

RULES FOR CLASSIFICATION

Offshore units

DNVGL-RU-OU-0503

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Offshore fish farming units and installations

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FOREWORD

DNV GL rules for classification contain procedural and technical requirements related to obtaining and retaining a class certificate. The rules represent all requirements adopted by the Society as basis for classification.

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CHANGES – CURRENT

This is a new document.

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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 offshore fish farming units and installations*, the terms and procedures for assigning and maintