaneously with the close-up examination.

The surveyor shall review the final thickness measurement report and countersign the cover page.

**2.2.7** Where substantial corrosion, as defined in Ch.1 Sec.1 [2] is found, additional thickness measurements shall be taken to confirm the extent of substantial corrosion.
2.2.8 The examination may be extended also in cases when:

— information is available of defects suffered on similar structure or details in similar tanks/holds or on similar units
— the structure under survey has been approved with reduced scantlings due to an approved corrosion control system.

2.2.9 The owner shall keep a complete record of all the thickness measurements and prepare a thickness measurement report including:

— locations of the measurements
— thickness measured and corresponding original thickness
— the date when the measurements were carried out
— type of measuring equipment
— personnel performing the measuring and their qualifications.
— the report shall be signed by the operator.

These additional thickness measurements shall be carried out before the survey is considered as completed.

2.2.10 Corrosion allowance

In the design of column-stabilised and jack-up units corrosion allowance is normally not included as the structure is considered adequately protected against corrosion, e.g. by sacrificial anodes, impressed current and coating.

For ship-shape units corrosion addition is included as part of the DNV Rules for ships, but for hull girder global strength gross thickness is used combined with a corrosion protection system similar for column-stabilised and jack-up units.

The corrosion diminution criteria as given in DNVGL-CG-0172, shall be applied. Alternative methods may be accepted in agreement with the Society.

2.2.11 Conditions of protective coating

Where provided, the condition of protective coating of cargo holds, cargo tanks and ballast tanks shall be examined.

The condition will be rated GOOD, FAIR or POOR as defined in Table 1.

Table 1 Conditions of protective coating

<table>
<thead>
<tr>
<th>Corrosion prevention system</th>
<th>Condition with only minor spot rusting.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion prevention system Normally a full hard coating, usually to be epoxy coating or equivalent. Other coating systems, which are neither soft nor semi-hard coatings, may be accepted provided they are applied and maintained in compliance with the manufacturer's specification. (Ref. IACS UR Z7)</td>
<td>Normally a full hard coating, usually to be epoxy coating or equivalent. Other coating systems, which are neither soft nor semi-hard coatings, may be accepted provided they are applied and maintained in compliance with the manufacturer's specification. (Ref. IACS UR Z7)</td>
</tr>
<tr>
<td>Corrosion condition &quot;GOOD&quot;</td>
<td>Condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.</td>
</tr>
<tr>
<td>Corrosion condition &quot;FAIR&quot;</td>
<td>Condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.</td>
</tr>
</tbody>
</table>

2.2.12 For structures where original protective coatings are in GOOD condition, the extent of close-up examination and thickness measurements may be specially considered.

Special consideration as used in this context is taken to mean, as a minimum, that sufficient close-up examination and thickness measurements are carried out to confirm the actual average condition of the structure under the protective coating.

For areas with general breakdown of the protective coating, close-up examination and thickness measurements shall be carried out to an extent sufficient to determine both average and local corrosion levels.
2.2.13 The above also applies to tanks of stainless steel. If not otherwise specified, the same applies for re-coated structures (by epoxy coating or equivalent, alternatively a type approved coating, e.g. semi-hard), provided that the condition of the protective coating is in GOOD condition and that documentation is available stating that:
— the scantlings were assessed and found satisfactory by a surveyor prior to re-coating
— the coating was applied according to the manufacturer's recommendations.

2.3 Repair of structural damage or deterioration

2.3.1 A prompt and thorough repair is a permanent repair completed at the time of survey to the satisfaction of the surveyor, therein removing the need for the imposition of any associated condition of class.

Guidance note:
There are situations that composite repairs can be accepted on a case by case basis. For the procedure to be followed we refer to RP-0177. Class is involved before the application.

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2.3.2 Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the surveyor, will affect the unit's structural, watertight or weathertight integrity, shall be promptly and thoroughly repaired.

2.3.3 For locations where adequate repair facilities are not available, consideration may be given to allow the unit to proceed directly to a repair facility.

2.3.4 Additionally, when a survey results in the identification of significant corrosion or structural defects, either of which, in the opinion of the surveyor, will impair the unit's fitness for continued service, remedial measures shall be implemented before the unit continues in service.

3 Machinery and systems

3.1 Maintenance and preparation for survey

3.1.1 Every unit shall have implemented a maintenance system including machinery system and equipment subject to class (see Table 1).

The maintenance system shall ensure that:
— inspections and maintenance are carried out at defined intervals
— any non-conformity is reported with its possible cause, if known
— appropriate corrective action is taken
— records of these activities are maintained.

The machinery and systems subject to class shall be maintained in accordance with the maintenance system implemented.

Guidance note:
The maintenance system may be paper based or in a electronic format.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

3.1.2 In preparation for survey and to allow for a thorough examination, machinery components and related spaces shall be cleaned, including removal from surfaces of loose accumulated corrosion scale, mud and oil-residues. The spaces and components of attention shall have proper access including dismantling as necessary.

3.2 Machinery verification

3.2.1 If significant repairs are carried out to main or auxiliary machinery, a dock and/or sea trial shall be carried out as required by the attending surveyor.
3.2.2 For propulsion systems where shaft alignment calculations have been required, the alignment shall be confirmed by suitable measurements when the system has been dismantled and or when external forces (e.g. grounding, welding work) may have influenced the alignment.

The measurements shall be carried out with the ship afloat and be presented to the attending surveyor.

Systems which require shaft alignment are specified in DNV Rules for ships Pt.4 Ch.4 Sec.1 A403 and F400.

Guidance note:
For installation and testing refer to DNV Rules for ships Pt.4 Ch.4 Sec.1 H300 and I100.

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3.2.3 As an alternative to opening up for inspection, measurements may be carried on certain components such as vibration dampers, elastic couplings, speed governor and quick passing through device.

4 Special provisions for ageing offshore units

4.1 General

4.1.1 Mobile Offshore Units with age exceeding their initial design life (in many cases 20 years) shall be subject to evaluation for special provisions.

4.1.2 The special provisions for maintaining required safety level is related to fatigue and corrosion condition of the hull and supporting structure. Degradation mechanisms due to ageing effects related to other aspects such as marine systems have also to be given due consideration by owner through maintenance, and by DNV GL surveyors through regular surveys.

4.2 Corrosion measurements and condition of protective coating

The special provisions with regard to condition of protection coating system and minimum measurements are included in the descriptions for the renewal survey as specified in Sec.3 [4]. In addition is referred to [2.2] with regard to thickness measurements and inspection of protective coatings in general.

4.3 Fatigue utilization index (FUI)

4.3.1 The FUI is defined as the ratio between the effective operational time and the initially documented fatigue life.

4.3.2 When the actual age of the unit exceeds the documented fatigue life, the fatigue utilisation index (FUI) shall be calculated for the following type of units:

— column-stabilised
— self-elevating.

4.3.3 FUI calculation is not required for ship-shaped units. These units have a more robust fatigue redundancy and are considered adequately covered by standard survey arrangements.

4.3.4 If fatigue cracks have been found in a unit prior to the FUI reaching 1.0, and the findings are located within fatigue sensitive areas of the unit, the owner shall assess structural details in these areas at latest prior to the renewal survey for the 5-year period.

4.3.5 Calculation of effective operational time shall be based on the recorded operation history. For the purpose of calculating the FUI, the following may be assumed:

— contribution from operation in harsh environment, e.g. North Sea, North Atlantic and Canada, equals actual operating time in such environment
— contribution from operation in other environments equals one third (1/3) of actual operating time in such environments
— periods of lay-up and yard stay may be disregarded
— for self-elevating units; contribution from transit operation.

4.3.6 The owner shall submit FUI as part of the planning process prior to renewal survey, see [4.3.2] above.
4.3.7 Operation of the unit may continue when FUI > 1.0 provided:
— the required safety level of the vessel is maintained
— no fatigue cracks have been found in critical areas of the unit
— the inspection program is extended.

4.3.8 When the FUI > 1.0, the following measures will in general be taken:
— The Society will issue a MO (Memo to Owner) stating the actual FUI.
— The installed leak detection system for column stabilized units shall be examined for leakage two times each month and shall be confirmed at each annual survey.

Guidance note:
For additional inspections to self-elevating units, see OU-0104 Pt.7, Ch.2, Sec.3

4.3.9 For a unit with FUI > 1.0 and where cracks have been detected in fatigue sensitive areas, the required safety level is in general considered satisfied either by:
— increasing the inspection frequency (i.e. NDT scope with 2 1/2 year interval) or
— by performing a condition based assessment for the vessel.

Guidance note:
For additional inspections to self-elevating units, see Rules for self-elevating units DNVGL-RU-OU-0104 Pt.7 Ch.2 Sec.3.

Where a condition based assessment for the unit is performed, the procedure and method are to be approved prior to the renewal survey for the next 5-year period.

Guidance note:
A condition based inspection planning is performed by judging the vessel based on the actual condition rather than on age in order to maintain the required safety level. In this context a scope implementing all or parts of the following procedure can/should be performed:
— Apply the results from a fatigue analysis. The detail level of the analysis will influence the results. Higher detail level reduces the uncertainties and increases the confidence in the results and hence reduces the inspection frequency.
— Mapping of critical connections with regard to fatigue capacity, i.e. ranking of fatigue sensitive details.
— Identify details to be modified/upgraded with regard to fatigue strength.
— Determine required safety level - dependent on consequence and access for inspection.
— Apply the fatigue results in a risk based analysis (RBI) including historical data from inspections/findings and inspection quality for preparing the inspection program.
— Evaluate the result from inspections (findings) and/or analysis and perform modifications/improvements ensuring that the associated risks are adequately controlled.
— Perform a continuous updating of the inspection plan based on inspection results.

The inspection plan obtained from a condition based approach depends on the method and procedure applied, including the confidence level of the parameters considered. Less confidence increases the probability of failure (PoF) and hence the inspection frequency will increase.

4.3.10 Previous cracks located in fatigue sensitive areas shall be subject to additional NDE at intermediate surveys corresponding to the extent of the NDE inspection required for the renewal surveys.

4.3.11 Associated plans and procedures, i.e. condition based inspection plans applying risk based approach, shall be approved by the Society. The scope of the improvement program will depend on the initial assessment and owner’s plans for further use of the unit. Units which have undergone an assessment and improvement program to the Society’s satisfaction will be surveyed based on the modified inspection program.
SECTION 3 PERIODICAL SURVEY EXTENT FOR MAIN CLASS

1 General

1.1 Introduction

1.1.1 This section and Sec.4 presents the standard extent of surveys for retention of main class (1A) for mobile offshore units and OI for floating offshore installations as applicable for all service notations.

The descriptions for the different surveys cover first requirements relevant for all vessel types followed by vessel type specific descriptions for subsequently ship-shaped, column-stabilised and self-elevating units.

1.1.2 Main class periodical survey scope includes the applicable service notation survey requirements as listed in Sec.5.

1.1.3 Additional system and special facility covered by main class are given in Sec.5. Subsections for tailshaft (Sec.4 [1]) and thrusters for propulsion (Sec.4 [3]) are not applicable for OI class.

1.1.4 For units and installations with special feature notation NON-SELFPROPELLED the survey scopes for steering gear, tailshaft and thrusters for propulsion may be adjusted to be in accordance with the intended use (e.g. for DYNPOS-AUTS, POSMOOR, as auxiliary installation, or not used).

1.1.5 The extent of the periodical survey on the unit’s structure is further detailed by the In-service Inspection Program (IIP) as described in [1.2].

1.2 In-service inspection program (IIP)

1.2.1 The In-service Inspection Program (IIP) (see Sec.1 [2.1.5]) is developed on the basis of a general, experience-based scope in combination with design and fabrication particulars for the actual unit as well as experience from in-service surveys of units of similar type.

1.2.2 Relevant survey requirements for units of ship-shaped types additional to those stated in the DNV Rules for ships are summarised in Table 1.

Guidance note:
For clearness it is underlined that ship-shaped offshore units are not subject to Extended Hull Survey Requirements (EHSR) or Enhanced Survey Programs (as shown by the ESP class notation) as defined in the DNV Rules for ships.

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1.2.3 The basic scope for development of IIP for units of column-stabilised type is given in Table 2.

1.2.4 The basic scope for development of IIP for units of self-elevating type is given in Table 3.

1.2.5 Detailed locations for thickness gaugings will be prepared based on the condition of the unit and following the applicable table of [4]. Measurements are to be recorded and stored in DNV GL’s Structure Integrity Management (SIM) tool.

1.2.6 The extent of examination specified in the referred tables may be modified based on design documentation evaluation, inspection results / crack history and experience with similar units /details.

1.2.7 The extent of examination specified in the referred tables may be refined by use of RBI / RCM methodologies.

Guidance note:
At the 1st Annual or intermediate survey after construction, column-stabilised and self-elevating units may be subject to examination of major structural components including non-destructive testing, as deemed necessary by the Society. If the Society deems such survey to be necessary, the extent should be agreed to by the Society and the owner or customer prior to commencement of the Survey.

For further guidance on RBI see also DNVGL-RP-0001 Probabilistic methods for planning of inspection for fatigue cracks in offshore structures and DNVGL-RP-0178 Risk Based Corrosion Management.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---
### Table 1  Basis scope for development of IIP for ship-shaped units

<table>
<thead>
<tr>
<th>TYPE OF SURVEY</th>
<th>AS</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INT</td>
<td>EXT</td>
<td>INT</td>
</tr>
<tr>
<td>V</td>
<td>NDT</td>
<td>V</td>
<td>NDT</td>
</tr>
</tbody>
</table>

**Special Areas for Inspection (SP) – connections:**

<table>
<thead>
<tr>
<th>Asignation</th>
<th>AS</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP1 Moonpool openings</td>
<td>C</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>SP2 Turret</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

**Attachments of:**

<table>
<thead>
<tr>
<th>Asignation</th>
<th>AS</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP5 Crane pedestals and top flange</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SP6 Anchor windlasses</td>
<td>X</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>SP7 Anchor chain fairleads</td>
<td>C</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>SP8 Helideck, derrick and drill-floor support</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SP9 Other attachment/support connections e.g. sponsons, life-boat support structure</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Primary Areas for Inspection (PR):**

<table>
<thead>
<tr>
<th>Asignation</th>
<th>AS</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR4 Deck structure and Turret</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PR5 Drill floor with substructure</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PR6 Crane/ gangway pedestal</td>
<td>X</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>PR7 Lifeboat platforms support</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>PR8 Helideck and flare support structure</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PR9 Other support structures</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

A = 100%
B = 50%
C = 25%
X = Spot check 2-5%
V = Visual Inspection including Close Visual Inspection of Special Areas.
NDT = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ECI) of selected stress concentrations and fatigue sensitive details.

**Notes**

1) Special Areas for Inspection (SP) are those sections of the structure which are in way of critical load transfer point, stress concentrations, often special steel selection etc. see listing in [4.3.2]

2) Primary Areas for Inspection (PR) are elements which are essential to the overall structural integrity of the unit. See listing in [4.3.2]

3) - of the total number of these parts.

4) The inspection extent might be reduced (be less than 100%) if based on design documentation, see [1.2.6] (above).
### Table 2 Basis scope for development of IIP for column-stabilised Units

<table>
<thead>
<tr>
<th>TYPE OF SURVEY</th>
<th>AS</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INT</td>
<td>EXT</td>
<td>INT</td>
</tr>
<tr>
<td></td>
<td><strong>V</strong></td>
<td><strong>NDT</strong></td>
<td><strong>V</strong></td>
</tr>
</tbody>
</table>

**Special Areas for Inspection 1)**

(SP) – Connections;

**SP1** Horizontal bracing
- Pontoon to pontoon: A
- Pontoon to pontoon: A

**SP2** Vertical diagonal bracing
- Pontoon to pontoon: A
- Pontoon to pontoon: A

**SP3** Columns to pontoon
- Column to pontoon: X
- Column to pontoon: X

**SP4** Main Barge girder/bulkhead
- Column to pontoon: X
- Column to pontoon: X

**Attachments of:**

**SP5** Crane pedestals and top flange
- Crane pedestals and top flange: A
- Crane pedestals and top flange: A

**SP6** Anchor windlasses
- Anchor windlasses: X
- Anchor windlasses: X

**SP7** Anchor chain fairleads and anchor bolsters
- Anchor chain fairleads and anchor bolsters: C
- Anchor chain fairleads and anchor bolsters: C

**SP8** Helideck, derrick and drill-floor support
- Helideck, derrick and drill-floor support: X
- Helideck, derrick and drill-floor support: X

**SP9** Other attachment/support connections, e.g. flare and life boat support structures
- Other attachment/support connections, e.g. flare and life boat support structures: X
- Other attachment/support connections, e.g. flare and life boat support structures: X

**Primary Areas for Inspection (PR); 2)**

**PR1** Horizontal bracings
- Horizontal bracings: A
- Horizontal bracings: A

**PR2** Vertical diagonal bracings
- Vertical diagonal bracings: C
- Vertical diagonal bracings: C

**PR3** Column and pontoon shell
- Column and pontoon shell: C
- Column and pontoon shell: C

**PR4** Upper hull girders/bulkheads
- Upper hull girders/bulkheads: X
- Upper hull girders/bulkheads: X

**PR5** Drill floor with substructure
- Drill floor with substructure: X
- Drill floor with substructure: X

**PR6** Crane/gangway pedestal
- Crane/gangway pedestal: X
- Crane/gangway pedestal: X
Table 2  Basis scope for development of IIP for column-stabilised Units  (Continued)

<table>
<thead>
<tr>
<th>PR7</th>
<th>PR8</th>
<th>PR9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifeboat platforms support</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Helideck support structure</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Other support structures</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

\[ A = 100\% \ (6) \]
\[ B = 50\% \ (5) \]
\[ C = 25\% \ (5) \]
\[ X = \text{Spot check 2-5\%} \ (5) \]
\[ V = \text{Visual Inspection including Close Visual Inspection of Special Areas} \]
\[ NDT = \text{Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ECI) of selected stress concentrations and fatigue sensitive details} \]

Notes

1) Special Area for Inspection (SP) is those sections of the Structure which are in way of critical load transfer point, stress concentrations, often special steel selection etc. see listing in [4.3.2].
2) Primary Area for Inspection (PR) are elements which are essential to the overall structural integrity of the unit. See listing in [4.3.2].
3) As a minimum centre bulkhead s and corners to be covered.
4) May be waived if unit operating on DP.
5) - of the total number of these parts.
6) The inspection extent might be reduced (be less than 100%) if based on design documentation, see [1.2.6] above.
7) External NDT may be waived at IS if the unit has an approved leakage detection system according to guidelines issued by the Society.
8) Area adjacent to column connection to deck.

Table 3 Basic scope for development of IIP for self-elevating units

<table>
<thead>
<tr>
<th>TYPE OF SURVEY</th>
<th>AS (see IACS Z15 3.3.5)</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>NDT</td>
<td>V</td>
<td>NDT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special Areas for Inspection (^1) (SP) – connections:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP1 Leg to Spudcan (^5)</td>
</tr>
<tr>
<td>SP2 Leg Nodes and splices above the waterline</td>
</tr>
<tr>
<td>SP3 Connections of primary members in Jack House</td>
</tr>
<tr>
<td>Leg guides (IACS Z15 3.3.6)</td>
</tr>
<tr>
<td>SP4 Main Barge girder/bulkhead connections</td>
</tr>
<tr>
<td>Plating in way of leg well (IACS Z15 3.3.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attachments of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP5 Crane/gangway pedestals and top flange</td>
</tr>
<tr>
<td>SP6 Support of Drill Floor and Cantilever</td>
</tr>
<tr>
<td>SP7 Windlass and Anchor chain/wire fairleads</td>
</tr>
<tr>
<td>SP8 Helideck support</td>
</tr>
<tr>
<td>SP9 Other attachment/support connections, e.g. flare and life boat support structures.</td>
</tr>
</tbody>
</table>
### Table 3  Basic scope for development of IIP for self-elevating units  (Continued)

<table>
<thead>
<tr>
<th>Primary Areas for Inspection (PR):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PR1 Spudcans</td>
<td>A</td>
</tr>
<tr>
<td>PR2 Legs</td>
<td>X</td>
</tr>
<tr>
<td>PR3 Jack Houses</td>
<td>A</td>
</tr>
<tr>
<td>PR4 Main Barge (deck structure)</td>
<td>X</td>
</tr>
<tr>
<td>girders/bulkheads</td>
<td></td>
</tr>
<tr>
<td>PR5 Drill floor with substructure</td>
<td>X</td>
</tr>
<tr>
<td>and cantilever</td>
<td></td>
</tr>
<tr>
<td>PR6 Crane/gangway pedestal</td>
<td>X</td>
</tr>
<tr>
<td>PR7 Lifeboat platform structure</td>
<td>A</td>
</tr>
<tr>
<td>PR8 Helideck and flare support</td>
<td>X</td>
</tr>
<tr>
<td>structure</td>
<td></td>
</tr>
<tr>
<td>PR9 Other support structures</td>
<td>X</td>
</tr>
</tbody>
</table>

A = 100% 5)
B = 50% 4)
C = 25% 4)
X = Spot check 2-5% 4)
V = Visual Inspection including Close Visual Inspection of Special Areas.
NDT = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ET) of selected stress concentrations and fatigue sensitive details.

1) Special Areas for Inspection (SP) are those sections of the structure which are in way of critical load transfer point, stress concentrations, often special steel selection etc. see listing in [4.5.2]

2) Primary Areas for Inspection (PR) are elements which are essential to the overall structural integrity of the unit. See listing in [4.5.2]

3) At levels which have been in way of lower guided in operation, upper guides in transit and in way of spudcans.

4) - of the total number of these parts.

5) The inspection extent might be reduced (be less than 100%) if based on design documentation, see [1.2.6] (above).

6) As part of the ‘lower leg & spudcan’ survey as defined in DNVGL-OU-0104, Pt.7 Ch.5

7) For plate type legs, square or circular. examine also the pin holes IACS Z15 2.3.3).

8) May be waived if unit permanently operating on the field.

9) Only for leg nodes above the waterline. Leg nodes below the waterline are part of the ‘lower leg & spudcan’ survey.

---end---of---guidance---note---

## 2  Annual survey

### 2.1  Survey extent

#### 2.1.1  Annual survey is a general survey of the hull and equipment, machinery and systems to confirm that the unit complies with the relevant rule requirements and is in satisfactorily maintained condition.

The survey will normally cover systems and parts for:

— structure and equipment
— machinery and safety systems
— temporary equipment as defined in Ch.1 Sec.1 [2.2].

The survey for the temporary equipment shall only confirm class involvement as specified in Ch.1 Sec.5 [2.7].

**Guidance note:**
The survey extent with regard to structure should follow the unit specific IIP as described in [1.2].

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

#### 2.1.2  The survey may be performed on location provided that the structure, including submerged parts, can be thoroughly inspected as specified in the in-service inspection programme. If required, underwater inspection shall be in accordance with an approved procedure, and using approved personnel and equipment.
2.2 Structure and equipment, general

2.2.1 The following requirements are applicable for all types of structural design. Specific type requirements, e.g. self-elevating, ship-shaped, column stabilized, are given in [2.3].

2.2.2 Any material alterations to the unit (its structural arrangements, subdivision, superstructure, fittings, and closing appliances upon which the stability calculations or the load line assignment is based) are to be surveyed and the relevant documentation to be reviewed. (see IACS Z15 3.3.2)

2.2.3 If a loading instrument or loading computer system is available onboard it shall be verified that the system has a valid certificate.

It shall be documented that an annual check of the loading instrument/computer by running one of the test conditions has been carried out. If not, the surveyor shall verify the running of the test condition onboard. Approved loading and stability information shall be verified available onboard. This information shall be the same as required when the unit was assigned class with the Society or at a later conversion of the unit, in accordance with the rule requirements applicable in each case.

2.2.4 The system for recording changes to the lightweight of the unit is to be examined. (Ref. MODU code 3.1.4)

Guidance note:
For more information and guidance with regards to lightweight control is referred to DNVGL-OTG-12 “Lightweight monitoring and control during the operational life-cycle

---e-n-d---o-f---g-u-i-d-a-n-c-e---n-o-t-e---

2.2.5 Deck houses accommodating crew are to be examined. (see IACS Z15 3.3.3)

2.2.6 Items which are important for the reserve buoyancy in connection with stability of the unit shall be surveyed. The survey shall include inspection of external and internal closing appliances, ventilators, air pipes and flame screens, side scuttles etc., as well as an external inspection of scupper valves and sanitary valves. (see IACS Z15 3.3.3)

2.2.7 Remote controls and alarm systems for external and internal watertight doors, hatches and watertight dampers shall be examined and function tested.

2.2.8 Remote control system for valves in bilge, ballast and cooling water systems shall be surveyed and tested.

2.2.9 Means of protection of the crew, such as guard rails, bulwarks, walkways and lifelines to be examined.

Guidance note:
For units or installations subjected to annual load line survey by DNV GL, the requirements in [2.2.7] and [2.2.9] are covered by this survey. (see IACS Z15 3.3.3)

---e-n-d---o-f---g-u-i-d-a-n-c-e---n-o-t-e---

2.2.10 The «Appendix to the classification certificate» and the documents referred to therein, shall be verified as kept available onboard the unit.

2.2.11 The towing arrangement (permanent and emergency) of the unit shall be examined.

Guidance note:
Where the unit has the MODU Code this requirement is considered covered.

---e-n-d---o-f---g-u-i-d-a-n-c-e---n-o-t-e---
2.2.12 Accessible and visible parts of the unit’s temporary mooring system shall be inspected. If the temporary mooring system is part of the mooring system for position keeping on location, then accessible and visible parts of the position mooring system shall also be inspected.

(see IACS Z15 3.3.3)

2.2.13 It is to be confirmed that the unit is operating within its approved design envelope

2.2.14 Corrosion
Where the unit has an impressed current cathodic protection system, the annual overview readings from the system are to be examined.

2.2.15 Condition of protective coating to be reported on according Sec.2 [2.2.9]. For areas with general breakdown of the protective coating, close-up examination and thickness measurements shall be carried out to an extent sufficient to determine both general and local corrosion levels.

2.2.16 Areas where substantial corrosion is found at the survey being carried out, shall have thickness measurements taken or extended following Table 4 as guidance.

Table 4 Thickness measurements, extent and pattern in way of areas with substantial corrosion

<table>
<thead>
<tr>
<th>Area/ Structural Member</th>
<th>Extent of measurement</th>
<th>Pattern of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plating</td>
<td>Suspect area and adjacent plates</td>
<td>5 points over 1 m²</td>
</tr>
<tr>
<td>Stiffeners</td>
<td>Suspect area</td>
<td>3 points in line across web</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 points in line across flange</td>
</tr>
</tbody>
</table>

Guidance note:
See Sec.2 [2.2] for the extend of thickness measurements.
See Sec.2 [4] for special provisions for ageing units.

---e-n-d-o-f---g-u-i-d-a-n-c-e---n-o-t-e---

2.2.17 Means of escape
Means of escape from working and accommodation spaces to muster location, helideck and lifeboat embarkation deck shall be verified in order.

2.2.18 For units with bow or stern loading arrangement emergency escape routes from the associated control station shall be verified in order.

2.2.19 Safety management certificate
For units that shall comply with SOLAS Reg. IX/2, irrespective of the issuing authority for the Safety Management Certificate (SMC), the surveyor will complete a list of evidence of possible safety management system failures recorded on the occasion of the annual survey. The list will be submitted with the annual survey report.

2.3 Structure and equipment, type specific

2.3.1 Additional requirements for ship-shaped units
There are no additional requirements.

2.3.2 Additional requirements for column-stabilised units
Units or installations with submerged primary structural members allowing internal access for inspection may be omitted from external survey, subject to satisfactory results from the internal survey.

2.3.3 Primary structural members which are flooded shall be subject to external survey unless otherwise agreed. The extent of survey is given in the in-service inspection program, and will comprise visual inspection of vital parts and may include non-destructive testing of highly stressed areas.

2.3.4 The means for leakage detection of dry bracings shall be function tested. Records of owner’s routine testing and inspection of the area shall be reviewed. If owners routines are not duly followed up, external NDT of the column to brace connections may be required to be carried out.
2.3.5 Additional requirements for self-elevating units

A complete overview of the requirements is given in DNVGL-RU-OU-0104 Pt.7 Ch.4 Sec.1.

2.3.6 Additional requirements for units of other shape

The requirements for ship-shaped units are to be applied as far as practical.

2.4 Machinery and safety systems

2.4.1 All units

The survey shall include examination of spaces for machinery, boilers and incinerators, and equipment located therein, with particular attention to general cleanliness and maintenance with special attention to fire/explosion hazards.

2.4.2 The main and auxiliary steering gear arrangement (including azimuth arrangements of thrusters) shall be tested for proper functioning including test of alarm and safety functions.

2.4.3 As the DNV GL surveyor deems necessary, running tests and/or opening of machinery, tests of safety devices and equipment with verification of integrity/ function of:

- jacketed high pressure fuel injection piping system
- shielding of flammable oil piping system
- insulation of hot surfaces exceeding 220ºC
- oil burning equipment on boilers, hot water heaters, incinerators and inert gas generators.

2.4.4 Remote shutdown for fuel-oil transfer service pumps and ventilating equipment, together with oil tank outlet valves where required to be capable of being remotely closed are to be proved satisfactory (quick closing valves).

(ref IACS UR Z15, 2.8,2)

2.4.5 Helifuel systems shall be examined with attention to general cleanliness, maintenance and fire/ explosion hazards.

2.4.6 Boilers shall be externally surveyed. The general condition of the boiler including mountings, piping and insulation shall be ascertained and the surveyor may require opening, removal of insulation etc. if found necessary. Safety valves, instrumentation and automation systems shall be tested in operating condition when found necessary by the surveyor.

2.4.7 The bilge and ballasting system and related subsystems, such as remote valve operation and tank level indications shall be visually surveyed and tested.

2.4.8 For fire extinguishing systems the survey shall include:

- testing of the water fire fighting system i.e. fire pumps, fire mains, hydrants and hoses as deemed necessary
- verification of the international shore connection
- verification of the non-portable and portable fire extinguishers and portable foam applicators
- examination of the fire fighter’s outfit
- examination of the fixed fire extinguishing systems.

2.4.9 The following systems shall be surveyed and tested for correct functioning:

- fire detection and alarm system
- fixed gas detection and alarm system, both flammable and toxic
- general alarm system and communication between control stations.

(see IACS UR Z15 3.5 and 3.7)

2.4.10 For electrical installations the survey shall include:

- examination of main source of electrical power with respect to general condition, fire hazard and
personnel safety, i.e. generators, main switchboards, distribution boards, control gear, consumers, chargers and battery/UPS systems

— test of automatic start and connection to the switchboard of the stand-by generator set by initiating shutdown of the running diesel generator causing black-out.

**Guidance note:**
During this test, the emergency generator shall be disabled. The test is applicable for all E0/ECO vessels (built at any time) and all vessels constructed on or after 1 July 1998, where electricity is necessary for propulsion and steering.

For DP3 rigs with independent engine rooms and switchboard rooms, a total blackout is not required for this test, but a test of individual engine rooms is acceptable.

Applicable test records may replace the required testing.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

— inspection of insulation monitoring devices for all distribution systems. If in doubt of correct reading (ex. if the reading is infinity), the device shall be tested
— examination of cable installations with respect to general condition, support and physical protection
— examination of emergency source of electrical power with respect to general condition, fire hazard, personnel safety and function, i.e. generator, emergency switchboard, emergency distribution boards, control gear, chargers, emergency consumers and battery/ UPS systems
— check if any modifications are done in the electrical system
— test of emergency power system, i.e. manual and automatic connection of generator/batteries to emergency switchboards, alternative start methods
— It shall be verified that records of inspections and maintenance of Ex- installations in accordance with the implemented maintenance system are kept available onboard.
— Verify that the document “Schedule of batteries” is kept up to date.

### 2.4.11 In hazardous area the following equipment and systems shall be surveyed and tested:

— ventilation systems shall be function tested. The tests shall include emergency stop systems and alarms for lost ventilation
— self-closing gastight doors and airlocks including other openings or accesses
— alarms or shutdown of pressurised equipment
— electrical equipment and cables
— devices for monitoring of insulation resistance or earth leak monitoring including alarms
— protection devices for combustion engines

(see IACS UR Z15 3.5 and 3.7)

#### 2.4.12 Control and monitoring systems for main and auxiliary machinery shall be surveyed including:

— propulsion machinery
— electric power generation and distribution
— steam generation
— thermal oil heating
— oil or gas burning equipment on incinerators, inert gas generators and hot water heaters.

The survey shall include:

— alarm functions
— safety functions
— remote control functions
— automatic control functions
— electrical and mechanical condition, labels, signboards etc.
— control panels and local indicating instruments
— emergency lighting in engine room
— communication systems
— fire alarm and fire protection systems.
— verification of the change handling process for control and monitoring systems, see DNVGL-OS-D202 Ch.2 Sec.3.

Guidance note:
For units with notation E0 or ECO, see Sec.6 [11].

---e-n-d---o-f---g-u-i-d-a-n-c-e---n-o-t-e---

2.4.13 Additional requirements ship-shaped units
No additional requirements.

2.4.14 Additional requirements for column stabilised units
No additional requirements.

2.4.15 Additional requirements for self-elevating units
A total overview of all relevant requirements is given in DNVGL-OU-0104 Pt.7 Ch.4 Sec.1.

2.4.16 Additional requirements for units of other shape
No additional requirements.

3 Intermediate survey

3.1 General

3.1.1 Intermediate survey is a survey including visual examinations, measurements and testing as applicable, of the hull and equipment, machinery and systems, in order to confirm that the offshore unit complies with the relevant rule requirements and is in satisfactorily maintained condition.

The required examinations, measurements and testing shall be carried out before the intermediate survey is regarded as completed.

3.1.2 The survey shall, in general, be carried out as the annual survey, but with extended visual inspection and non-destructive testing of the structure as given in relevant rules and in-service inspection programme (where relevant), see [1.2].

3.1.3 The survey may be performed on location provided that the structure, including submerged parts, can be thoroughly inspected as specified in the in-service inspection programme. If required, underwater inspection shall be in accordance with an approved procedure, and using approved personnel and equipment.

(Ref. IACS Z15 3.3.1)

3.2 Structure and equipment

3.2.1 All units
If the temporary mooring system is part of the mooring system for position keeping on location, then the position mooring system shall also be inspected. The mooring system shall be function tested during typical anchor handling operations.

3.2.2 For units over 5 years of age, the unit specific ballast spaces as specified in [3.2.4] to [3.2.6] are to be internally examined, thickness gauged, placed in satisfactory condition as found necessary, and reported upon.

If such examinations reveal no visible structural defects, the examination may be limited to a verification that the corrosion prevention system remains effective.

(Ref IACS Z15 4.3)

3.2.3 For units over 10 years of age the survey of sewage (black water) tanks and wastewater (grey water) tanks shall include:
— for integral tanks internal examination.
— Tanks with hard coating of internal structures recorded in GOOD condition at the previous renewal survey may be specially considered based on a satisfactory external examination. The internal examination of tanks used in association with sewage treatment may be specially considered based on a satisfactory external examination and provided that an internal inspection has been carried out in accordance with onboard maintenance system during the last 12 months and relevant records are provided and confirmed.

— for independent tanks external examination including the tank supporting structures.
— thickness measurements shall be carried out as deemed necessary.

3.2.4 Additional requirements for ship-shaped units
The specific areas as mentioned in [3.2.2], are one peak tank and at least two other representative ballast tanks between the peak bulkheads used primarily for water ballast.

(see IACS Z15 4.3.2)

3.2.5 Additional requirements for column-stabilised units
The specific areas as mentioned in [3.2.2] are representative ballast tanks in footings, lower hulls, or free-flooding compartments as accessible, and at least two ballast tanks in columns or pontoons, as applicable.

(see IACS Z15 4.3.4)

3.2.6 Additional requirements for self-elevating units
A complete overview is given in DNVGL-OU-0104 Pt.7 Ch.4 Sec.2.

3.2.7 Additional requirements for units of other shape
Requirements for ship-shaped units are to be applied as far as practical.

3.3 Machinery and safety systems - all units
There are no additional survey requirements.

4 Renewal survey, structure and equipment

4.1 General

4.1.1 Renewal survey is a major survey including visual examinations, measurements and testing of the hull and equipment, machinery and systems, in order to confirm that the unit complies with the relevant rule requirements and is in satisfactorily maintained condition.

The required examinations, measurements and tests shall be carried out before the renewal survey is regarded as completed.

4.1.2 Possible deficiencies shall normally be rectified before the renewal survey is regarded as completed. The Society may accept that minor deficiencies, recorded as condition of class, are rectified within a specified time limit, normally not exceeding 3 months after the survey completion date.

4.1.3 Surveys on location
Renewal surveys may be carried out on location without interrupting the function of the unit, provided that they are based on approved procedures outlined in a maintenance system and survey arrangement.

4.1.4 See also Ch.2 Sec.1 [12] for matters that will be taken into consideration for acceptance of surveys on location.

4.1.5 Provisions regarding fatigue safety factors and corrosion protection shall be in accordance with the following requirements:
— DNVGL-OS-C102 for ship-shaped units.
— DNVGL-OS-C103 Appendix A for column-stabilised units
— DNVGL-OS-C104 Appendix A for self-elevating units.
4.2 All units

4.2.1 The renewal survey includes the requirements given in the annual survey (ref [2]). The extent of the survey on the structure is given in the IIP as described in [1.2], and will additionally include the requirements given in the remaining of this section.

4.2.2 Thickness measurements shall as a minimum be carried as specified in [4.3], [4.4] and [4.5] for respectively ship-shaped, column stabilized and self-elevating units.

4.2.3 Air pipe heads on exposed decks shall be externally and internally examined following Table 5 below. According to the results of the examination, the surveyor may require examination of other air pipe heads.

**Table 5  Examination of air pipes**

<table>
<thead>
<tr>
<th>Vessel type</th>
<th>1st renewal survey</th>
<th>2nd renewal survey</th>
<th>3rd renewal survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship shaped</td>
<td>Preferably serving ballast tanks as follows:</td>
<td>— all within 0.25 L from the forward end</td>
<td>— all air pipe heads. Exemption may be considered for air pipe heads where there is substantiated evidence of replacement within the previous five years.</td>
</tr>
<tr>
<td></td>
<td>— one port and one starboard, forward</td>
<td>— at least 20% of those serving spaces aft, preferably serving ballast tanks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— one port and one starboard, serving spaces aft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All other units</td>
<td>Four randomly chosen, preferably serving ballast tanks</td>
<td>25% of all the air pipes randomly chosen</td>
<td></td>
</tr>
</tbody>
</table>

4.2.4 Where wastage is evident or suspect, thickness measurements shall be carried out. An internal overall examination of all compartments and tanks, except fuel oil, lube oil and fresh water tanks, shall include all structures, piping systems outside machinery area and sea connections in machinery area, i.e. plating and framing, valves, coupling, anodes, equipment for level indication, bilges and drain wells, sounding, venting, pumping and drainage arrangements.

The tightness of the tanks shall be verified with a head of liquid to the overflow or by an appropriate procedure.
(Ref. IACS Z7 2.2.5 and Z15 2.3.1)

4.2.5 For sewage (black water) tanks and wastewater (grey water) tanks the survey shall include:

— For integral tanks internal examination.
  For units not exceeding 10 years of age the internal examination of tanks used in association with sewage treatment may be specially considered based on a satisfactory external examination and provided that an internal inspection has been carried out in accordance with onboard maintenance system during the last 12 months and relevant records are provided and confirmed.
— For independent tanks external examination including the tank supporting structures.
  Thickness measurements shall be carried out as deemed necessary.

4.2.6 Where provided, the condition of the corrosion prevention system of cargo oil tanks shall be examined.

4.2.7 Examination of fuel oil, lube oil and fresh water tanks shall be in accordance with Table 6.

Independent tanks in machinery spaces shall be externally examined including the tank supporting structures.
4.2.8 The watertight integrity of internal bulkheads and decks shall be verified.

Special arrangements related to stability such as watertight closing appliances for openings in internal bulkheads and decks, cross-flooding, counter-flooding etc., shall be examined and tested if necessary.

Bulkhead shaft seals shall be verified. Dismantling shall be carried out where necessary to examine condition of the bulkhead seal.

Guidance note:
Documented maintenance may be considered as a base for extent of dismantling.

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4.2.9 Testing of structures forming boundaries of double bottom, deep tanks, peak tanks and other tanks, including holds adapted for the carriage of water ballast, shall be in accordance with Table 7. The surveyor may require further testing.

Testing of double bottoms and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination together with an examination of the tanktop is carried out.

Independent tanks in machinery spaces shall be tested as deemed necessary.

### Table 6 Minimum requirements for internal examination of fuel oil, lube oil and fresh water tanks 1) 2) 3)

<table>
<thead>
<tr>
<th>Tank</th>
<th>Age of ship, years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 to 5</td>
</tr>
<tr>
<td>Fuel oil/ diesel oil</td>
<td></td>
</tr>
<tr>
<td>— engine room/machinery space</td>
<td>None</td>
</tr>
<tr>
<td>— area outside engine room/machinery space</td>
<td>None</td>
</tr>
<tr>
<td>Lube oil</td>
<td>None</td>
</tr>
<tr>
<td>Fresh water 5)</td>
<td>None</td>
</tr>
</tbody>
</table>

Notes:
1) Tanks of integral (structural) type.
2) If a selection of tanks are accepted to be examined, then different tanks shall, as far as practicable, be examined at each renewal survey, on a rotational basis.
3) Peak tanks (all uses) are subject to internal examination at each renewal survey.
4) At renewal surveys no 3 and subsequent surveys, one deep tank for fuel oil outside engine room is to be included, if fitted.
5) Tanks for clean fresh water, i.e. potable water, boiler water and other holding tanks for clean fresh water. Tanks for mainly contaminated fresh water as waste water (gray water) and sewage (black water) shall be subject to internal examination as given in [4.2.5].

(see IACS UR Z7)

### Table 7 Minimum requirements for testing of tanks

<table>
<thead>
<tr>
<th>Tanks 1) to be tested</th>
<th>Test head or pressure</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ballast tanks</td>
<td>Top of air pipe</td>
<td></td>
</tr>
<tr>
<td>Cargo holds adapted for carriage of ballast</td>
<td>Near the top of cargo hold hatch coaming</td>
<td>3)</td>
</tr>
<tr>
<td>Bilge water holding tanks</td>
<td>Top of air pipe</td>
<td>2) alternatively as for fuel oil tanks</td>
</tr>
<tr>
<td>Fuel oil tanks</td>
<td>Head of liquid to the highest point that liquid will rise under service conditions</td>
<td>2), 3)</td>
</tr>
<tr>
<td>Lub. Oil tanks</td>
<td>Head of liquid to the highest point that liquid will rise under service conditions</td>
<td>2)</td>
</tr>
</tbody>
</table>
Remote level indicating systems for ballast tanks shall be surveyed and function tested.

**Temporary mooring**

Where the temporary mooring systems is independent of the mooring system for position keeping on location,

Windlass, including piping system and foundations shall be examined.

The anchors and chain cables shall be ranged, examined and the required complement and condition verified.

The chain lockers, holdfasts, hawse pipes and chain stoppers shall be examined and drainage arrangement of the chain lockers tested.

At the second and subsequent renewal surveys, chain cables shall be gauged. Any length of chain cable shall be renewed if the mean diameter at any cross-section is worn beyond 12% of its original diameter.

**Guidance note:**
The mean diameter of a cross-section may be taken as the average of the minimum diameter and the diameter measured perpendicular to this.

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**Bottom survey**

A bottom survey shall be carried out in accordance with Sec.4 [7]) as part of the renewal survey.

(Ref. IACS Z15 2.2.1)
4.2.14 Other items

Sea chests and other sea inlets and discharges (above and below the waterline) with valves, including sanitary valves and scupper valves, shall be opened for survey.

Alternative survey methods may be accepted upon special consideration and approved procedures.

4.2.15 The presence of required signboards shall be verified.

4.2.16 The cathodic protection system of the submerged zone shall be surveyed by visual inspection. The efficiency of the system for the forthcoming 5-year period shall be confirmed. Corrosion in welds of vital parts which may be subject to fatigue shall be particularly considered. Potential measurements to be performed if deemed necessary.

4.2.17 Fixation of major appurtenances to the main structure shall be surveyed. These may typically include crane pedestals, helicopter decks, lifeboat platforms and heavy deck modules or skids.

4.3 Specific requirements for ship-shaped units

4.3.1 Thickness measurements shall as a minimum be carried out as shown in Table 8 for ship-shaped units.

Table 8 Minimum requirements for thickness measurements for ship-shaped units at renewal survey

<table>
<thead>
<tr>
<th>Renewal survey No.1</th>
<th>Renewal survey No.2</th>
<th>Renewal survey No.3</th>
<th>Renewal survey No.4 and subsequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 0-5 years</td>
<td>Age 5-10 years</td>
<td>Age 10-15 years</td>
<td>Age &gt;15 years</td>
</tr>
</tbody>
</table>

1) Suspect areas throughout the unit.
2) One transverse section of deck plating abreast the moon pool opening within the amidships 0.6L, together with internals in way as deemed necessary. Where the unit is configured with side ballast tanks, the plating and internals of the tanks are also to be gauged in way of the section chosen.
3) Moon pool boundary bulkhead plating.

1) Suspect areas throughout the unit.
2) Two Transverse Sections (Girth Belts) of deck, bottom and side plating abreast the moon pool and one hatch opening within the amidships 0.6L together with internals in way as deemed necessary. Where unit is configured with side ballast tanks, the plating and internals of the tanks to be gauged in way of the required belts, Remaining internals in ballast tanks to be gauged as deemed necessary.
3) Moon pool boundary bulkhead plating.
4) Internal in forepeak and after peak tanks as deemed necessary.
5) Lowest strake of all transverse bulkheads in hold spaces. Remaining bulkhead plating to be gauged as deemed necessary.
6) All plates in two wind and water strakes, port and starboard, full length.
7) All exposed main deck plating full length and all exposed first-tier superstructure deck plating (poop, bridge and forecastle decks).
8) All keel plates full length plus additional bottom plating as deemed necessary by the Surveyor, particularly in way of cofferdams and machinery spaces.
9) Duct keel or pipe tunnel plating or pipe tunnel plating and internals as deemed necessary.
10) All air pipes and ventilator coamings on exposed main deck.

Notes:
1) if considered necessary by the attending surveyor.
2) to 10) mandatory thickness measurements, number and extent of thickness measurement requirements may be modified by the surveyor considering the corrosion protection condition and arrangements.
4.3.2 Inspection area categorisation

Application categories for structural components to be inspected referred in Table 8, are defined in Sec.3 Table 1.

Special areas for inspection:

- Connections of bulkheads, stiffeners, flats or decks in the moonpool area. Moonpool corners and attachments.
- Turret – connections within structure at support.
- External brackets, portions of bulkheads, and frames which are designed to receive concentrated loads at intersections of major structural members.
- Support connections for helideck, derrick and drill-floor etc.
- Highly utilised areas supporting anchor line fairleads and winches, crane pedestals, flare towers/booms etc.
- Other support areas – lifeboat platform supports etc.

Primary areas for inspection:

- Structural members of bulkheads, stiffeners, flats or decks and girders in deck structure and turret.
- Deck plating, heavy flanges, and bulkheads within the upper hull or platform which form "box" or "I" type supporting structure.
- Bulkheads, decks, stiffeners and girders which provide local reinforcement or continuity of structure in way of intersections, except areas where the structure is considered for special application.
- Main support structure of heavy sub-structures and equipment, e.g. anchor line fairleads, cranes, drill-floor substructure, life boat platform, thruster foundation and helicopter deck.

Other areas for inspection:

- Upper platform decks, or decks of upper hulls except areas where the structure is considered primary or special areas for inspection.
- Deckhouses.
- Other structures not categorised as special or primary

4.4 Specific requirements for column stabilised units

4.4.1 Thickness measurements shall be carried out as shown in Table 9.

Table 9 Minimum requirements for thickness measurements - column-stabilised units

<table>
<thead>
<tr>
<th>Id.</th>
<th>Area</th>
<th>Renewal survey No.1 Age 0-5 years</th>
<th>Renewal survey No.2 Age 5-10 years</th>
<th>Renewal survey No.3 Age 10-15 years</th>
<th>Renewal survey No.4 and subsequent Age &gt;15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All</td>
<td>Suspect areas</td>
<td>Suspect areas</td>
<td>Suspect areas</td>
<td>Suspect areas</td>
</tr>
<tr>
<td>2</td>
<td>Structural components of Special and Primary areas for inspection</td>
<td>Areas with indication of wastage.</td>
<td>Areas with indication of wastage.</td>
<td>Areas with indication of wastage.</td>
<td>Areas with indication of wastage.</td>
</tr>
<tr>
<td>3</td>
<td>Bracings</td>
<td>Representative plates in splash zone. Internals as deemed necessary.</td>
<td>Representative plates and internals in splash zone.</td>
<td>Representative plates and stiffeners at the connection to column/pontoon and bracings (k-nodes).</td>
<td>Representative plates and internals in splash zone.</td>
</tr>
<tr>
<td>4</td>
<td>Columns</td>
<td>Representative plates in splash zone. Internals as deemed necessary.</td>
<td>Representative plates and internals in splash zone.</td>
<td>Selective plates and stiffeners of selective seawater tanks.</td>
<td>Representative plates and internals in splash zone.</td>
</tr>
</tbody>
</table>
Guidance note:
Sample of structures prone to rapid wastage:
— Areas of columns and bracings without an efficient/intact hard epoxy coating system in way of the splash zone.
— Column and pontoon seawater tanks without an efficient/intact hard epoxy coating system.
— Chain lockers.

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4.4.2 Inspection area categorisation
Application categories for structural components to be inspected referred in Table 9, are defined in Sec.3 Table 2.

Special areas for inspection:
— Connections of bulkheads, stiffeners, flats or decks and girders in vertical columns, decks, lower hulls diagonals.
— Portions of deck plating, heavy flanges, and bulkheads within the upper hull or platform which form “box” or “I” type supporting structure which receive major concentrated loads.
— External shell structure in way of intersections of vertical columns, decks and lower hulls.
— Major intersections of bracing members.
— “Through” material used at connections of vertical columns, upper platform decks and upper or lower hulls which are designed to provide proper alignment and adequate load transfer.
— External brackets, portions of bulkheads, and frames which are designed to receive concentrated loads at intersections of major structural members.
— Highly utilised areas supporting anchor line fairleads and winches, crane pedestals, flare etc.

**Primary areas for inspection:**

— Bulkheads, stiffeners, flats or decks and girders in vertical columns, decks, lower hulls diagonals.
— Deck plating, heavy flanges, and bulkheads within the upper hull or platform which form “box” or “I” type supporting structure which do not receive major concentrated loads.
— External shell structure of vertical columns, lower and upper hulls, and diagonal and horizontal braces.
— Bulkheads, decks, stiffeners and girders which provide local reinforcement or continuity of structure in way of intersections, except areas where the structure is considered for special application.
— Main support structure of heavy substructures and equipment, e.g. anchor line fairleads, cranes, drillfloor substructure, life boat platform, thruster foundation and helicopter deck.

**Other areas for inspection:**

— Upper platform decks, or decks of upper hulls except areas where the structure is considered as primary or special areas for inspection.
— Bulkheads, stiffeners, flats or decks and girders in vertical columns, decks, lower hulls, diagonal and horizontal bracing, which are not considered as primary or special application.
— Deckhouses.
— Other structures not categorised as special or primary.

### 4.4.3 Lightweight survey

A lightweight survey or inclining test shall be conducted at the first renewal survey. If a lightweight survey is conducted and it indicates a change from the calculated light ship displacement in excess of 1% of the operating displacement, an inclining test shall be conducted, or the difference in weight shall be placed in an indisputably conservative vertical centre of gravity and approved by the Administration.

(See MODU code 3.1.5.1)

**Interpretation:**

A lightweight survey or inclining test, in accordance with an approved procedure, should be carried out in protected waters, and in presence of and to the satisfaction of the attending Surveyor. The report, endorsed by the Surveyor, is to be submitted for approval immediately after the test.

An indisputably conservative vertical centre of gravity will normally be at the drill floor level.

-------------- end of Interpretation --------------

### 4.4.4

If the survey or test at the first renewal survey demonstrated that the unit was maintaining an effective weight control programme, and at succeeding renewal surveys this is confirmed by the records under paragraph [2.2.4], light ship displacement may be verified in operation by comparison of the calculated and observed draught. Where the difference between the expected displacement and the actual displacement based upon draught readings exceed 1% of the operating displacement, a lightweight survey shall be completed in accordance with paragraph [4.4.3].

(See MODU code 3.1.5.2)

**Guidance note:**

For more information and guidance with regards to lightweight control is referred to DNVGL-OTG-12 "Lightweight monitoring and control during the operational life-cycle"
### 4.5 Specific requirements for self-elevating units

#### 4.5.1 For self-elevating units thickness measurements shall in general be carried out as presented in Table 10.

**Table 10  Minimum requirements for thickness measurements - self elevating units**

<table>
<thead>
<tr>
<th>Id.</th>
<th>Area</th>
<th>Renewal survey No.1 Age 0-5 years</th>
<th>Renewal survey No.2 Age 5-10 years</th>
<th>Renewal survey No.3 Age 10-15 years</th>
<th>Renewal survey No.4 and subsequent Age &gt;15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All</td>
<td>Suspect areas</td>
<td>Suspect areas</td>
<td>Suspect areas</td>
<td>Suspect areas</td>
</tr>
<tr>
<td>2</td>
<td>Structural components of Special and Primary category</td>
<td>Areas with indication of wastage.</td>
<td>Representative chords and bracings/ plate and stiffeners in way of splash zone.</td>
<td>Representative chords and bracings/ plate and stiffeners in way of splash zone and at connections to mat/ spudcan.</td>
<td>Representative chords and bracings/ plate and stiffeners in other levels.</td>
</tr>
<tr>
<td>3</td>
<td>Legs</td>
<td>Representative chords and bracings/ plate and stiffeners in way of splash zone.</td>
<td>Representative chords and bracings/ plate and stiffeners in way of splash zone and at connections to mat/ spudcan.</td>
<td>Representative chords and bracings/ plate and stiffeners in way of splash zone and at connections to mat/ spudcan.</td>
<td>Representative chords and bracings/ plate and stiffeners in way of splash zone and at connections to mat/ spudcan.</td>
</tr>
<tr>
<td>4</td>
<td>Mat or spudcan connections to legs and main structural bulkheads of mat or spudcan.</td>
<td>Representative plates, bulkheads and stiffeners.</td>
<td>Representative plates, bulkheads and stiffeners.</td>
<td>Representative plates, bulkheads and stiffeners.</td>
<td>All plates, bulkheads and stiffeners</td>
</tr>
<tr>
<td>5</td>
<td>Jackhouse and load transfer area (external and in way of preload tanks) including leg wells and lower guides.</td>
<td>Representative plates and stiffeners</td>
<td>Representative plates and stiffeners</td>
<td>Representative plates and stiffeners</td>
<td>All plates and stiffeners.</td>
</tr>
<tr>
<td>6</td>
<td>Upper hull exposed deck and bottom plating.</td>
<td>Representative plates.</td>
<td>Representative plates</td>
<td>All plates.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Upper hull &quot;Box&quot; or &quot;I&quot; type sections Main supporting structure.</td>
<td>Representative plates and stiffeners.</td>
<td>Representative plates and stiffeners.</td>
<td>Representative plates and stiffeners.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Preload tanks</td>
<td>Representative structure of one preload (seawater) tank.</td>
<td>Representative structure of two preload (seawater) tanks.</td>
<td>Representative structure of all preload (seawater) tanks.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Main supporting structure of heavy substructures and equipment. e.g. crane pedestal, cantilever and drill floor substructure, lifeboat platform and helicopter deck.</td>
<td>Representative plating and stiffeners.</td>
<td>Representative plating and stiffeners.</td>
<td>Representative plating and stiffeners.</td>
<td></td>
</tr>
</tbody>
</table>
Table 10 Minimum requirements for thickness measurements - self elevating units (Continued)

<table>
<thead>
<tr>
<th></th>
<th>Structural components of Special or Primary category other than under 3-7 above. (These areas are normally identified in the IIP).</th>
<th>Representative plating and stiffeners.</th>
<th>Representative plating and stiffeners.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Air pipes and ventilators</td>
<td>Selected air pipes and ventilator coamings on exposed main deck.</td>
<td>All air pipes and ventilator coamings on exposed main deck.</td>
</tr>
<tr>
<td>11</td>
<td>Plating of sea chest.</td>
<td></td>
<td>All plating of sea chest</td>
</tr>
</tbody>
</table>

Notes:
1) and 2) if considered necessary by the attending surveyor.
3) to 12) mandatory thickness measurements, number and extent of thickness measurement requirements may be modified by the surveyor considering the corrosion protection condition and arrangements.

Guidance note:
Sample of structures prone to rapid wastage:
– Areas of legs without an efficient/intact hard epoxy coating system in way of the splash zone.
– Upper hull seawater tanks without an efficient/intact hard epoxy coating system.

4.5.2 Application categories for structural components to be inspected referred in Table 10 are defined in Table 3.

Special areas for inspection:
– Vertical columns in way of intersection with the mat structure (spudcan).
– Highly stressed elements of bottom of leg, including leg connection to spudcan or mat.
– Intersections of lattice type leg structure, which incorporates novel construction, including the use of steel castings.
– Highly stressed elements of guide structures, jacking and locking system(s), jackhouse and support structure.
– Highly stressed elements of crane pedestals, etc. and their supporting structure.

Primary areas for inspection:
– Combination of bulkhead, deck, side and bottom plating within the hull which form “Box” or “I” type main supporting structure.
– All components of lattice type legs and external plating of cylindrical legs.
– Jackhouse supporting structure and bottom footing structure, which receives initial transfer of load from legs.
– Internal bulkheads, shell and deck of spudcan or bottom mat supporting structures which are designed to distribute major loads, either uniform or concentrated, into the mat structure.
– Main support structure of heavy substructures and equipment, e.g. cranes, drill floor substructure, life boat platform and helicopter deck.

Other areas for inspection:
– Deck, side and bottom plating of hull except areas where the structure is considered primary or special application.
– Bulkheads, stiffeners, decks and girders in hull that are not considered as primary or special application.
– Internal bulkheads and girders in cylindrical legs.
– Internal bulkheads, stiffeners and girders of spudcan or bottom mat supporting structures except where the structures are considered primary or special areas for inspection.
4.5.3 A complete overview is given in DNVGL-RU-OU-0104, Pt.7 Ch.3.

4.6 Specific requirements for units of other shape
The requirements for ship shaped units are to be applied as far as practical.

5 Renewal survey, machinery and systems

5.1 General
Machinery systems and equipment are covered by the renewal survey as described in [5.2] and separate surveys as listed below.

— Tailshaft survey - see Sec.4 [1].
— Propeller connection survey - see Sec.4 [2].
— Survey of Thrusters for main propulsion or dynamic positioning– see Sec.4 [3] and Sec.4 [4]
— Boiler survey, including steam generator, see Sec.4 [5]
— Thermal oil heater, see Sec.4 [6]

The renewal survey may be replaced by alternative survey arrangements as discussed in Sec.7.

5.2 Machinery

5.2.1 Machinery systems shall be examined and tested according to Sec.7 Table 1.

5.2.2 Settling tank and daily service tanks for heavy fuel oil and diesel oil as well as lubrication oil circulation tanks assessed with respect to tank cleanliness.

If inspection and cleaning have been carried out by the crew during the last 12 months and relevant log extracts are provided and confirmed, this may be credited as surveyed at the surveyor’s discretion.

Opening up of tanks may be required as found necessary by the surveyor.

5.2.3 Auxiliary thrusters shall be examined and tested as follows:

— oil analysis of gear house oil and oil for the CP mechanism
— examination of gear and bearings through inspection openings or by other means
— examination of external piping systems
— examination of bearings, gear and shafts and other relevant parts if any indications of abnormalities are observed. Satisfactory maintenance according to manufacturer’s recommendations to be documented and considered as a base for extent of possible opening.

Opening to be carried out normally at least every 10 years. Any opening up of a thruster shall be witnessed by a surveyor of the Society
— function testing of sealing arrangements
— function testing of lubrication and hydraulic oil system
— function testing of CP mechanism
— function testing of thruster unit including alarm system.

Guidance note:
It is advised to take oil analysis at regular intervals and always prior to docking in order to ensure that there is no need for opening of the thruster (e.g. water in the oil).

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5.2.4 For ships with gas turbine installations the survey shall include verification of records and major overhaul reports onboard.

Major overhaul on Gas turbines shall be performed by either the original equipment manufacturer (OEM) or an OEM authorized company.

5.2.5 For non self-propelled units (e.g. most jack ups or semis where the vessel is not intended to do a rig
move under its own power) with propellers or thrusters, the renewal survey shall ensure the watertight integrity of the (shaft) sealing of the hull.

5.3 Electrical installations

5.3.1 The survey shall comprise examination of the electrical installations with regard to fire and explosion hazards and injury from accidental touching. The survey is also to include testing of correct functioning of equipment covered by class requirements.

5.3.2 As far as practicable, the following equipment shall be examined for satisfactory condition:

— main and emergency switchboards
— generators
— distribution boards
— motor starters
— electrical motors
— converters (e.g. transformers, rectifiers, chargers)
— cable installations
— enclosures for electrical equipment
— lighting equipment
— heating equipment
— battery installations.

5.3.3 The following tests shall be carried out to the extent deemed necessary by the surveyor to ascertain the proper functioning of the equipment:

— generator full load test
— generator parallel operation
— generator protection relays including non-important load trip, if fitted
— generator remote speed control
— generator synchronising equipment
— power plant interlocking systems
— insulation resistance indicating device
— emergency generator including switchboards
— battery chargers
— mechanical ventilation of battery rooms and lockers
— navigation lights, with controllers including alarms
— electrical motors for essential and important use
— interlocking and/or alarms for pressurised rooms and equipment
— emergency generator - auto start following loss of main supply.

Protection relays in generator and bus tie circuit breakers shall be tested with secondary current injection, or with suitable apparatus made for testing of the installed protection units.

5.3.4 Records of insulation test shall be shown to the surveyor. This requirement may be waived if:

— testing of all individual motors is included and logged in the planned maintenance system, and
— the insulation monitoring alarms required by DNVGL-OS-D202 Ch.2 Sec. 2 are integrated in the machinery alarm

Guidance note:
Meggertesting may involve risk of explosion due to sparks. Therefore appropriate procedures for such work should be followed as relevant e.g., “gas free certificate”.
Ex equipment to include Ex motors and Ex junction boxes and Ex enclosures.
5.4 Safety and control systems

5.4.1 Correct functioning of the various parts of the following systems shall, as far as applicable, be verified:

— alarm and safety system
— manual control of machinery
— remote control of propulsion machinery
— remote control of position keeping machinery.

Guidance note:
For units with notation E0 or ECO, see Sec.6 [13].

5.4.2 When cancelling of automatic load reduction and/or automatic stop of engine are provided, these functions shall be demonstrated to the satisfaction of the surveyor.

5.4.3 Emergency switch(es) for all electrical equipment including main and emergency generators, except alarm and communication systems and lighting in vital areas such as escape routes and landing platforms, are to be proved satisfactory (by a combination of testing and review of maintenance records).

(see IACS UR Z15, 2.8.2)

Guidance note:
The above implies a complete test of the ESD system in the presence of DNV GL. Approved Cause and effect Diagrams should be available if possible.
SECTION 4 MISCELLANEOUS MAIN CLASS SURVEYS

1 Propeller shaft survey

1.1 General

1.1.1 The propeller shaft shall be drawn to permit examination of the shaft and the following parts:

— propeller shaft bearing areas
— stern bushes or bearings
— shaft sealing arrangement, including lubricating oil system
— aft bearing clearances to be measured/calculated and recorded
— oil level monitoring of lubricating oil system.

Guidance note:
Bearing clearances to be measured or calculated from wear down measurements and clearance from new building or last shaft withdrawal.

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1.1.2 For oil lubricated propeller shafts with type approved sealing glands, the withdrawal of the propeller shaft may be exempted at alternate surveys, i.e. extended to 10 years intervals, provided the following items have been examined with satisfactory result (Reduced scope):

— new oil seals should be fitted
— oil sealing contact surfaces in order
— aft bearing clearances measured/calculated and recorded
— oil level monitoring of lubricating oil system
— oil analysis (not older than 3 months) in order.

Guidance note:
Bearing clearances to be measured or calculated from wear down measurements and clearance from new building or last shaft withdrawal.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

In addition to the above, a propeller connection survey in accordance with [2.1.1] shall be carried out for propeller shafts with a keyway.

Guidance note:
The lubricating oil analysis should include the minimum parameters:
— water content
— chlorides content (sodium and magnesium)
— content of bearing metal particles (iron, aluminium, nickel, chromium, copper, tin, and lead)
— content of other particles (silicon)
— oil aging, resistance to oxidation (TAN, TBN).

Oil sample should be taken under service conditions.

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2 Propeller connection survey

2.1 General

2.1.1 For arrangements where the propeller is mounted on a keyed taper the following shall be examined after the propeller is backed off:

— propeller shaft threaded end
— propeller shaft taper and keyway
— propeller hub taper and keyway
— key
— NDT of fore part of the shaft taper and shaft keyway by an approved crack detection method.

2.1.2 For arrangements where the propeller is mounted on a keyless taper, or by means of a cylindrical/conical sleeve the following shall be examined after the propeller is backed off:

— propeller shaft threaded end
— propeller shaft tapered or cylindrical section
— propeller hub taper
— NDT of the fore part of the shaft taper, or shaft cylinder, by an approved crack detection method.

2.1.3 For arrangements where the propeller hub is fitted to a flange coupling or a forged propeller shaft flange the following shall be examined:

— visual inspection of the flange and its fittings
— tightness of bolts or nuts
— NDT of the flange fillet radius, by an approved crack detection method, may be required if the visual examination of the area is not satisfactory.

Guidance note:
For tailshaft condition monitoring see Sec.6 [17.3].

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

2.2 Dismantling of propellers
Dismantling of keyed propellers will be required at intervals of maximum 5 years, and keyless propellers every 15 years. The following parts shall be surveyed as applicable:

— propeller nut
— tailshaft threaded end
— key and cone including examination of the keyway and the fore part of the taper by an approved crack detection method.

3 Survey of geared thrusters for main propulsion and positioning

3.1 Definitions

3.1.1 Thrusters for dynamic positioning are thrusters incorporated in systems for dynamic positioning of units, where the unit has been granted the additional class notation DYNPOS or DPS.

3.1.2 Thrusters for position mooring are thrusters incorporated in systems for thruster assisted position mooring of units, where the unit has been granted the additional class notation POSMOOR-TA or POSMOOR-ATA.

3.1.3 Thrusters for propulsion are defined as thrusters which are intended for propulsion or propulsion and steering of the unit during sea voyage.

3.2 Survey extent
See DNV Rules for ships Pt.7 Ch.1 Sec.5(4).

4 Survey of podded thrusters for main propulsion and positioning

4.1 General

4.1.1 The requirements in this sub-section apply to thrusters of podded design, hereafter denoted pods, for propulsion and positioning of the unit.

4.1.2 Pod survey implies a survey of the pod’s internal power transmission elements and driving motor enclosed in the pod, strut and steering column.
Pods have two scheduled surveys:

— annual
— complete.

For some pod sizes it will be limited access from inside the unit and annual survey should be done to the extent that is practically possibly. Complete survey might require some dismantling.

4.1.3 Parts of the survey may be replaced by an approved condition monitoring arrangement, see Classification Note 10.2.

4.1.4 At each overhaul, all relevant parts of the components made accessible shall be presented for survey by the Society, see DNV Rules for ships Pt.7 Ch.1 Sec.5(5.2).

Assembly and mounting on board shall be verified and tested.

4.2 Scheduled surveys
See DNV Rules for ships Pt.7 Ch.1 Sec.5(5.2).

5 Boiler survey
Survey of boilers (oil/gas fired, exhaust heated, composite, electric heated and steam generators) shall be carried out according to the DNV Rules for ships, Pt.7 Ch.1 Sec.5(6).

These requirements are also applicable to steam/thermal oil heated steam generators.

6 Thermal oil heater survey
Survey of thermal oil heaters shall be carried out according to the DNV Rules for ships, Pt.7 Ch.1 Sec.5(7).

7 Survey of the unit's bottom and related items

7.1 Schedule

7.1.1 The outside of the unit’s bottom and related items are to be examined two times in any five (5) year period, with an interval not exceeding three (3) years between examinations.

7.1.2 Consideration may be given at the discretion of the Society, to any special circumstances justifying an extension of the interval.

7.2 Survey planning and record keeping
Plans and procedures for underwater inspection shall be submitted for review in advance of the survey and made available on board. Submitted data, after review by the Society, will be subject to revision if found to be necessary in light of experience.

Guidance note:
The Society may consider alternative methods for providing adequate assurance that a unit's bottom is in a satisfactory condition at the mid-term class period survey.

A survey based on such alternative methods is subject to acceptance by the relevant flag administration.

7.3 Ship-shaped units (ship or barge type units)

7.3.1 External surfaces of the hull, keel, stem, stern frame, rudder, nozzles, and sea strainers are to be selectively cleaned to the satisfaction of the attending surveyor and examined together with appendages, the propeller, exposed parts of stern bearing assembly, rudder pintle and gudgeon securing arrangements, sea chest and strainers, and their fastenings (as applicable).

7.3.2 Propeller shaft bearing, rudder bearing, and steering nozzle clearances (as applicable) are to be ascertained and reported upon.
7.4 Column-stabilised units
External surfaces of underwater areas of columns, sea chests, and propulsion units as applicable, shall be examined.

7.5 Self-elevating units
For self-elevating units operating for longer periods on location (e.g. drilling and accomodation units), the lower leg and spudcans are scheduled separately from the bottom in a spudcan and leg survey as described in DNVGL-RU-OU-0104 Pt.7 Ch.5.

Guidance note:
The described split of the bottom survey scope is in line with the accessibility of the separate parts in elevated respectively transit mode.
The split is not applied for units frequently changing from location, e.g. wind turbine installation vessels. For these, the complete bottom survey applies.

8 Survey of towing, temporary and position mooring equipment

8.1 Types of survey

8.1.1 Annual survey is a visual examination to ascertain the general condition of the relevant items. The survey is normally carried out on location with the unit at operational draft and the mooring system in use. No special inspection aids are required and no disruption to the unit’s operation is intended.

8.1.2 Renewal survey will require appropriate cleaning with good access and adequate lighting, i.e. the special inspection aids and facilities usually associated with a sheltered water visit.

8.1.3 Continuous survey. Alternatively, the owner may opt for a continuous survey by providing an extra mooring line which is regularly inspected in special facilities onshore and exchanged with lines installed on the unit. This arrangement is normally noted by an MO which gives the last/next survey date of each mooring line.

Guidance note:
For acceptance criteria for chain, wire and fibre mooring see App.B.

8.2 Annual survey

8.2.1 Towing and temporary mooring equipment are to be subject to visual inspection.

8.2.2 Position mooring equipment is to be inspected as follows:
There is to be carried out visual inspection of the accessible part of the mooring lines, on or adjacent to the windlass. Particular attention to be paid to:
— the proper support of links in the pockets, i.e. contact is made at only the four shoulder areas of the link to avoid critical bending stresses in the link
— wear on the chain shoulders in way of the chain stopper and windlass pockets
— condition of wire or fibre rope
— condition of anchors and anchor bolsters.

Where severe damage or neglect of maintenance is observed, e.g. missing studs, worn cable lifters causing damage to the anchor chain, damage to wire or fibre rope, a more extensive survey should be required, ref. renewal survey.

The surveyor shall ascertain if any problems have been experienced in the previous 12 months period with the mooring system, e.g. chain breaks, jumping, mechanical damages, loose joining shackles.

If available, visual inspection of the anchors shall be carried out. If anchors have experienced any problems and/or been replaced, the anchor certificate shall confirm suitability.
8.3 Renewal survey

8.3.1 General Requirements
The towing and mooring equipment shall be surveyed as follows:

— all chain lockers and anchor stowage arrangements shall be surveyed
— the permanent towing arrangement of the unit shall be surveyed
— the temporary mooring systems shall be surveyed
— if the temporary mooring systems are part of the mooring system for position keeping on location, and covered by POSMOOR or flag state-requirements (MODU-code), the complete mooring system for position keeping shall be subject to a comprehensive survey. This will include thorough visual examination and extensive non-destructive testing of mooring chain or wire rope and inspection/assessment testing of fibre ropes. This inspection shall include dismantling and non-destructive testing of all joining shackles that have been in service for more than 5 years.
— function testing of the mooring systems shall be performed
— the anchor shackle or swivel, anchor head, flukes and shank shall undergo close visual inspection. If found necessary, NDT shall be carried out with particular attention to the bolts fitted to certain designs for altering the fluke angle.
— In water inspection of mooring lines by ROV may be used as an alternative to visual inspection. Inspection by ROV shall be carried out by a recognised firm.

8.3.2 Chain
For chain which is less than 20 years old with proper documentation and service history, and no previous failures the extent of examination shall be:

— 100% visual examination
— 5% NDT on general chain
— 20% NDT on chain which has been in way of fairleads over last 5 years
— 20% NDT on chain which will be in way of fairleads over next 5 years.

8.3.3 If no documentation or history is available, the examination shall be increased to include mechanical testing of each length of chain and NDT increased to cover 20% of the whole chain.

8.3.4 All joining shackles of Kenter or similar design which have been in service for more than five years, are to be dismantled and magnetic particle (MT) or liquid penetrant testing (PT) is to be carried out on all the machined surfaces.

Guidance note:

Abrasive blasting prior to MT or PT. may damage the machined surfaces and should be avoided. Alternative methods of cleaning should be used, e.g. high pressure water washing.

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8.3.5 Background information to be supplied for the renewal survey:
The service history of the chain should be supplied beforehand to the attending surveyor. The following information is to be provided:

— DNV GL chain certificate
— year entering service
— bar chart; length of chain out versus time
— information on chain breakages, e.g. position, year entering service, certificate
— identification marks on chain
— summary of previous repairs
— summary of previous survey findings
— information on the likely future service of the chain, e.g. if plans to head-to-tail chain, expected length to be over fairleads and windlass, likely area of operations.
8.3.6 For a chain which is more than 20 years old the following apply:

— If all documentation is available, and historical information including previous reports showing no failures and only minor repairs, then survey extent given in [8.3.2] can remain in place.
— If no documentation is available (i.e. no certificates, unable to identify the chain, unable to ascertain orientation of the chain, which parts have been over the fairleads etc.) then the chain shall be subjected to minimum 20% NDT and mechanical testing of all lengths
— If documentation review reveals history of defects, then NDT shall be increased to 100% in the areas where defects are found.

8.3.7 Steel wire rope
The survey of steel wire ropes consists of a 100% visual control, and the following items shall be covered:

— the nature and number of wire breaks
— wire breaks at the termination
— localised grouping of wire breaks
— fracture of strands
— reduction of rope diameter including breaking of core
— external wear and corrosion
— deformation
— termination area.

8.3.8 It is advised that checkpoints are made for every 100 m. If areas of special interest are detected, the distance should be significantly reduced.

8.3.9 Re-certification of stranded wire ropes shall be carried out. It shall be based on a visual examination of the wire rope and a condition assessment and/or a section shall be cut from the end of the rope and inspected.

8.3.10 Fibre rope
On the survey of the fibre ropes consists of a 100% visual examination of the rope covering the following items:

— external wear
— deformation
— termination area.

8.3.11 In addition to [8.3.10] the in-service load history shall be assessed or, if this information is not available, a cut-off section from the end of the rope shall be tested.

8.3.12 Winches and fairleads
The fairleads shall be inspected visually and by ROV as far as possible. All fairleads are to be inspected.

8.3.13 Visual inspection of windlass and fairlead pockets shall be carried out. Particular attention shall be paid to:

— rate of wear on pockets, including relative rate of wear between links and pockets
— mismatch between links and pockets, including improper support of the links in the pockets.

8.3.14 Special attention shall be given to the holding ability of the windlass. The chain stopper and the resultant load path to the unit's structure should be inspected and its soundness verified.

8.3.15 Special attention shall be given to the holding ability of the winch and the satisfactory operation of the pawls, ratchets and braking equipment. The soundness of the resultant load path to the unit's structure shall be verified.

8.3.16 Proper spooling of the wire on the winch drum shall be verified and drums and spooling gear adjustments made if required.

8.3.17 The system for emergency release of the winch brake is to be tested. The visual and audible alarm is to be confirmed. The activation of the deluge system over the anchor windlasses is to be tested.
SECTION 5 PERIODICAL SURVEY EXTENT FOR SERVICE NOTATIONS

1 General

1.1 Introduction

1.1.1 This section presents the standard extent of surveys for retention of service notations applicable to oil production units and installations.

1.1.2 The requirements shall be applied in addition to those for main class notation (1A or OI) presented in Sec.4. The detailed scope is given in the following sub-sections.

2 Oil Production units and installations

2.1 Application

2.1.1 The requirements in this sub-section apply to units or installations with class notations:

- Oil Production Unit or Oil Production Installation.

2.1.2 For units with both production and storage facilities (e.g. FPSOs), the requirements of this sub-section shall be supplemented with the requirements of sub section 3.

2.2 Survey arrangement

Annual and complete periodical surveys may take advantage of an approved planned maintenance system, thus minimising interruption of the function of the unit or installation.

2.3 Annual survey

2.3.1 Structure

The following structure issues shall be subjected to a general survey:

- structure related to process and utility modules foundation (hull reinforcements).
- accessible parts of the turret structure, and submerged turret structure (including STP buoy) shall be surveyed to confirm structural integrity and condition of securing arrangement

2.3.2 Arrangement

The following arrangement issues shall be subjected to a general survey:

- condition of measures preventing escalation of process incidents to the cargo tank area, e.g. related to openings/penetrations in process deck
- condition of additional safety measures taken for any approved process equipment located below process deck. Typical measures would be oil spillage collection, additional fire detectors, fire water system, structural fire protection, piping, and cables,
- condition of drainage and bunding for spillage collection at process deck for prevention of escalation to lower deck.
- any damage from green sea on structures, riser ESD valves, and equipment covered by the class.
- condition of access for inspection, maintenance and fire fighting in the space between process/utility deck and storage tank deck (FPSO)
- personnel protection against moving machinery parts, or hot surfaces. Also any flare radiation shielding shall be surveyed.
- laydown areas w.r.t protection against impact from dropped items or other crane incidents associated with their usage. Any new laydown areas being observed shall be subject to design approval.
2.3.3 Hazardous area classification

The following Hazardous Area Classification issues shall be subjected to a general survey:

— condition of entrances and openings between hazardous areas and accommodation, machinery, and service spaces w.r.t tightness, alarms, and marking.
— condition of explosion protected equipment in non-hazardous areas being intended for operation in ESD situations.
— condition of instrumented ignition source control
— condition of ignition protection of any hot surfaces
— condition of ventilation system and associated alarms, door tightness etc in rooms kept non-hazardous by overpressure ventilation
— condition of ignition prevention measures for any combustion engine/boiler approved for operation in hazardous area.

2.3.4 Electrical equipment in hazardous areas shall be examined with respect to:

— corrosion
— flameproof enclosure/ingress
— no unauthorised modification
— correct rating of lamps
— earthing (spot check)
— function testing of pressurised equipment and of associated alarms
— testing of insulation resistance of power circuits (Ex p, Ex e and Ex n). Where proper records of testing are maintained consideration may be given to accepting recent readings (maximum 12 months) by the ship's crew
— insulation monitors with alarms shall be function tested, if installed
— for rooms protected by air locks, interlocking with ventilation of electrical supply to non-explosion protected equipment and de-energising of such equipment in case of ventilation failure shall be examined and function tested as applicable.

Guidance note:
Megger testing may involve risk of explosion due to sparks. Therefore appropriate procedures for such work should be followed as relevant e.g., “gas free certificate”.
Ex equipment to include Ex motors and Ex junction boxes and Ex enclosures.

2.3.5 ESD

The Emergency Shutdown System shall be subjected to survey and function testing:

— the production unit shall be confirmed being in safe operating condition before any testing
— a system status regarding maintenance and any modifications/changes shall be obtained
— a visual survey of control room safety screens, mimics, critical alarm panel and manual ESD activation devices shall be done
— survey of boundary ESD valves, actuators and accessories
— survey and testing of power supply, including UPS, and associated system alarms
— communication/interfaces between various sections and systems (e.g F&G detection, PSD) and associated alarms shall be demonstrated
— test of the highest ESD level, showing alarms and status in control room, and correct actions and alarms in field. It shall be confirmed that the applied logic is the latest approved revision of the cause and effect diagrams. The test shall be carried out to the extent deemed necessary by the surveyor.

Guidance note:
If operations make it difficult to carry out testing, a low level ESD is sufficient to comply to the above. As an alternative, a review of ESD test records can be done.
2.3.6 Fire and gas detection
The fire and gas detection system shall be surveyed and function tested:

- the production unit shall be confirmed being in safe operating condition before any testing
- a system status regarding maintenance and any modifications/changes shall be obtained (1A)
- a visual survey of control room safety screens, mimics, critical alarm panel shall be done (1A)
- a general survey of condition of fire and gas detectors in hazardous areas, and their cables.
- a test of shutdown actions by fire and gas detection system to an extent as required by the surveyor. This normally applies to ventilation shutdown (1A).

2.3.7 Passive fire protection

- Condition of fire division in production area shall be surveyed.
- Condition of structural fire protection on load-bearing structure shall be surveyed. This applies to process and utility modules support structure. For passive protection within process plant refer to PROD notation.

2.3.8 Fire water and foam systems
The fire water and foam systems shall be surveyed and tested in line with the requirements for 1A/OI with the following specific focus:

- All fire pumps shall be confirmed available for duty. Start sequence of fire pumps from fire detection or manual push button from main control room shall be tested. Pump status given in control room shall be verified. (1A).
- Pressure surge prevention measures shall be surveyed (1A).
- Marine growing condition in fire water system. Also protective measures shall be surveyed.
- Condition including operation of sectional valves in ring main, and for the two supplies to deluges valve skids.
- Monitors, hydrants and hose equipment shall be visually surveyed in general (1A).
- The function of fire water systems in all turret and process areas, as deemed necessary by the surveyor.
- It shall be verified that the fire water ring main is not in use for other than fire-fighting purposes.
- The function of deluge valves, including their activation. Test shall be carried out.
- The deluge nozzles shall be surveyed as deemed necessary by the surveyor, and their cleanness shall be verified by a water discharge test. In this respect systems using carbon steel piping, also galvanised, may require extended testing.
- Survey and testing of deck foam system.
- Verify certificates confirming the physical and chemical condition of the foam concentrate.

2.3.9 Fixed fire extinguishing systems

- Condition of fixed fire extinguishing system in turbine enclosure, in any engine and/or boiler room not included in main class, and in any turret enclosure shall be verified as deemed necessary by the surveyor.

2.3.10 Marine systems
Where any cross connection between marine systems (non-hazardous) and production systems (hazardous) exist, measures taken to prevent contamination of the non-hazardous systems shall be surveyed.

Any turret machinery shall be surveyed and function tested

2.3.11 Instrumentation and telecommunication system
Function test of overall unit safety related alarms shall be done (typical fire, gas, ESD, mustering, evacuation alarms).
2.4 Complete periodical survey

2.4.1 ESD
The ESD test required for annual survey shall be extended to include a representative number of higher and lower ESD levels as deemed necessary by the surveyor.

2.4.2 Crude fuelled boilers in enclosed spaces
For units or installation having boilers in enclosed spaces in hull or topsides, burning crude oil or slop, survey and testing of control equipment including monitoring systems and shutdown functions related to the following systems shall be carried out:

- ventilation and gas-tightness, fuel supply line and boiler with boiler front lagging
- fuel pumps and heating arrangement
- drain pipe ducts and automatic closing drain traps
- inert and purging systems
- manual and automatic quick closing valves and shutdown systems
- boiler hood ventilation system
- boiler compartment ventilation
- boiler front extinguishing system
- pilot burner arrangement
- gastight bulkhead penetrations
- gas detection system
- fuel heater
- boilers located outdoor in topsides follow safety principles of PROD, ref DNVGL-OS-201.

2.4.3 Gas fuelled machinery in enclosed spaces
For units or installations having turbines, engines or boilers in enclosed spaces in hull or topsides, burning gas, survey and testing of the safety and control equipment and alarm and shutdown functions related to the following systems shall be carried out:

- gas heating arrangement
- ventilation arrangement
- protection and flame screens
- gas freeing and purging systems
- manual and automatic shutdown system
- gas detection system
- pilot flame burner or “fuel floor” arrangement
- governor stability switching from gas fuel to oil, or vice versa
- boilers located outdoor in topsides follow safety principles of PROD, ref DNVGL-OS-201.

2.4.4 Hydrocarbon processing equipment in hull compartments
Production systems and equipment installed in hull compartments below damage water line shall be surveyed as per PROD requirements. Thickness checking of pipework shall be carried out and records reviewed by the surveyor, as applicable. Hydrostatic testing may be requested by the surveyor. Attention is to be paid to fire and other hazards.

2.4.5 Gas turbines
Upon completion of onboard overhaul, or installation of overhauled unit or module, the gas turbine shall be tested. The testing shall cover alarms, local fire fighting systems and shutdown functionality as required in Sec.3 and [2.4.1].

Guidance note:
Original operations documentation retained on board will reflect the original manufacturer alarm or acceptance limits and set points as established through the type approval.
3 Oil storage units and installations

3.1 Application
The requirements in this sub-section apply to units or installations with class notations:

Oil Storage Unit or Oil Storage Installation.

3.2 Survey arrangement
Annual and complete periodical surveys may take advantage of an approved planned maintenance system, thus minimising interruption of the function of the unit or installation.

3.3 Annual survey

3.3.1 Arrangement
Laydown areas shall be surveyed w.r.t protection against impact from dropped items or other crane incidents associated with their usage. Any new laydown areas being observed shall be subject to design approval.

3.3.2 Hazardous area
The following Hazardous Area Classification issues shall be subjected to a general survey:

— condition of entrances and openings between hazardous areas and accommodation, machinery, and service spaces w.r.t tightness, alarms and marking
— wheelhouse doors and windows, side scuttles and windows in superstructure and deckhouse bulkheads facing the cargo area and possible bow or stern loading and unloading arrangements shall be surveyed for gas and vapour tightness
— condition of electrical equipment in hazardous areas
— condition of explosion protected equipment in non-hazardous areas being intended for operation in ESD situations
— condition of instrumented ignition source control.

3.3.3 Electrical equipment in hazardous areas shall be examined with respect to:

— corrosion
— flameproof enclosure/ingress
— no unauthorised modification
— correct rating of lamps
— earthing (spot check)
— function testing of pressurised equipment and of associated alarms
— testing of insulation resistance of power circuits (Ex p, Ex e and Ex n). Where proper records of testing are maintained consideration may be given to accepting recent readings (maximum 12 months) by the ship's crew
— insulation monitors with alarms shall be function tested, if installed
— for rooms protected by air locks, interlocking with ventilation of electrical supply to non-explosion protected equipment and de-energising of such equipment in case of ventilation failure shall be examined and function tested as applicable.

Guidance note:
Megger testing may involve risk of explosion due to sparks. Therefore appropriate procedures for such work should be followed as relevant e.g., “gas free certificate”.
Ex equipment to include Ex motors and Ex junction boxes and Ex enclosures.

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3.3.4 ESD
The Emergency Shutdown System shall be surveyed and function tested:

— the storage unit shall be confirmed being in safe operating condition before any testing
— a system status regarding maintenance and any modifications/changes shall be surveyed
— a visual survey of control room safety screens, mimics, critical alarm panel and manual ESD activation shall be done
— survey of boundary ESD valves, actuators and accessories
— survey and testing of power supply, including UPS, and associated system alarms
— communication/interfaces between various sections and systems (e.g. F&G detection, PSD) and associated alarms shall be demonstrated
— test of the highest ESD level, showing alarms and status in control room, and correct actions and alarms in field. It shall be confirmed that the applied logic is the latest approved revision of the cause and effect diagrams. The test shall be carried out to the extent deemed necessary by the surveyor.

Guidance note:
If operations make it difficult to carry out testing, a low level ESD is sufficient to comply to the above. As an alternative, a review of ESD test records can be done.

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3.3.5 Fire and gas detection
The fire and gas detection system shall be surveyed and function tested:
— the storage unit shall be confirmed being in safe operating condition before any testing
— a system status regarding maintenance and any modifications/changes shall be surveyed
— a visual survey of control room safety screens, mimics, critical alarm panel shall be done
— a general survey of condition of fire and gas detectors in hazardous areas, and their cables, shall be done
— examination and testing of gas detection system in cargo pump rooms
— a test of shutdown actions by fire and gas detection system shall be demonstrated to an extent as required by the surveyor. This normally applies to ventilation shutdown (1A).

3.3.6 Fire water systems
— All fire pumps shall be confirmed available for duty. Start sequence of fire pumps from fire detection or manual push button from main control room shall be tested. Pump status given in control room shall be verified.
— Marine growing condition in fire water system shall be confirmed. Protective measures shall be surveyed.
— Operation of sectional valves in fire main, shall be surveyed.
— Monitors, hydrants and hose equipment shall be visually surveyed in general.
— Survey and testing of deck foam system.
— Verify certificates confirming the physical and chemical condition of the foam concentrate.

3.3.7 Cargo systems
The following cargo system and components shall be surveyed and tested as shown:
— survey of cargo transfer and stripping pumps
— testing of remote operation and shut-down devices for the cargo system
— survey of temperature sensors in bulkhead shaft glands bearings for pumps installed in cargo pump rooms
— survey and testing of gas detection/sampling system in tanks/spaces adjacent to cargo tanks. The examination shall include verification of integrity of the suction lines between suction points and analysing units.
— survey of pressure gauges on cargo/cow discharge lines
— survey of temperature sensors for cargo, tank washing and ballast pumps
— survey of oily water interface detector
— survey of oil discharge monitoring system
— all piping on deck shall be overall surveyed. Pressure testing and thickness measurements of any piping system may be required if found necessary by the surveyor
— survey of provisions for drainage of cargo tank vent lines
— segregation between cargo and segregated ballast system shall be confirmed, if applicable
— crude oil washing system
— pump rooms shall be surveyed with special attention to piping and pumps, bulkheads for signs of oil leakage or fractures and, in particular, the sealing arrangements of all penetrations of cargo pump room bulkheads, and access ladders
— condition of protection measures against overpressure in slop tank from any pipe connection with process plant shall be surveyed
— for ships with gas detection system, the examination shall include verification of integrity of the suction lines between suction points and analysing units (where applicable).

3.3.8 Inert and tank vent systems
The following cargo tank vent items shall be surveyed and tested as deemed necessary by the surveyor:
— the inert gas generator, included oil burning equipment, blowers, scrubber, deck water seal, associated control and safety systems, P/ V breaker and non-return valve
— testing of remotely operated or automatically controlled valves, interlock features of soot blowers, and alarms and safety devices
— inert gas piping shall be surveyed with attention to gas or effluent leakage
— the pressure/vacuum monitoring arrangement for cargo tanks
— cargo tank openings with pressure/ vacuum valves
— venting/ gas freeing arrangements including masts and risers with flame screens/ flame arrestors
— valve securing system.

3.3.9 Instrumentation and telecommunication system
Function test of overall unit safety related alarms shall be done (typical fire, gas, ESD, mustering, evacuation alarms).

3.4 Complete periodical

3.4.1 Structure and equipment
For single hull oil storage units with double bottom or double side spaces (for water ballast, or void spaces), the survey requirements for double hull oil tankers shall be applied in way of the double bottom or the double sides.

3.4.2 Extended close-up examination shall be carried out according to the following tables from the DNV Rules for ships, Pt.7 Ch.1 Sec. 4:
— Table 18 for single hull oil storage units
— Table 21 for double hull oil storage units.

3.4.3 The survey of stainless steel tanks may be carried out as an overall examination supplemented by close-up examination as deemed necessary by the surveyor.

3.4.4 Thickness measurement, extent and pattern in way of areas of substantial corrosion, single hull oil Storage units are given in DNV Rules for ships Pt.7 Ch.1 Sec.4 Table 20.

3.4.5 Thickness measurements shall be carried out in accordance with the following tables from the DNV Rules for ships, Pt.7 Ch.1 Sec.4:
— Table 19 for single hull oil storage units
— Table 22 for double hull oil storage units.

3.4.6 Thickness measurement of stainless steel hull structure and piping may be waived, except for clad steel plating.

3.4.7 Thickness measurement, extent and pattern in way of areas of substantial corrosion, double hull oil storage units are given in DNV Rules for ships, Pt.7 Ch.1 Sec.4 Table 23.
3.4.8 Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams shall be pressure tested.

3.4.9 Pressure testing
All cargo tank bulkheads shall be pressure tested at the 2nd and subsequent renewal surveys.

The pressure shall, in general, correspond to a head of liquid to the highest point that liquid will rise under service conditions.

Pressure testing of cargo tanks may be accepted based on confirmation from the Master, stating that the pressure testing has been carried out according to the requirements, with a satisfactory result.

3.4.10 The testing of boundaries facing double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination together with an examination of the tanktop is carried out.

3.4.11 The surveyor may extend the tank testing as deemed necessary.

3.4.12 FUI description
Floating (production) and storage units (FPSO's) shall follow the principles for life time extension as given in DNVGL-OS-C102 App. B when the unit's design life is exceeded.

3.4.13 Record for examination
A ballast tank shall be recorded for examination at subsequent annual surveys where, in addition to the conditions given in 104 and 118 the hard protective coating is found to be less than GOOD condition and is not repaired to the satisfaction of the surveyor.

4 Oil loading units and installations

4.1 Application
Application The requirements in this sub-section apply to units or installations with class notations: Oil Loading Unit or Oil Loading Installation.

4.2 Survey arrangement
Annual and complete periodical surveys may be carried out on location based on an approved operation manual.

Manual with instructions for operation and/ or maintenance shall be verified for:

— inert gas system
— oil discharge monitoring system
— crude oil washing system
— vapour emission control system
— protected coating for dedicated seawater ballast tanks, double-side skin spaces and void spaces, (including ships with class notation COAT-PSPC)
— offshore bow loading arrangement, (including ships
— with class notation BOW LOADING)
— arrangement for carriage of low flashpoint liquids, (including ships with class notation LFL)
— gas fuelled engine installations, (including ships with class notation GAS FUELED).
SECTION 6  OPTIONAL CLASS NOTATION SURVEYS

1  Introduction

1.1  General

1.1.1  This section presents the standard extent of surveys for retention of optional class notations applicable to oil production and/or storage units.

1.1.2  Unless otherwise noted, the interval of the complete surveys as listed in this section is 5 years.

2  Position mooring equipment

2.1  Application

2.1.1  The requirements in this sub-section apply to units with class notation POSMOOR.

2.1.2  If the unit is in DP mode and not in POSMOOR mode at time of survey and hence equipment's functionality related to the POSMOOR notation is not available for survey/testing a reduced survey scope may be accepted. Annual or complete survey depending on time since last survey is to be carried out before the mode is taking into use.

2.2  Types of surveys

2.2.1  Annual surveys may be carried out with the unit at operational draft and the mooring system in use. No special inspection aids are required and no disruption to the unit's operation is intended.

2.2.2  Renewal survey will require appropriate cleaning with good access and adequate lighting. The complete mooring system for position keeping on location is subject to comprehensive survey, including opening up and NDT of selected parts of windlasses and winches and fairleads.

Critical parts of all mooring chains or wires and accessories will be thoroughly visually examined and subjected to extensive NDT when required. The extent and type of survey is dependent on the design such as corrosion protection / allowance and fatigue, see [2.4], [2.5] and [2.6].

For units with permanently locked off chain arrangement, particular attention will be paid to the hanging off arrangement.

2.2.3  Mooring lines:

Alternatively, the owner may opt for a continuous survey by providing an extra mooring line, which is regularly inspected in special facilities onshore and exchanged with lines installed on the unit. This arrangement is normally noted by an MO which gives the last/next survey date of each mooring line. At each renewal survey for the hull, the attending surveyor shall carry out the equivalent of the intermediate survey on each mooring line and renewal survey extent on the other parts of the mooring system, i.e. windlass, fairleads, anchors, etc. which are not covered by the continuous survey cycle.

2.2.4  Owners are to ensure that the mooring system can be adequately surveyed. An inspection and survey plan shall be submitted to the Society for approval at the commencement of the in-service phase.

The following information shall be submitted to the Society:

- sample chain/wire/fibre rope certificate
- sample joining shackle certificate (one of each type of shackle used)
- design fatigue life
- fatigue life used since new / last inspection
- latest inspection reports
- history of chain/wire/fibre rope, e.g. inspections, chain/ wire /fibre rope breaks, joining shackles
- planned remaining field life
— future inspection plans.

2.3 Annual survey

2.3.1 Accessible and visible parts of the unit’s mooring system for position keeping on location shall be inspected. In addition, Sec.4 [8.2] applies.

2.3.2 The Mooring Analysis as required in DNVGL-OS-E301 Ch.3 Sec.1 (4.2) to be verified on board. It shall also be verified that the unit operates within the limits stated in the mooring analysis. The mooring line records shall also be reviewed.

2.3.3 The calibration certificates for the load cells to be verified on board. (Ref DNVGL-OS-E301 Ch.2 Sec.4 [14]).

2.3.4 Winch control to be verified from all operator stations.

2.3.5 Additional requirements for units with system notation letters: POSMOOR-TA or POSMOOR-ATA.

System maintenance documentation, including information regarding hardware and software changes, shall be reviewed.

Guidance note:
This requirement includes, in addition to the POSMOOR control system and other systems necessary for performing position keeping, e.g. thruster control system.

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2.3.6 The electrical installation in excess of the main class requirements shall be visually inspected, i.e. installations comprising the position mooring system, e.g. controllers and operating stations for POSMOOR and references systems, sensors and mode change system.

2.3.7 The technical condition of the POSMOOR system shall be verified during the survey.

Guidance note:
Verification of the technical condition of the POSMOOR system denotes testing to verify that the POSMOOR system is capable of positioning the unit, and thus validating that system functionality is in place.

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2.3.8 If the survey is carried out when the unit is undergoing regular operations, then tests that possibly can introduce unacceptable risks shall not be performed.

2.3.9 Capacity of UPSs and other battery systems serving the POSMOOR control system, including its peripherals, shall be verified.

2.3.10 The alarm for loss of charging power shall be verified.

Guidance note:
If the survey is carried out during regular operations, then the capacity of the batteries need not be proven by testing.

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2.3.11 Emergency stop of thrusters from the POSMOOR control centre shall be tested. If the survey is carried out when the unit is undergoing regular operations, then testing shall not be performed if there is any possibility of introducing unacceptable risks.

2.3.12 The Simulation facility shall be verified as far as possible.

2.4 Complete periodical survey

2.4.1 Application
The requirements given in [2.2] apply with the additions given in this sub-section.

2.4.2 The scope of the complete periodical survey is complemented depending on availability of fatigue analysis and corrosion allowance as specified in [2.5] to [2.7]. Section [2.8] subsequently specifies additional requirements for thruster assisted systems.
2.4.3 Fairleads and winches irrespective of fatigue life factors
The fairleads shall be inspected visually and by ROV as far as possible. All fairleads are to be inspected with special attention to wear and tear of fairlead wheels and malfunctioning.

2.4.4 Visual inspection of windlass and fairlead pockets shall be carried out. Particular attention shall be paid to:

1) Rate of wear on pockets, including relative rate of wear between links and pockets.
2) Mismatch between links and pockets, including improper support of the links in the pockets.

2.4.5 Special attention shall be given to the holding ability of the windlass. The chain stopper and the resultant load path to the unit’s structure should be inspected and its soundness verified.

2.4.6 Special attention shall be given to the holding ability of the winch and the satisfactory operation of the pawls, ratchets and braking equipment. The soundness of the resultant load path to the unit’s structure shall be verified.

2.4.7 Proper spooling of the wire on the winch drum shall be verified and drums and spooling gear adjustments made if required.

2.5 Complete periodical survey - systems designed before 1996 (no fatigue analysis and corrosion allowance)

2.5.1 For mooring systems designed without corrosion protection/allowance and not designed with respect to fatigue the following shall be carried out in addition to [2.4]:

— inspection of the unit’s log and anchor line records
— dismantling and non-destructive testing of all joining shackles which have been in service for more than 5 years, except for LTM shackles
— function testing of windlasses/winches and fairleads, including testing of brake torque
— complete inspection of mooring system including:
  — visual examination and extensive non-destructive testing of critical parts of all anchor chains, wire and fibre ropes and accessories
  — dimension control of chain and connection elements
  — inspection of cathodic protection system of sockets.

2.5.2 The survey of steel wire ropes consists of a 100% visual control, and the following items shall be covered:

— the nature and number of wire breaks
— wire breaks at the termination
— localised grouping of wire breaks
— fracture of strands
— reduction of rope diameter including breaking of core
— external wear and corrosion
— deformation
— termination area.

2.5.3 It is advised that checkpoints are made for every 100 m. If areas of special interest are detected, the distance should be significantly reduced.

2.5.4 For acceptance/rejection criteria the following standards shall be used as guideline:

— for fibre rope: DNV-RP-E304
— for chain: Sec.4 [8.3.2] and API RP 2I with the following addition: the anchor chains shall be replaced if the diameter of the chain with the breaking strength used in the design is reduced by 2%. 

2.6 Complete periodical survey – fatigue design life factor 3

2.6.1 A survey scheme as outlined herein will only apply for mooring systems with recommended connection elements. The scheme applies to all production and/or storage units designed according to:

- DNV MOU Rules Pt.6 Ch.2 Position Mooring (POSMOOR), dated January 1996 (Design life factor 3)

2.6.2 Recommended connection elements in long term mooring systems shall be purpose made elements such as triplates and D-shackles of Long Term Mooring (LTM) type.

2.6.3 Assumptions and conditions for acceptance of approach:

- the remaining fatigue life exceeds the expected field life by a factor of 3
- loss of one line will not lead to a critical situation for the installation
- if any defects are found on the chain/wire during visual inspection, all chains/wires are to be pulled for visual inspections
- chain/wire inspection is carried out under supervision by DNV GL surveyors results of ROV inspection to be verified by DNV GL surveyors
- all studs found loose are to be pressed tight
- the most heavily loaded (extreme tension) line is to be inspected. If a different line is most heavily utilised in fatigue, then this line is also to be inspected
- no twist shall exist between upper and lower fairlead. Any twists shall be removed
- fairleads and winches surveyed according to [2.4].

2.6.4 All mooring lines shall be inspected offshore by use of ROV within 5 years.

At least 2 out of every 8 chain lines (25%) shall be included in visual /MPI inspection at a suitable offshore or onshore facility as follows:

- 100% visual
- 100% MPI of joining links
- 10% of the links are to have overall MPI (may be reduced for benign waters)
- diameter measurements of the chain link every 100th link. The anchor chains shall be replaced if the diameter of the chain with the breaking strength used in the design is reduced by 2%
- 2-neck measurement values to be noted every 100th link (measurement of the two diameters taken at the neck of the link at the mating surface).

Guidance note:
When considering 2 neck measurements (intergrip), where loss of diameter exceeding 2% is indicated, the owner should carry out a detailed assessment of the remaining mean breaking load taking into account the manufacturing tolerances and allowable ovality.
When considering intergrip wear, the surveyor should also consider the general corrosion level found out with the intergrip area.

2.6.5 All the remaining chain/wires shall be ROV inspected with respect to the following:

- overall visual inspection (including cleaning if necessary)
- go/no go gauge on 2 link wear every 100th link
- wear and scouring in touch down area
- anchors and anchor jewellery
- chain/wire attachments to the hull shall be surveyed visually as far as possible, if not accessible by ROV
- wear and tear in chain links where the mooring line is locked of in the chain stopper
- chain links in the fairlead pockets and close to fairleads shall be given special attention
- six strand wire ropes shall be inspected according to [2.5.2].

2.6.6 If the ROV inspection reveals defects that are considered as critical, i.e. cracks, severe pitting and wear and tear, a more detailed inspection including MPI will be required.
2.6.7 Normally connection elements such as Kenter shackles, pear links, C-links and D-shackle with locking pin through bow and bolt, and swivels are not accepted in long term mooring systems. However, if such equipment is accepted installed they shall either be dismantled and subjected to non-destructive testing of all machined surfaces, or be replaced with new elements at least every 5 years.

2.7 Complete periodical survey – fatigue life factor 5-8 or greater

2.7.1 The requirements in [2.7] are valid for mooring system design according to:
   — DNV MOU Rules Pt.6 Ch.2 Position Mooring (POSMOOR) dated January 1996 (design life factor 10)
   — DNVGL-OS-E301 Position Mooring, dated June 2001 (design life factors 5 - 8).

2.7.2 For assumptions and conditions for acceptance of approach, see [2.6.4].

2.7.3 All mooring lines shall be inspected offshore by use of ROV during a 5 years period as follows:
   — 100% overall visual inspection (including cleaning if necessary)
   — diameter measurements of the chain link every 100th link of at least 1 out of 8 chains lines (12.5%). The anchor chains shall be replaced when the diameter of the chain with the breaking strength used in the design is reduced by 2%. If unexpected wear and tear or corrosion reveals, the diameter measurements shall be extended. The plan for the extended inspection shall be approved by the surveyor.
   — 2-neck measurement values to be noted every 100th link (measurement of the two diameters taken at the neck of the link at the mating surface)
   — go/no go gauge on 2 link wear every 100th link
   — wear and scouring in touch down area
   — anchors and anchor jewellery if available
   — chain/wire /fibre rope attachments to the hull shall be surveyed visually as far as possible.

   Guidance note:
   When considering go-nogo gauging results for standard chain, chain shall be considered for replacement when the link length exceeds $6.15 \times \text{diameter}$. For none standard chains special assessment shall be carried out. When considering go/nogo gauging results, the surveyor should understand that failure may be a combination of intergrip wear and link elongation.

2.7.4 Special attention shall by paid to connection elements such as:
   — LTM shackles and their bolts and locking devices
   — wear and tear of connection elements
   — corrosion with attention to severe pitting
   — steel wire rope sockets and their cathodic protection system
   — chain stoppers
   — wear and tear of chain links in chain stoppers and fairleads
   — damage to the protection (sheathing) of steel wire rope.

2.7.5 If the ROV inspection reveals defects that are considered as critical, i.e. cracks, severe pitting and wear and tear, a more detailed inspection including MPI will be required.

2.7.6 Normally connection elements such as kenter shackles, pear links, C-links and D-shackle with locking pin through bow and bolt, and swivels are not accepted in long term mooring systems. However, if such equipment is accepted installed they shall either be dismantled and subjected to non-destructive testing of all machined surfaces, or be replaced with new elements at least every 5 years.

2.7.7 Additional requirements - tropical waters only
For units located in “tropical waters” chain measurements shall be taken in the splash zone during a 5 years period, or in case of submerged turrets; in the first 8 m zone below the chain attachment to hull/turret table. The measurements shall be carried out for at least two lines and comprise:
— 2-neck measurements (crown to crown)
— diameter measurements of the chain link (average over two diameters taken at 90° angle).

For FPSOs/FSOs the measurements can be taken from the lowest draught after offloading and for approximately 8 m upwards towards chain stopper on deck. Measurements are to be taken by rope access personnel, or in case of submerged hull attachment, by divers.

All scaling and growth shall be removed at the location of the measurement points.

2.8 Complete periodical - additional requirements for thruster assisted systems

2.8.1 With the unit in POSMOOR mode, a sea trial shall be performed.

The complete system shall be tested in all operational modes. The testing shall include simulation of different failure conditions to verify switching of modes, back-up systems and the alarm system.

2.8.2 The different modes of thruster control from the DP control centre(s) shall be tested:
— manual control
— joystick control (if installed)
— position mooring control
— transfer of control.

Manual override shall be demonstrated during normal operation and during failure conditions.

2.8.3 Emergency stop of POSMOOR thrusters from POSMOOR control centre to be tested.

2.8.4 All sensors, peripheral equipment and reference systems shall be tested:
— verify correct operation and adequate accuracy
— failure of sensors and reference systems shall be simulated to check the alarm system and the switching logic
— switch-over between reference systems as input to controller shall be carried out to assure that warnings, alarms and information to operator are satisfactory.

**Guidance note:**
Due to practicalities some reference systems may be unavailable during the tests. In such cases the testing can be performed by the crew as soon as possible after survey. When testing is left to the crew this must be recorded in the survey report, and a condition of class or memo to owner must be issued. The condition of class or memo to owner can be deleted based on a signed test report from the master.

The survey of the thruster unit should be carried out as for thrusters for propulsion and dynamic positioning. Surveys of the thrusters are separate survey elements and these surveys do not need to take place at the same time as the POSMOOR survey.

2.8.5 Alarm for loss of position and heading out of limit shall be demonstrated.

2.8.6 Single failures in thruster control systems including signal wire breaks of thruster command and feedback signals shall be tested in order to verify safe response on the thrust output. Equivalent testing may also be required for rudders controlled by the DP control system.

2.8.7 Overload prevention shall be tested.

**Guidance note:**
If it is possible to induce overload by setting out thrust command from the DP control system (e.g. by use of joystick function) then the overload protection function (e.g. pitch reduction) should be tested. System configuration and/or available power considerations may lead to this test being omitted.

2.8.8 Capacity of UPSs and other battery systems serving the POSMOOR control system including its peripherals shall be verified by testing. Alarm for loss of charging power shall also be verified.

2.8.9 For units where the design capacity is dependent on certain thrusters to remain intact after failure, required redundancy shall be documented through an FMEA test. The FMEA report and FMEA test program shall be verified to ensure that they have been updated when alterations have been done.
Guidance note:
This requirement is only valid for units with class request after 1. July 2004.

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2.8.10 Correct functioning of the Consequence Analysis facility shall be verified as far as possible.

3 Dynamic positioning systems

3.1 General

3.1.1 These rules do not include verification of requirements or recommendations in regard to the vessels operation or other characteristics.

3.1.2 The requirements in this sub-section apply to units with class notation DYNPOS or DPS.

3.2 Specific requirements

3.2.1 Qualifier (A)
For units with qualifier (A) given as DYNPOS-AUTR(A) or DYNPOS-AUTRO(A) notation, the annual survey shall be carried out in accordance with the requirement for complete survey.

3.2.2 An updated FMEA report with a corresponding FMEA test program shall be kept onboard, and shall be used as basis for the testing.

3.2.3 For units in POSMOOR
If the unit is in moored position and not in dynamic positioning mode at time of survey and hence the equipment’s or functionality related the dynamic positioning is not available for survey/testing a reduced survey scope may be accepted. Annual or complete survey depending on time since last survey is to be carried out before the mode is taking into use.

3.3 Annual and complete survey
See DNV Rules for ships Pt.7 Ch.1 Sec.6(12).

4 Loading computers for damage control

4.1 Application
The requirement in this sub-section applies to units with class notation LCS.

4.2 Annual survey and complete surveys
It shall be checked that the approved in-service test programme for all sensors has been followed.

5 Offshore bow loading

5.1 Application
The requirements in this sub-section apply to units or installations with class notation BOW LOADING.

5.2 Complete periodical survey

5.2.1 Spaces and zones used in connection with bow loading shall be surveyed with respect to general cleanliness and maintenance.

5.2.2 Valves and piping, including inert gas purge pipes shall be externally surveyed. Opening up and/or pressure testing may be required if found necessary by the surveyor. Condition of spray-shield and collecting tray in way of connector shall be in order.

5.2.3 Instrumentation, automation and communication equipment in bow control station shall be surveyed, tested and verified to be in order.
5.2.4 Ventilation of gas-free spaces shall be verified to be in order.

5.2.5 Electrical equipment in gas-dangerous spaces shall be surveyed.

5.2.6 Emergency disconnection systems, automatic and manual, shall be surveyed and tested as far as possible.

The bow loading area shall be surveyed with respect to fire and explosion hazards and is to include survey of: fire extinguishing equipment protective measures preventing structural elements initiating sparks ventilation of bow control station and bow loading connector room emergency escape routes from bow control station interlock functions for the mooring and loading systems.

5.2.7 It shall be verified that the required operation manual is in order.

6 Crude offloading system

6.1 Application
The requirement in this sub-section applies to units and installations with class notation OFFLOADING.

6.2 Survey arrangement
A maintenance system shall be implemented for systems and equipment covered by the OFFLOADING notation. The survey may take advantage from records therein.

6.3 Complete survey
6.3.1 General
— Verify that the ‘Offloading manual’ for operation and maintenance is in order
— Survey spaces and areas used in connection with offshore offloading with respect to general housekeeping/cleanliness, spillage drain and bunds arrangement, and spray-shield and collecting tray in way of connector.

Survey general condition of access within area and to main escape routes.

6.3.2 Examine condition of ventilation system of:
— offloading control station
— any room kept non-hazardous by overpressure ventilation, including associated alarms and door tightness.

6.3.3 Piping and valves
— Survey valves and piping externally. Open up and perform pressure testing of valves and piping as deemed necessary.
— Survey condition of piping system for inert gas purging and drain lines.

6.3.4 Control and safety systems
— Test control and monitoring system, including field instrumentation for pressure and tension values.

6.3.5 Test isolation valve immediate upstream hose reel and its activation from control, system and overall ESD system.

6.3.6 Communication system
— Test communication between remote and local control stations.
— Test, if possible, communication between the offloading control station and the receiving shuttle tanker.

6.3.7 Disconnection
— Survey and test the mooring line and hose emergency disconnection systems, automatic and manual as far as possible.
Test that automatic disconnection includes closing of end coupler valve and shut down the crude oil transfer pumps.

— Test the manual back up emergency disconnection system.

### 6.3.8 Hose and hawser

— survey general condition of hose and hawser
— survey hose reel locking mechanism
— survey interlock functions for the mooring and loading systems.

### 6.3.9 Ignition prevention

— Survey protective measures preventing structural elements initiating sparks.

### 7 Production plant

#### 7.1 Application

The requirements in this sub-section apply to units or installations with class notation PROD.

#### 7.2 Survey arrangement

A maintenance system shall be implemented for systems and equipment covered by the PROD notation.

#### 7.3 Annual survey

**7.3.1** An overall survey of production related equipment, structures and systems with particular attention to structural integrity, fire or explosion hazards, safety systems and personnel protection shall be carried out. If deemed necessary by the surveyor running test, NDT, and/or opening up of equipment may be required.

**7.3.2** Riser system shall be visually surveyed as far as accessible. Refer to DNV-OS-F201 Sec.9.

**7.3.3** Pressure vessels, heat exchangers, high pressure or capacity pumps, and compressors shall be externally surveyed. Safety valves and instrumentation systems shall be surveyed and tested in operating condition as found necessary by the surveyor.

*Guidance note:*

Opportunities to carry out survey and testing during owner’s scheduled shutdowns may also be utilised.

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**7.3.4** Piping systems including flexible pipes shall be surveyed.

**7.3.5** Pressure relief and depressurising valves shall be surveyed and tested.

**7.3.6** Survey of accessible parts of the following structures shall be carried out to confirm structural integrity and condition of securing arrangement:

— main structural elements and load transfer points in large support structures, modules or skids
— base frames for equipment
— flare or ventilation structures
— support for flare structure
— supports for conductors and risers
— pipe racks and pipe supports.

**7.3.7** The process and utility safety systems and the subsea control system for wellhead shutdown shall be surveyed during operation and tested for correct functioning as found necessary by the surveyor with particular emphasis on:

— shutdown valves
— shutdown instrumentation
— shutdown sequence and logic
— interconnection with emergency shutdown system
— regulation or control system
— alarm system.

A review of the maintenance manual or test log may be an acceptable survey method provided a satisfactory recording system and an acceptable maintenance procedure exist.

7.3.8 Drainage system for produced liquids for hazardous areas shall be surveyed.

7.4 Complete periodical survey

7.4.1 For riser below water components a review of the maintenance system records is an acceptable survey method provided a satisfactory recording system and acceptable maintenance procedure exist. Refer to DNV-OS-F201 Sec. 9

7.4.2 Pressure vessels and heat exchangers shall be subjected to internal surveys. Examination of related equipment such as valves, piping and fittings shall be carried out.

7.4.3 High pressure or capacity pumps and compressors shall be visually surveyed without dismantling. Opening up to be carried out if found necessary. Review of the maintenance system records is an acceptable survey method provided a satisfactory recording system and acceptable maintenance procedure exist.

7.4.4 As basis for the survey of special and primary structure a program for NDT of structural components shall be established.

7.4.5 Function test of safety devices and instrumentation listed in [7.3.7] shall be carried out.

8 Helicopter deck

8.1 Application

The requirements in this sub-section apply to units with class notation HELDK.

For the additional survey requirements for this notation with the qualifier (N) as required by the Norwegian authorities is referred to DNVGL-SI-0166 Ch.3.

8.2 Complete survey

See DNV Rules for ships Pt.7 Ch.1 Sec.6(8).

9 Crane

9.1 Application

9.1.1 The requirements in this sub-section apply to units with class notation CRANE.

9.1.2 For the additional survey requirements in CRANE(N) as required by the Norwegian authorities is referred to DNVGL-SI-0166 Ch.3.

9.2 Annual and complete surveys

For annual and complete survey see DNV Rules for ships Pt.7 Ch.1 Sec.6(6).

10 Additional fire protection arrangements

10.1 General

The requirements in this sub-section apply to ships with class notation F.
10.2 Complete survey
Complete surveys at an interval of 2.5 years shall be i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6(11).

11 Periodically unattended machinery space and machinery centrally operated

11.1 Application
The requirements in this sub-section apply to units with class notations E0 and ECO.

11.2 Annual and complete surveys
Annual and complete surveys shall be i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6(25).

12 Hull monitoring system

12.1 Application
The requirements in this sub-section apply to units with class notation HMON.

12.2 Objective
The purpose of the survey is to ensure the maintenance of the hull monitoring system as specified for the class notation.

12.3 Annual survey
See DNV Rules for ships Pt.7 Ch.1 Sec.6(14).

13 Noise, vibration and comfort rating

13.1 Application
The requirements in this sub-section apply to units with the class notations VIBR.

13.2 General
Before the notation can be issued, vibration measurements at the different positions and components, as described in the Protocol, shall be carried out. The Protocol is a table of positions to be measured worked out prior to the measurements based on a risk evaluation and experience. If minor excessive vibration levels are found for non-critical components or positions, dispensation may be given, which may also include a requirement for new measurements, after a limited period. This will be decided by the Society.

13.3 Complete
Complete measurements at the different positions, as described in the Protocol, shall be carried out by or under the supervision of a surveyor of the Society.

14 Cold climate notations

14.1 Winterization application
These requirements apply to units with the following class notation WINTERIZED.

14.2 Annual survey
14.2.1 The Anti-Icing, De-Icing and Anti-Freezing measures applied onboard shall be subject to a general survey to confirm continued satisfactory performance, including the review of the onboard records covering any periods of severe cold climate weather conditions since the last annual survey. The survey shall also assess the effectiveness of the mechanical protection provided against mechanical/water damage for equipment subjected to frequent de-icing activities.
14.2.2 The thermal insulation arrangements relevant to cold climate operations shall be surveyed, with particular attention to the thermal insulation for piping and pressure vessel insulation in areas exposed to weather or deluge. The vessel’s “corrosion under insulation” management program shall be reviewed and re-assessed based on the survey findings.

14.2.3 The stability records onboard shall be reviewed to confirm that vessel is adequately monitoring/ accounting for potential and actual ice loadings on an ongoing basis.

14.2.4 The fire fighting equipment exposed to cold climate conditions shall be surveyed, with particular attention that the extinguishing agents are appropriate for cold climate conditions.

14.2.5 The electrical heat tracing systems shall be generally surveyed, with particular attention to the insulation resistance values.

14.2.6 The anti-skid coating on exposed deck surfaces shall be surveyed.

14.2.7 The drainage arrangements for meltwater/ washdown water on exposed decks shall be surveyed, with particular attention that the anti-freezing arrangements for the drains.

14.2.8 The drying arrangements for the compressed air systems shall be surveyed.

14.2.9 The Personal Lifesaving Appliances shall be subject to general surveyed to confirm that their storage arrangements are suitable for cold-climate conditions.

14.2.10 The information onboard related to snow/ice "dropped object" incidents/near misses since the last annual survey shall be presented to the attending surveyor for assessment.

14.2.11 The information onboard related to the continuing effectiveness of the lighting (floodlights, emergency lights, navigation lights, helideck lights, helicopter obstacle lighting, ice searchlight) shall be presented to the attending surveyor for assessment.

14.2.12 For units with the qualifier POLAR, the ice searchlight shall be function tested.

14.2.13 For units with the qualifier POLAR, the annual survey requirements for class notation CLEAN shall be carried out, as applicable.

14.3 Complete survey
The heat tracing systems shall be examined.
Electrical heat tracing systems shall be examined with particular attention for damage/deterioration to the heat tracing cabling, recent megger-test results shall be presented to attending surveyor.
Heat tracing systems using fluids as the heating medium shall be subject to pressure test to maximum working pressure.

15 Environmental notations

15.1 Ballast water management systems

15.1.1 Application
The requirements in [15.1] apply for vessels with the notation BWM, CLEAN and/or CLEAN DESIGN.

15.1.2 Annual, intermediate and complete surveys
Annual, intermediate and complete surveys shall be carried out i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6(22).

15.2 CLEAN or CLEAN DESIGN

15.2.1 Application
The requirements in [15.2] apply to units with class notations CLEAN or CLEAN DESIGN.

15.2.2 Annual survey
Annual surveys shall be carried out i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6(16).
15.3 Recycling

15.3.1 Application
These requirements apply for units with the class notation **RECYCLING**.

15.3.2 Annual survey
Complete surveys shall be carried out in line with DNV Rules for ships Pt.7 Ch.1 Sec.6(35).

15.3.3 At replacement, or significant repair of the structure, equipment, systems, fittings, arrangements and material, the owner may request an occasional survey as described in DNV Rules for ships Pt.7 Ch.1 Sec.7.

15.4 Vapour control systems

15.4.1 Application
These requirements apply for units with the class notation **VCS**.

15.4.2 Renewal surveys
Renewal surveys shall be carried out i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6(15).

16 Integrated software dependent systems

16.1 General

16.1.1 Application
The requirements in this sub-section apply to units with the class notation **ISDS**.

16.1.2 Objective
The purpose of the survey is to ensure the confidence that has been built into the unit is actually maintained.

16.1.3 Modifications
The owner is to inform DNV GL whenever a system with the **ISDS** notation is modified. For major upgrades or conversions of the unit in operation the full set of requirements in DNVGL-OS-D203 may apply.

16.2 Annual survey

16.2.1 The effective implementation and continuous maintenance of the activities required DNVGL-OS-D203 phase E, operation, shall be assessed.

16.2.2 Any changes, introduced after the latest assessment, to the systems within **ISDS** scope are to be addressed. An impact analysis of changes shall be reviewed and confirmed. Any follow up activities shall be agreed.

16.2.3 Updated records are to be kept and made available for review by the attending surveyor i.a.w. DNVGL-OS-D203 Ch.3 Sec.1 [3.2].

16.3 Complete survey
The complete assessment will have a specific focus on identified process areas or activities. These areas or activities are to be selected based on a discussion with owner of specific focus areas and should also be based on important or frequent findings from the annual assessments carried out since the last complete survey.

17 Special feature notations

17.1 Non self-propelled units

17.1.1 The requirements in [17.1] apply to units with special feature notation **NON-SELF PROPELLED**.
17.1.2 Extent of surveys of the following items will be restricted to the main safety facets:
- tailshafts
- thrusters
- motors and other equipment for propulsion
- steering gear.

17.1.3 For these items the scope of classification is to ensure that the equipment does not pose a threat to the unit by its presence onboard when in use. This means the watertightness should be considered and the safety of the equipment for people working in the vicinity must be taken care of. The operation of the equipment is of secondary importance.

17.2 Self-propelled self-elevating units

17.2.1 The requirements in [17.2] apply to self-elevating units with special feature notation SELF PROPELLED.

17.2.2 The extent of the survey shall cover tailshafts, thrusters, motors and other equipment for propulsion and steering gear as defined for main class in Sec.3.

17.3 Tailshaft monitoring

17.3.1 Application
The requirements in [17.3] apply to units with class notation TMON.

17.3.2 General
A tailshaft condition monitoring arrangement (class notation TMON) will be granted for oil lubricated tailshafts that are monitored to ascertain the condition of the tailshaft system during operation, and that fulfils the design requirements in DNV Rules for ships Pt.4 Ch.4 Sec.1 E300 provided a successful initial survey is carried out.

In such cases DNV GL will not require any specific time interval between propeller shaft withdrawal surveys.

Units with more than 3 years since the last propeller shaft withdrawal are normally to carry out a propeller shaft survey in connection with the TMON initial survey as described in DNV Rules for ships Pt.7 Ch.1 Sec.6(17.2).

Guidance note:
The requirement for a propeller shaft withdrawal at TMON initial survey may be waived on a case by case basis, provided that documentation showing satisfactory condition of the stern tube arrangement is presented to the Society. Such documentation, normally covering the last 3 years, should include:
- monthly measurements of stern tube bearing temperatures with corresponding sea water temperatures, oil consumption, water content in oil
- for vessels with alternative water in oil analysis performed by an accredited laboratory, results from 3 monthly analysis can be accepted
- lub. oil analysis reports from accredited laboratory with conclusion, where available (ref. [17.3.3] d).

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

17.3.3 Annual survey
The survey shall include:

a) examination of the TMON record file:
   - verification that the on board oil analysis for checking of water content in the stern tube lubricating oil has been performed monthly and recorded in the file by the Chief Engineer.

Guidance note:
As an alternative to the monthly onboard checking of the water content in the oil, submitted lubricating oil samples to an accredited laboratory every 3 months is acceptable (ref. [17.3.3] d below).

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- verification that the stern tube bearing temperatures have been recorded every month with highest and lowest temperatures, with corresponding seawater temperatures
— verification that the consumption of stern tube lubricating oil has been recorded for every month by the Chief Engineer
— if there are performed any overhauls, complete oil changes or similar, this shall be recorded in the TMON record file on the overhaul page
— verify functionality of tailshaft grounding device, where applicable
— verification that wear down measurements have be taken at every dry-docking.

b) testing of stern tube aft bearing alarm
c) visual inspection of inner and outer shaft seal for leakage, as far as practicable.
d) verification that documentation of laboratory analysis is kept on board:
   — at least two oil samples per year shall be submitted to an accredited laboratory for analysis testing of water content, iron, chromium, copper, tin, silicon, Na (sodium) and magnesium
   — the documentation shall contain a conclusion regarding the condition of the oil and its suitability for further use
   — the report from the latest oil analysis shall be less than three months old.
SECTION 7 ALTERNATIVE SURVEY ARRANGEMENTS

1 General

1.1 General

1.1.1 Alternative survey arrangements may be accepted as an option to applicable periodical surveys for main class.

Alternative survey arrangements are defined for the following areas:

— Machinery equipment, see [2]
— Structure, see [3].

1.1.2 Machinery systems listed in Table 1 shall be surveyed according to one of the listed survey arrangements if not part of a separate survey.

Table 1 Machinery surveys

<table>
<thead>
<tr>
<th>Item</th>
<th>Machinery Renewal and Machinery Continuous</th>
<th>Machinery PMS</th>
<th>Offshore CM</th>
<th>PMS RCM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survey method 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prime movers</td>
<td>Diesel engine</td>
<td>1</td>
<td>3</td>
<td>3 and 4</td>
</tr>
<tr>
<td>Steam turbines 2)</td>
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<td>1</td>
<td>4[16]</td>
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<td>Gas turbines</td>
<td>See Sec.3 [5.2.4]</td>
<td>See Sec.3 [5.2.4]</td>
<td>See Sec.3 [5.2.4]</td>
<td>See Sec.3 [5.2.4]</td>
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<td>3</td>
<td>3 or 4</td>
<td>5[19]</td>
</tr>
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<td>Thrust-and intermediate shaft including bearings, clutch, couplings and torsional and axial vibration damper</td>
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<td>3 and 4</td>
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<td>Separate survey Sec.4 [1]</td>
<td>Separate survey Sec.4 [1]</td>
<td>Separate survey Sec.4 [1]</td>
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<td>3 and 4</td>
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<td>3 or 4</td>
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<tr>
<td></td>
<td>Electric motors</td>
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<td>3</td>
<td>3 or 4</td>
</tr>
<tr>
<td></td>
<td>Pipes, valves and filters</td>
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### Table 1 Machinery surveys (Continued)

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<th>Item</th>
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<th>PMS RCM</th>
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<td></td>
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<td>3 and 4</td>
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<td>4</td>
<td>5(^{(19)})</td>
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<td>3</td>
<td>3 or 4</td>
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<td>3 or 4</td>
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<tr>
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<td><strong>Bilge and ballast system</strong></td>
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### Table 1 Machinery surveys (Continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Machinery Renewal and Machinery Continuous</th>
<th>Machinery PMS</th>
<th>Offshore CM</th>
<th>PMS RCM</th>
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<td>3</td>
<td>3 or 4</td>
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<td>Pipes, valves and filters 10)</td>
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<tr>
<td>Air compressors, piston</td>
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<td>3</td>
<td>3 or 4</td>
<td>5(19)</td>
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<td>3</td>
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1) Survey method

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Floating production, storage and loading units

DNV GL AS
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<tr>
<th>Item</th>
<th>Machinery PMS</th>
<th>Offshore CM</th>
<th>PMS RCM</th>
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<tr>
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<td></td>
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</table>
| Switchboards              | 2             | 3           | 3       | 5\(^{19)}
| Distribution board        | 2             | 3           | 3       | 5\(^{19)}
| Electrical equipment      | 2             | 3           | 3       | 5       |
| Cable installations       | 2             | 3           | 3       | 5       |
| Navigation light controllers |             | 3           | 3       | 5       |
| Mechanical ventilation of battery lockers or rooms | 2 | 3 | 3 | 5 |
| Forced draught fan        | 2             | 3           | 4       | 5       |
| Other turbines \(^{2)}    | 1             | 1           | 4       | 1       |
| Sea and sanitary valves   | 1             | 1           | 1       | 1       |
| Incinerator arrangement   | 1             | 3           | 3       | 5\(^{19)}
| Inert arrangement for vessels without notation INERT | 1 | 3 | 3 | 5\(^{19)}
| Instrumentation and automation for vessels without notation EO or ECO | 2 | 3 | 3 | 5 |

Survey method \(^{1)}
Notes to Table 7-1

1) The survey methods are defined as follows:
   - Survey method No. 1: Visual inspection by opening up fully or partly. Function testing and or pressure testing to be carried out when relevant and found necessary by the surveyor.
   - Survey method No. 2: Visual inspection without dismantling and performance test to be carried out. Opening up if found necessary. Last overhaul to be verified.
   - Survey method No. 3: Audit of maintenance history in the planned maintenance system and selected spot checks.
   - Survey method No. 4: Audit of condition monitoring results.
   - Survey method No. 5: Verification of maintenance records, assessment of maintenance handling, review of management, safety incidents and continuous improvement processes and fully or partly opening of equipment, if found necessary by surveyor.

2) As an alternative to Survey method No.1, a performance test and a condition analysis may be carried out.

3) Selected bearings shall be examined. Gears and roller bearings may as far as practicable be inspected without dismantling complicated assemblies.

4) Strainers to be opened. Selected pipes and main engine(s) system tanks to be surveyed for sludge.

5) Valves, cocks and strainers to be opened.

6) For steam pipes with temperature 450°C and above: Crack detection and/or thickness examination may be required. Selected pipes to be pressure tested to 1.5 times working pressure. Steam pipes of copper to be pressure tested to 2 times working pressure.

7) To be pressure tested to 1.2 times working pressure if internal survey not possible.

8) For piping systems outside machinery spaces, see DNV Rules for ships Pt.7 Ch.1 Sec.4 (2.1.14).

9) Settling tank and daily service tanks for both heavy fuel oil and diesel oil as well as lubrication oil circulation tanks shall be internally surveyed for assessment of tank condition and presence of sludge. If inspection and cleaning of above mentioned tanks have been carried out by the crew during the last 12 months and relevant log extracts are provided and confirmed, this may be credited as surveyed at the surveyor’s discretion.

10) Valves where the function in the piping system is not evident are to be adequately and readably marked.

11) To be pressure tested to 1.2 times working pressure if internal survey not possible.

12) For piping systems outside machinery spaces, see DNV Rules for ships Pt.7 Ch.1 Sec.4 (2.1.14).

13) Survey of gear and bearings through inspection openings or by other means (may be carried out concurrent with bottom survey).

14) Opening up and Survey of bearings, gear and shafts and other relevant parts if any indications of abnormalities are observed. Satisfactory maintenance according to manufacturer’s recommendations to be documented and considered as a base for extent of possible opening. Any opening up of a thruster to be witnessed by a DNV GL surveyor.

15) Hydraulic oil, lubrication oil, alarm and safety systems are to be surveyed as applicable for respective systems.

16) In addition to the annual survey for Offshore CM, a limited internal inspection shall be carried out on main steam turbines. (see CN 10.2 Ch.3.1)

17) Fresh water generator (only for steam turbine propulsion).

18) NDT and load testing on loadbearing structures/components to be carried out. Pressure test piping, valves, pressure vessels and other pressure rated equipment to the maximum allowable working pressure as relevant.

19) Test of safety functions to be carried out.

20) For piped systems with compression couplings with rubber seals the condition of the seals is to be confirmed.

2 Machinery survey arrangements

2.1 General

2.1.1 The different machinery survey arrangements are based on the inventory list established for the vessel. The difference is the conditions for obtaining and maintaining the survey arrangement. If a survey arrangement is not specified, the periodical survey requirements as detailed in Sec.4 shall be followed.

2.1.2 The following alternative survey arrangements are available:

- Machinery Continuous, see [2.2]
- Machinery PMS (Planned Maintenance System), see [2.3]
- PMS RCM (Reliability Centred Maintenance), see [2.5]
- Offshore CM (Condition Monitoring), see [2.5].
2.2 Machinery continuous

2.2.1 Machinery Continuous is a survey arrangement where the components in the machinery list established for the vessel are subject to separate surveys with survey interval 5 years.

The due dates shall normally be distributed with 20% of the surveys each year and the separate surveys shall in all cases be carried out once in each 5 year period of the class certificate.

The time window for surveys to be carried out are generally set as 6 months before the due dates as distributed.

2.2.2 A follow-up system covering the Society’s machinery list in accordance with Table 1 shall be established on board the vessel.

2.2.3 Machinery component surveys may be credited based on documented maintenance history presented by the Chief Engineer/ Mechanical Supervisor.

2.2.4 Requirements for Machinery Continuous Survey Arrangement are given in the DNV Rules for ships Pt.7 Ch.1 Sec.7(3.1).

2.2.5 Annual survey

Annual survey of the machinery and safety systems are carried out according to Sec.3 [2.4].

2.2.6 Renewal survey

Renewal survey is not a part of this survey arrangement.

2.3 Machinery planned maintenance system

2.3.1 General

Machinery PMS is a survey arrangement based on audits of an approved and implemented planned maintenance system onboard which shall cover all component surveys in the machinery list for the vessel.

2.3.2 The audits shall be part of the main class annual survey.

2.3.3 The Owner/Manager is responsible for ensuring that the Chief Engineer/ Mechanical Supervisor is qualified to register and carry out maintenance on all class related machinery items.

2.3.4 Job intervals shall be based on maker’s recommendations, adjusted for prevailing operational conditions.

2.3.5 The approval process is a two-step process: The first step “Management Approval” is a review of the planned maintenance system prior to the initial survey onboard. “Management Approval” will only be applicable to the first vessel in a fleet. The final step is an initial survey onboard each vessel.

2.3.6 If the conditions for the survey arrangement are not complied with, or in case of change of technical management of the vessel, the Survey Arrangement Machinery PMS will be cancelled.

Requirements for Machinery PMS Survey Arrangement are given in the DNV Rules for ships Pt.7 Ch.1 Sec.7(3.2).

2.3.7 Annual survey

To prolong the validity of the survey arrangement an annual survey of the implemented PMS system onboard is required. The purpose of this survey is to review and evaluate the previous period’s maintenance activities and experience. If found necessary by the surveyor, opening or testing of machinery may be required.

2.3.8 Annual survey of the machinery and safety systems are carried out according to Sec.3 [2.4].

2.3.9 Renewal survey

Renewal survey is not a part of this survey arrangement.
2.4 PMS reliability centred maintenance

2.4.1 General
PMS RCM allows the owner to arrange surveys as part of his planned maintenance system, based on analysis of applicable functions onboard the vessel. PMS RCM is a survey arrangement based on review of the company management, the RCM analysis and the implemented maintenance system. It is required to be operating according to an RCM analysis or equivalent maintenance strategy and to comply with the Machinery PMS before entering PMS RCM. Condition Monitoring may be implemented. PMS RCM survey arrangement is applicable to main class machinery.

2.4.2 The following conditions must be fulfilled before the survey arrangement is valid:

— approved RCM analysis
— successful management review
— successful implementation survey.

2.4.3 Machinery systems and equipment with corresponding survey method for this arrangement see Table 1.

2.4.4 If the conditions for the survey arrangement are not complied with or in case of change of technical manager of the vessel, the survey arrangement will be automatically cancelled.

Guidance note:
When developing the maintenance system it is recommended to apply standard maintenance terminology ref. NS-EN 13306: Maintenance terminology.
To make it possible to collect, exchange and analyse reliability/maintenance data based on common viewpoints and enable industry co-operation it is recommended to use a standardization of maintenance parameters and data ref. NS-EN ISO 14224: Collection and exchange of reliability and maintenance data.

2.4.5 Approval of RCM based maintenance programme
The following conditions must be fulfilled before applying:

— compliance with the specifications for Machinery PMS, except [2.3.5] (Management approval)
— management and organisation in place to support continuous improvement and maintenance of a high safety level
— procedures and systems for performing the RCM analysis.

Guidance note:
It is recommended to apply NS-EN 13306 Maintenance - Maintenance terminology in development of an maintenance system.

2.4.6 The following is to be verified during management review:

— operational and maintenance philosophy and organisation supporting an PMS RCM survey concept.
— organisational chart has the necessary resources and responsibilities defined for an PMS RCM strategy to be supported adequately
— a continuous improvement methodology is implemented
— adequate skill level on involved personnel
— selected methods of measuring the maintenance performance in the organisation (Key Performance Indicators).

Guidance note:
When selecting KPI’s it is recommended to use NS-EN 15341 Maintenance Performance Indicators.

2.4.7 Approval of the analysis is based on the following:

— a Reliability Centred maintenance analysis must have been performed according to IEC 60300-3-11, Application Guide Reliability Centred Maintenance or alike
— the RCM team must consist of experienced people related to the asset that is analysed. If the asset
analysed is a new asset, the analysis process should be performed by the use of substitution of experience from comparable assets

- team members representing all relevant operational and maintenance discipline (electrical, electronic, mechanical) should have been involved
- experienced RCM facilitator coming from outside the asset organisation should have been used
- a documented and approved RCM methodology is in place describing the RCM analysis methodology applied, relevant input data, decision logic and risk matrix
- references to documentation used are provided
- methodology used for selecting systems
- an inventory list, sorted after unit no or tag no that shows the criticality of all units shall be produced.

Guidance note:
It is recommended that the analysis is performed on a level in the equipment hierarchy where it is possible to identify a suitable failure management policy. For most system this will typically imply that most of the analysis is performed at the level where individual pumps, racking arms, motors etc can be found.

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2.4.8 If condition monitoring of equipment is to be carried out as part of the RCM system, this is to be carried out in accordance with an approved programme. See [2.5] for further details. Condition monitoring of equipment will normally be approved on an individual equipment.

2.4.9 Implementation survey
A survey of the maintenance system is carried out when the RCM based preventive maintenance routines have been implemented. After approximately 6 months of operation the proper operation of the system is surveyed onboard. In order to verify the crew's general knowledge, the implementation survey is to be carried out during normal operation (voyage survey). Provided a successful implementation survey, a certificate for the Machinery PMS RCM will be issued stating conditions for the survey arrangement.

2.4.10 To maintain the validity of the survey arrangement PMS RCM, an annual survey of the implemented maintenance programme is required, preferably during normal operation. This survey replaces the annual and renewal surveys of machinery for components included in the PMS RCM scheme. The purpose of this survey is to review and evaluate the previous period's maintenance activities and to ensure that the system is operated correctly.

The annual survey shall consist of:

- spot check of equipment included in the scheme
- verification of maintenance records
- assessment of maintenance handling onboard.

If found necessary by the surveyor, opening or testing of machinery may be required.

2.4.11 Renewal survey
To prolong the validity of the survey arrangement a renewal survey of the implemented PMS RCM survey arrangement is required. This can be done during normal operation or during renewal survey. The purpose of the survey is to ensure that the conditions for approval of the system are still adhered to and that the results of the maintenance work achieve acceptable results. The following will normally be reviewed, in addition to scope of annual survey:

- management
- safety incidents
- continuous improvement processes
- functional testing of critical equipment
- verification of critical piping and structures.

The survey scope of each of these topics is outlined in [2.4.12] to [2.4.17].

2.4.12 The management of the unit is to be surveyed during renewal survey in order to verify that the basis of the survey arrangement is still intact. This will include review of procedures, verification of crew training and interviews.
Guidance note:
During the implementation of PMS RCM a review has been made of several parts of the owner’s organization. During renewal survey the same topics will normally be covered as spot checks. However major changes of the organization could give rise to an increase in the survey scope.

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2.4.13 The review of safety incidents is conducted on a spot check basis. It is to be ensured that maintenance related incidents result in traceable improvement actions and that the maintenance work itself is conducted in a safe manner.

2.4.14 The systematic continuous improvement effort is to be evaluated during the renewal survey. It is to be verified that the company procedures are complied with. Additionally it must be verified that the effort actually causes traceable improvements in the preventive maintenance system.

Guidance note:
It is required that the continuous improvement work utilizes input from safety reports, feedback from maintenance personnel and analysis of relevant systems. Furthermore the results of the improvement actions should be evaluated by the owner in order to ensure that real improvements are achieved.

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2.4.15 The functional testing is intended to verify the physical results of the maintenance work by observing the function of the equipment.

2.4.16 The critical structures are verified by review of NDT jobs in the maintenance system. However, if other tasks have been identified by the RCM analysis for the relevant failure modes, these tasks will normally be accepted as an alternative to NDT.

2.4.17 Work survey
When Category 1 equipment (see Table 3-1 in DNVGL-OS-E101 Ch.3 Sec.3) is overhauled the DNV GL surveyor shall be contacted in order to agree the extent of his participation during the work.

2.5 Offshore CM (condition monitoring)

2.5.1 General
Offshore CM is a survey arrangement based on use of an approved service supplier for execution of condition monitoring on rotating machinery and drilling equipment. A comprehensive approval process of the service supplier is conducted in order to verify the procedures, competence and resources of the company. The implementation survey and the annual survey of this arrangement take place onshore or offshore.

2.5.2 The survey arrangement is based on compliance with ISO 17359 (vibration measurements) and can be applied to main class machinery and equipment as covered by the DRILL notation.

2.5.3 The following conditions must be fulfilled before the survey arrangement is valid:
— approved service supplier (see Sec.8)
— successful implementation survey (see [2.5.9])
— approved survey arrangement PMS (see [2.3]).

2.5.4 Machinery systems and drilling equipment with corresponding survey method for this arrangement see Table 1.

2.5.5 All applicable CM documentation including CM programme, procedures and reports shall be in English.

2.5.6 Approval of the CM programme is based on a description of the following:
— maintenance strategy
— monitoring methods including vibration and lubrication (see [2.4.10])
— implementation of condition monitoring in the planned maintenance system
— training programme/plan for involved crew. The operator carrying out condition monitoring shall be qualified and certified to the appropriate level for their scope of work, minimum Category 1 in accordance with ISO 18436-2
— name and address of the appointed service supplier
— a list of the machinery systems and/or drilling equipment included in the arrangement
— drawings that show the measuring points and an overview of the installed equipment
— measuring points shall be clearly marked on the equipment with unique ID
— communications plan that outlines the owner’s communication with DNV GL and the service supplier
— EX certificates are to be provided if equipment is installed in hazardous areas.

Guidance note:
The choice of conditioning monitoring strategy has substantial influence on the scope of work of the crew. For instance an online system requires another level of involvement than use of handheld measuring equipment. This must be reflected in the maintenance system, training manuals etc. It should be verified that the process complies with ISO17359.

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2.5.7 Damage to machinery systems or equipment covered by classification shall always be reported to the Society and into the planned maintenance system as a corrective action.

2.5.8 If the conditions for the survey arrangement are not complied with or in case of change of technical manager of the vessel, the survey arrangement will be automatically cancelled. The arrangement is also cancelled if the service supplier loses his approval.

Guidance note:
Generally it is necessary to comply with ISO17359 or similarly recognised standard.

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2.5.9 Implementation survey
An implementation survey is required in order to verify that the CM programme is properly implemented and operated. It shall be demonstrated that the onshore and offshore maintenance and administrative systems ensure a proper operation of the survey arrangement. The survey normally consists of an offshore part and an onshore part. The survey should take place when the system has been operating for approximately 6 months. Based on similar recent survey with the same owner the onshore or offshore survey may be omitted.

2.5.10 Lubricating and hydraulic oil analysis
The basic requirements to the lubricating/hydraulic oil samples are as follows:

— Oil samples shall be submitted for analysis on a regular basis as recommended by the approved service supplier.
— Laboratory analysis reports and documentation of follow-up of recommended actions shall be available.
— The oil sampling point should be clearly identified and positioned to ensure that the sample is taken at the same position each time.
— If possible, samples should be acquired from the return flow, usually this will mean immediately downstream from the component in question.
— Oil samples are always to be acquired while the equipment is operating and the oil is circulating.
— Before sampling, a sufficient draining is required to ensure representative oil samples.
— Wherever samples intended for particle counting are acquired, special ultra-clean particle free equipment and bottles are to be used. Both the sampling point and the procedure are to be designed so as to minimize the risk of contamination.

Lubricating and hydraulic oil samples shall be submitted to the delivering oil company or an independent accredited oil analysis laboratory.

For lubricating oils the scope of work should, as a minimum, be:

— water content
— sodium content (salt)
— flash point
— wear particles
— viscosity
— base number
— insoluble material.

For hydraulic oils the scope of work should, as a minimum, be:

— water content
— viscosity
— wear particles
— acid number.

For hydraulic systems with high cleanliness demands specified by manufacturer, particle counting should be performed.

2.5.11 Annual survey
To maintain the validity of the survey arrangement Offshore CM, an annual survey of the implemented condition monitoring programme is required. Normally the survey takes place onshore, based on submitted documentation from the owner. This survey replaces the annual and renewal survey of machinery and components included in the condition monitoring scheme. The purpose of this survey is to ensure that the system is operated correctly and that the safety integrity level of the vessel is kept intact. Where more than one vessel follow the same scheme, the annual survey can be based on spot checks of a representative selection of vessels.

2.5.12 The annual survey shall consist of examination of:

— condition monitoring records
— maintenance records
— CM handling onboard, for instance collection of data and response to recommendations from service supplier
— reports and maintenance records from breakdowns.

If it is not properly demonstrated that the system is correctly operated and that it serves to ensure the technical integrity level of the asset, opening or testing of machinery may be required.

2.5.13 Approval of service supplier
The approved service supplier is granted a general authorisation to carry out condition monitoring in order to cover the scope of annual and renewal survey of machinery and equipment. This authorisation is valid for three years and the approval follows DNV Standard for Certification No. 2.9, Approval Programme No. 416, see Sec.8.

2.5.14 Thruster CM (condition monitoring)
Thrusters may be included as part of an Offshore CM arrangement. As an alternative to use of an approved service supplier for CM on thrusters, a case by case approval can be carried out.

2.5.15 The approval shall verify the procedures, competence and resources of a company involved in execution of condition monitoring.

2.5.16 Approval will only be granted for one owner and/or company and will follow the same approval process as outlined in DNV Standard for certification No. 2.9, Approval Programme No. 416 without the company audit. The scope of the audit will partially be covered during the implementation survey.

3 Structural survey arrangements

3.1 General
The different hull survey arrangements are based on the same inventory list established for the vessel. The difference is the conditions for obtaining and maintaining the survey arrangement. If a survey arrangement is not specified, the periodical survey requirements as detailed in Sec.4 shall be followed.
The following survey arrangements are available:

- Structural Continuous survey arrangement, see [3.2]
- Structural integrity management (SIM), see [3.3].

3.2 Structural continuous survey arrangement

3.2.1 Structural Continuous is a survey arrangement whereby the survey items in the hull list established for the unit are subject to separate surveys with interval 5 years. The arrangement shall provide for survey of approximately 20% of the total number of survey items during each year of the five-year class period.

3.2.2 The survey requirements are given in Ch.3 Sec.2 [2] to [4].

3.3 Structural integrity management

3.3.1 SIM is a survey arrangement offered as an integral part of classification compliance for the hull structure through the alignment and integration of classification requirements with an approved and implemented inspection system. The system performance and condition of hull structure and maintenance work carried out shall be verified by the Society during annual survey and in connection with renewal survey of the unit.

3.3.2 SIM survey arrangement allows for up to half of the hull items covered by the unit’s inspection program (SIM) to be inspected by the owner. Based on this inspection, the society can credit the relevant hull items at annual survey.

3.3.3 Approval of the arrangement shall include a documentation review covering a description of the following:

- inspection responsibilities and functions (SIM responsible person on board)
- training programme/plan for involved personnel
- inspection manual/instruction including ratings and acceptance criteria
- communications plan that outlines the owner’s communication with DNV GL.

3.3.4 Inspection by the owner shall be performed by qualified personnel. Qualification according to:

- NS 415-1 Level 1 certification or;
- SIM training arranged by the society.

3.3.5 If the conditions for the survey arrangement are not complied with or in case of change of technical management of the unit, the survey arrangement will be cancelled and substituted by Hull Continuous survey arrangement.

3.3.6 The DNV GL surveyor can, if found necessary, require a re-survey of hull items inspected by the owner.

3.3.7 The following conditions must be fulfilled before the survey arrangement is valid:

- approved inspection program and reporting system
- certified inspection personnel
- successful implementation survey (see [3.3.9]).

3.3.8 In case of change of manager/owner, the survey arrangement is automatically cancelled. The arrangement is also cancelled if it is evident that the conditions of the arrangement are not complied with. Any changes to the arrangement will be subject to class approval.

3.3.9 Implementation survey

An implementation survey shall be carried out on board the unit in order to verify that the system has been implemented in accordance with the approved documentation and that the system is used as intended. It is required that the SIM system has been operated for at least 6 months and/or minimum 3 inspection have been performed before the implementation survey is carried out.
3.3.10 The survey will include the following:

— correct use according to approved inspection program and reporting system
— inspection performed only by certified inspection personnel
— certification of inspectors available
— inspection responsibilities and functions
— training programme/plan for involved personnel
— inspection manual/instruction on-board and that involved personnel is familiar with the system.
— communications plan that outlines the owner’s communication with DNV GL.

3.3.11 Annual survey
To maintain the validity of the SIM survey arrangement, an annual survey of the arrangement is required. The purpose of this survey is to ensure proper use of the arrangement and that the safety integrity level of the unit is kept intact.

3.3.12 Renewal survey
Renewal survey is not a part of this survey arrangement.
SECTION 8  SURVEYS PERFORMED BY APPROVED COMPANIES

1  Surveys by approved companies

1.1  General
Parts of the periodical surveys may be carried out by companies approved by DNV GL. The following survey parts may be performed by such companies:

— thickness measurements
— bottom survey afloat
— general NDT
— mooring line survey
— condition monitoring.

1.2  Thickness measurements
1.2.1  Thickness measurements as part of the periodical surveys shall be carried out by a qualified company approved by the Society.
1.2.2  Thickness measurements shall normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment shall be proven to the surveyor as required.
1.2.3  A thickness measurement report shall be prepared. The report shall give the location of the measurements, the thickness measured and the corresponding original thickness. Furthermore, the report shall give the date when the measurements were carried out, type of measuring equipment, names of personnel and their qualifications. The report shall be signed by the operator.

Guidance note:
For more information, see DNV Standard for certification No. 2.9 / Approval Programme No. 402A: "Firms Engaged in Ultrasonic Thickness Measurements of Ship's Structure".

1.3  Bottom survey afloat
An approved company shall be used. The survey shall be witnessed by a surveyor of the Society. The diver shall use pictorial equipment of such quality that the surveyor is fully satisfied with the information relayed.

Guidance note:
For more information, see DNV Standard for certification No. 2.9 / Approval Programme No. 404: "Service Suppliers Carrying Out In-water Survey of Ships, High Speed and Light Craft and Mobile Offshore Units and DNVGL-OTG-08 "UWILD Guidance".

1.4  Non-destructive testing
Non-destructive testing as part of the periodical surveys shall be carried out by a qualified company approved by the Society.

Guidance note:
For more information, see DNV Standard for certification No. 2.9 / Approval Programme No. 402B: "Firms Engaged in Non-Destructive Testing (NDT) on Offshore Projects and Offshore Units/Components".

1.5  Mooring chain inspections
Dry inspection of mooring lines as part of the periodical surveys shall be carried out by a qualified company approved by the Society.

Guidance note:
For more information, see DNV Standard for certification No. 2.9 / Approval Programme No. 413: "Service Suppliers Engaged in Renewal Survey Examination of Mooring Chain Intended for Mobile Offshore Units".
1.6 Condition monitoring

Condition monitoring as part of DNV GL’s periodical surveys of machinery components and equipment incl. drilling equipment, can be carried out by a company approved by the Society.

**Guidance note:**
For more information, see DNV Standard for certification No. 2.9 / Approval Programme No. 416 “Service Suppliers Engaged in condition monitoring of machinery onboard Mobile Offshore Units”.

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APPENDIX A  SPECIAL CONSIDERATIONS FOR CONVERSIONS

1  Basic principles

1.1  Introduction
This appendix has been prepared to make available DNV GL's approach for an efficient transfer of existing oil tankers to offshore production and storage units or installations.

1.2  Assumptions
DNV GL assumes that the carrier being proposed for conversion:
— holds a valid class certificate from a recognised classification society
— has been assessed and considered suitable for the intended new duty and service life at a specified location.

1.3  Main principles

1.3.1  All new systems shall comply with the latest DNV GL Rules or standards or recognised international standards. Modified systems will normally be accepted based on Rules or standards applicable at the time of construction. Alternative solutions will be considered based on sound engineering principles.

1.3.2  Standard and 'field proven' equipment may be accepted without being subjected to re-certification, when equipment certificate (e.g. from a recognised classification society) or other supporting documentation provides evidence of suitability for intended use.

Guidance note:
Evidence of suitability for intended use of field proven equipment may be documented through records of satisfactory operation with identical equipment at similar climatic conditions, environmental and operating parameters for a representative number of installations (indication > 10) and period of time (indication > 2 years).

1.3.3  Deviations from requirements applicable to unrestricted worldwide operation will be accommodated, by evaluating fitness for purpose at the specific location. The criteria and limitations for the unit or installation, systems or components will be stated in the "Appendix to the classification certificate".

1.3.4  Approval schemes with terms of reference other than DNV GL rules or standards will be allowed for specific systems, when such references are found to give an acceptable safety level equivalent to the rules or standards.

1.3.5  Renewal surveys on location, avoiding dry-docking, will be accommodated to the extent feasible.

Guidance note:
Owners are encouraged to consider at the conversion stage the in-service inspection aspects of the unit on location.
The following are areas where small changes made at the conversion stage can contribute to better and more cost-effective follow-up in service:

Overboard valves
Consider fitting boroscope fittings downstream of the valves.
Consider how opening/replace valves can be safely carried out offshore. Attention to be paid to the effect of closing a sea chest, or losing the use of a valve.

Thrusters
Inspection on location, removal if damage is found.

Survey of bottom
Consider markings to allow identification of location of ROV/diver (see Pt. Ch.2 Sec.1 [12]).
Consider fitting of hinged sea chest grids.
Survey of tailshaft systems and rudder systems, e.g. water lubricated rudder bearings should be arranged to allow clearances taken on location.

Mooring systems
How to survey the part of the system that is close to the hull or the unit.
How to survey the area past the thrash zone.
Survey of the SLP/STL connections to the hull and the internals in the hull openings.
2 Class notations
Class notations applicable to conversions will be as given for production and storage units in Ch.1 Sec.3.

3 Technical guidance for classification

3.1 General
3.1.1 All new or modified structures, systems and components shall comply with the current class Rules in force at the time of signing the classification contract.
3.1.2 All other structures, systems and components will in principle be accepted based on Rules applicable at the time of construction (when the tanker was first classed), if suitable for the intended purpose.

3.2 Hull and topside structures
For guidance on hull and topside structure, see DNVGL-OS-C102, App.A.

3.3 Mooring
With few exceptions, the usual station-keeping concepts are spread mooring for relatively shallow to intermediate water depths, and single-point mooring for deeper waters.

There are basically two approaches for certification of the mooring system design:
— in accordance with class rules; or alternatively
— in accordance with recognised international standards (e.g. API RP 2SK).

3.4 Marine systems and equipment
The marine system piping and equipment are categorised in three groups based on the scope of the conversion work:
a) Not subjected to any alteration, or any effect from the modification of the related systems
   These systems and equipment will be accepted based on requirements for renewal survey.
b) Subjected to alteration and modifications
   These systems will be accepted as long as the modification of the equipment and system is carried out in accordance with Rules, or recognised international standards. Modification to systems and components which are identified as safety critical shall be subject to approval. The modified system shall also undergo satisfactory pressure or function testing as required by the DNV Rules for ships, Pt.7, as applicable for renewal survey.
c) New systems and equipment
   New systems and equipment that are covered by the class scope will be subject to approval based on class rules and/or international standards and shall undergo satisfactory pressure or function testing as applicable based on the DNV Rules for ships, Pt.4 and Pt.7, for acceptance.

3.5 Electrical and instrumentation
Typical consequences of conversions will be increased power demand and hazardous zone alterations. This requires incorporation of new elements to the existing systems, and obtaining unambiguous area classification with matching equipment requirements. Integration of instrumentation for marine applications with new process and offloading functions need to be implemented based on a consistent approach. Class requirements are based on IEC standards (61892 - series).

In case of incorporating US based equipment, the hazardous area definitions will need specific attention with particular focus on Div 1 and fulfilment of Zone 0 and 1 requirements. DNV GL accept electrical equipment for hazardous areas provided type test certificates issued by a recognised test laboratory or institution support these. This also applies to US based UL / FM listed electrical equipment upon evaluation of premises for use and scope of testing. Requirements to electrical installation as per the SOLAS convention applicable to “Oil Tankers” may be re-evaluated, taking into account the new intended duty and service.
3.6 Safety systems and arrangement

3.6.1 Safety systems will be subject to approval irrespective of the class scope chosen. The focus will mainly be on systems that have global impact on the safety of the vessel, and the effect from safety and control systems beyond the individual process skid or module.

The safety systems include the following:

- hazardous area classification
- ignition prevention (review of ‘ex’ equipment suitable for hazardous area)
- fire and gas detection system
- fixed fire fighting system
- emergency shutdown system.

3.6.2 Interface between safety and marine systems will be evaluated to ensure that addition of the hydrocarbon process plant has not compromised the safety and functionality of the marine systems.

3.6.3 The arrangement and lay-out of the processing plant should be considered in view of fire and explosion hazards, depending on size and complexity of the plant, as well as location in relation to accommodation, escape, shelter and evacuation facilities. Protection of equipment from operation of the plant should be considered, e.g. cranes and lay down areas to be in locations avoiding lifting operations over pressurised equipment.

3.6.4 Due regards should be given to the already built-in safety features required to fulfil the ICLL, SOLAS and MARPOL requirements.

3.6.5 In addition, special considerations shall be made in case of operational conditions deviating from the design conditions, for example operation in cold climate might call for additional heat tracing.

4 Additional services

Description of additional DNV GL services related to conversion projects within the areas of pre-conversion, class transfer, subsea installations, production facilities and in-service support can be found at the DNV GL web site www.dnvgl.com.
APPENDIX B   INTRODUCTION TO OFFSHORE CLASSIFICATION

1 Introduction
This appendix is informative and should not be understood as rule requirements. The appendix explains the system of classification, how it works, conditions of validity, and its interaction with statutory control. This information is to a large extent implied by the rules, but a brief clarification of the essential points in one place is considered useful.

2 The classification system

2.1 The classification process and its limitations

2.1.1 Classification is a system for safeguarding life and property at sea, and the environment due to operational consequences. It implies a process of verifying offshore objects against a set of requirements. The requirements are laid down in the rules and standards established by DNV GL. Classification has gained worldwide recognition as an adequate level of safety and quality.

2.1.2 Classification implies an activity, in which a unit is surveyed during construction based on design approval, tested before being taken into service, and surveyed regularly during its whole operational life until it is scrapped. The aim is to verify that the required rule standard is built in, observed and maintained.

2.1.3 Classification is not performed as a substitute for the customer's own quality and safety control and related duties, or the customer's obligations to third parties, nor to relieve the customer of any consequences of default. Classification implies that rule requirements are verified at regular intervals. It is the owner's responsibility to maintain the unit so as to comply with the rules at all times.

2.1.4 DNV GL keeps complete files on all classed ships and units covering the documentation required by the rules. Reports will not be disclosed to any party, apart from the national authorities involved, without the owner's consent. DNV GL also undertakes all reporting to national authorities required in connection with the safety certificates.

2.2 Who needs classification?
Classification serves as verification system for a number of parties who have special interest in the safety and quality of units, such as:

— National authorities, who accept units for registry, or let units into their territorial waters, need assurance that they are safe and represent a minimum hazard to their surroundings.

— Insurance underwriters require units to be classed in order to give insurance.

— Owners, who need the technical standard of the rules as basis for building contracts and to document the unit's standard when seeking insurance or financing, or when hiring out or selling the unit.

— Building yards and sub-contractors use the rules as a tool for design and construction, as required by their customer.

— Finance institutions use classification as a documented indicator of the unit's value.

— Charterers require confirmation of the unit's standard before hire.

2.3 Recognition of DNV GL
DNV GL is recognised as an international classification society by virtue of its position in the marine industry, founded on the following criteria:

Independence
— By classing a substantial share of the world fleet and through high equity and financial independence, the economic basis for independent decisions in classification matters is ensured.

High technical competence
— Extensive research and development in class related fields sustain a process where the rules and
— Continuous monitoring of a large classed fleet ensures valuable feedback from casualties, damage incidents and operational experience in general. Analyses of these data are one important source of improvements of the rules.
— DNV GL runs a scheme for training and qualification of its technical personnel to ensure correct, uniform quality of approval and survey work throughout the organisation.

**Worldwide survey station network**

— DNV GL operates survey stations all over the world. Efficient reporting and information systems support the operations, and provide service to customers and national authorities.

### 2.4 Responsibility for safety at sea

2.4.1 National law institutes national authorities' responsibility for the total safety control of units flying the national flag. Classification cannot in any way relieve the national authorities of that responsibility.

2.4.2 National authorities may use the classification system and DNV GL's worldwide survey station network as their executive branch for safety control. The convenience of this arrangement is proved by the fact that DNV GL has been delegated extensive authorisation to work and certify on behalf of the majority of the maritime nations of the world.

2.4.3 The classification system applied to delegated, statutory work offers the national authorities regular monitoring of survey and certificate status of units flying their flag. Verification of DNV GL's work process and quality systems may also be carried out. In this way, national control is retained at the discretion of the authority involved.

### 2.5 Classification of newbuildings

2.5.1 The builder initiates the process by submitting a request for classification to DNV GL. In response to a list of documentation issued by DNV GL for the specific class notations requested, the builder and sub-suppliers submit drawings, specifications, related technical descriptions and data, including specification of materials as required by class, for approval.

2.5.2 After examining the above documents, DNV GL informs the builder and sub-supplier whether the design and arrangement of structure, machinery and equipment is acceptable. If not, DNV GL may propose modifications needed to meet the classification requirements.

2.5.3 During the building period DNV GL carries out surveys at the building yard and its suppliers. To assess compliance with the rules the Society may require additional documentation and carry out an assessment of yard’s processes, systems and personnel related to classification projects. The results of the assessment should be used as a basis to decide on the extent of the involvement of surveyors of the Society. They should be clearly reflected in the Quality Survey Plan (QSP).

2.5.4 The purpose of the surveys is to verify that the construction, components and equipment satisfy the rule requirements and are in accordance with the approved plans, that required materials are used, and that functional tests are carried out as prescribed by the rules.

2.5.5 When DNV GL is satisfied that the requirements specified for the unit in question have been met, the appropriate class notation will be assigned and confirmed by the issuance of a classification certificate. Provided the requirements for retention of class are complied with, the certificate will normally have a validity of five years.

### 2.6 Classification in the operational phase

2.6.1 Compliance with the rule requirements in the operational phase is verified by DNV GL through a system of periodical surveys. The most comprehensive survey is the one carried out in connection with the renewal of the five-yearly classification certificate. During the five year period the unit undergoes annual and intermediate surveys covering various parts, equipment and systems, depending on the class assigned.
2.6.2 In order to confirm retained validity of class, DNV GL evaluates the extent of possible sustained damage and verifies ensuing repairs. Deferred repairs may be accepted by DNV GL, but always associated with a maximum time limit.

2.6.3 The Rules allow periodical surveys to contain an element of sampling. This sampling must be sufficient to enable the surveyor to obtain a proper assessment of the condition of the unit. This assessment is based amongst other things on type, age and technical history of the unit.

2.6.4 Results of the surveys are reported to the owners and to DNV GL's central office for updating records. Special findings are also recorded and used as basis for updating and development of the Rules.

2.6.5 “The register of vessels classed with DNV GL” is available for supplying information on ship's and unit's main particulars and details of their classification.

2.7 Owner's duties

2.7.1 In order to maintain valid class the classification system specifies the following to be observed by the owner:

— The unit has to be competently handled in accordance with the Rules.
— The unit has to be maintained to rule standard at all times. Any conditions of class have to be carried out as specified.
— The unit has to undergo prescribed periodical and renewal surveys, as well as surveys of damage, repairs, conversions and alterations.
— DNV GL must be furnished with all information that may influence its decisions in connection with classification.

2.7.2 Failure to meet any of these requirements may lead to termination of valid class and withdrawal of all class and statutory certificates.

2.7.3 To assist the owner in this regard DNV GL supplies regular status reports on certificates, surveys carried out and becoming due, and possible conditions of class.

3 Remuneration

Remuneration is normally based on a fee system, in which DNV GL invoices each type of survey according to a basic scale of fees. The basic scale of fees is developed by taking into consideration the amount of work needed to execute, process and follow up the survey in question, as well as the items surveyed. The fees also cover investment and development costs of the Rules as well as maintenance of a worldwide survey network, central service support system, etc. Price level and costs vary from country to country and are therefore reflected in the fees charged.

4 Classification support

4.1 General

4.1.1 The staff of DNV GL represents a significant accumulation of knowledge and practical experience in offshore-related technical fields. This is an asset often drawn on by the industry in matters related to classification.

4.1.2 The expertise of DNV GL is available to the owner at any time when needed in connection with operating problems, damage and casualties.

4.2 Pre-contract support

Co-operation with DNV GL early in the design stage, before classification is requested and any contract is signed, is usually very beneficial to both yard and owner. Different technical solutions may be evaluated, thus contributing to a more efficient unit, and ensuring that all safety aspects as specified by the Rules are taken care of. In this way, expensive changes late in a project may be avoided.
4.3 In-service support
Similar services are given in connection with units in operation. Alternative ways of repairs may be indicated, acceptable distributions of crude cargo and ballast to alleviate overstressing may be computed in case of damage, stability may be investigated, etc. These are typical examples.

4.4 Limitations
Two main restrictions prevail on DNV GL when undertaking classification support work:

— DNV GL does not carry out complete, conceptual design of units. In cases where DNV GL has been involved in design support, the plans and calculations must still be independently evaluated by DNV GL before being accepted for classification purposes.

— Information received from customers in connection with assignment of class is not disclosed and used in classification support work.
APPENDIX C  MOORING EQUIPMENT ACCEPTANCE STANDARD GUIDANCE

1  General

1.1  General

The following acceptance/rejection criteria the following standards may be used as guideline:

— for wire rope: ISO Standard 4309-2004 (E), API RP 2I
— for fibre rope: DNV-RP-E304
— for chain: as stated in [2.4].

2  Anchor chains; renewal survey examination guide

2.1  General

2.1.1  Magnetic particle testing (MT) shall basically cover the whole link, but concentrate on the following areas:

— shoulders of link where mechanical damage may occur
— flash butt weld for defects in way of weld
— ends of stud for cracks propagating into main part of link
— inner bend region where adjacent links bear on each other stud less chain: outer bend region at the crown and inner surfaces where the links start to bend
— any other area where there have been chain breaks or mechanical damage.

2.1.2  The diameter in way of the bend region and any area with excessive wear or gouging is to be measured on approximately 1% of the links distributed through the working length. The links are selected by the attending surveyor based on the findings of the visual inspection. The percentage may be increased or decreased if the visual inspection indicates excessive or minimal deterioration.

2.1.3  The length over five links should be measured approximately once every 100 m. However, measurements can be waived by the attending surveyor provided:

— it is confirmed that there have been no in-service problems with chain twisting/jumping or mismatch. between links and windlass/fairlead pockets
— no indications of stretched links observed during the visual inspection.

2.1.4  Supplementary requirements for MT and diameter measurements are to be applied to those lengths of each chain, which have been in contact with the windlass and fairleads when the mooring system was in operation.

2.1.5  MT is to be carried out on approximately 20% of the links and the diameter is to be measured on approximately 3% of the links distributed through the 150 m length.

2.1.6  Appropriate identification marks are to be placed on the surveyed lengths of chains. The identification marks are to:

— uniquely identify each individual length of chain
— identify the common links which are fitted adjacent to joining shackles.

Alternatively, accurate reliable records equivalent to the above markings are to be available onboard. Anchor chains; acceptance criteria and repair.
2.2 Diameter loss due to abrasion and corrosion

2.2.1 Temporary Mooring Equipment: Links or joining shackles with minimum cross-sectional area less than 81% of the original nominal area are to be rejected. The equivalent reduction in diameter is 10%. Two perpendicular measurements are to be taken and the average compared to the allowable 10% reduction.

2.2.2 Position Mooring Equipment: Links or joining shackles with minimum cross-sectional area less than 90% of the original nominal area are to be rejected. The equivalent reduction in diameter is 5%. Two perpendicular measurements are to be taken and the average compared to the allowable 5% reduction.

Lengths over five links should be 23.25 D as a maximum.

— Missing studs

Missing studs on stud link chains are not acceptable. Links are to be removed or studs are to be refitted, using an approved procedure.

— Corroded studs

As guidance, if the measured stud cross-sectional area is less than 40% of the nominal link (bar) cross-sectional area, links should be removed or studs should be refitted using an approved procedure.

— Studs secured by fillet welds

Grade 3 chains are sometimes fitted with studs secured by fillet welds. In service the welds may crack. The following applies:

— any axial or lateral movement is unacceptable. Links are be removed or studs are to be re-welded using an approved procedure
— links with intact fillet welds but with gaps exceeding 3 mm between the stud and the link should be removed or repaired using an approved procedure. This because the stud welds will eventually crack due to vibrations when chain is running over fairlead at speed during anchor handling
— existing links which are found to have the stud fillet welded at both ends are subject to special consideration.
— Studs secured by press fitting and mechanical locking

With this design of stud there is little prospect of the stud falling out even if it is loose. However, loose studs have caused fatigue at the edge of imprints. The following applies:

— axial stud movement up to 1 mm is acceptable
— axial stud movement greater than 2 mm is unacceptable. Links are to be removed or studs are to be pressed using an approved procedure
— acceptance of axial stud movement from 1 to 2 mm must be evaluated based on the environmental conditions of the unit’s location and expected period of time before the chain is again available for inspection
— lateral movement up to 4 mm is acceptable provided there is no realistic prospect of the stud falling out
— welding of studs is not acceptable.

2.2.3 Cracks, gouges, and other surface defects

Defects may be removed by grinding to a depth of 7% of original nominal diameter provided the resulting cross-sectional area is at least 81% (90% for Position Mooring Equipment) of the original nominal area.

The resulting grooves are to have a length along the link of approximately six times the depth and a bottom radius of approximately three times the depth. Grooves are to be blended into the surrounding surface to avoid any sharp contours.

Complete elimination of defects is to be verified by MT or PT.

2.2.4 Gross-distortion

Links showing distortion/ miss-shape are to be rejected.
2.3 Joining shackle defects and repair

2.3.1 Experience has shown a number of anchors and chains lost due to joining shackle failure. Joining shackle is to be rejected if cracks and other defects are found on the machined surfaces. In addition, all joining shackles on that chain which are of the same design and which have an equal or greater service life are also to be considered carefully with a view to rejection. Cracks and other defects on the remaining surface may be removed by grinding.

2.3.2 Distortion
Shackles showing distortion/miss-shape are to be rejected.

2.3.3 Tapered pins
Tapered pins holding the parts of joining shackles together must make good contact at both ends and the recess of counter-bore at the large end of the pin holder should be solidly plugged with a peened lead slug to prevent the pin from working out.

2.3.4 Replacement of links and joining shackles
Links or shackles beyond repair are to be replaced with joining shackles in compliance with current Rules and guided by the following good marine practice:

— joining shackles should pass through fairleads and windlasses in the horizontal plane
— since joining shackles have much lower fatigue lives than ordinary chain links as few as possible should be used
— if a large number of links meet the discard criteria and these links are distributed in the whole length, the chain should be replaced with new chain.

Any other type of replacement links are subject to special approval.

2.4 Anchors acceptance criteria and repair

2.4.1 The anchor shackle pin shall be renewed if excessively worn or bent.

2.4.2 Bent flukes or shanks may be heated and jacked back in place according to an approved procedure, followed by magnetic particle testing.

2.4.3 If swivels are fitted to the anchor, the threads engaging the swivel nut shall be examined. If significant corrosion is found, the swivel should be removed or replaced.
Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16 000 professionals are dedicated to helping our customers make the world safer, smarter and greener.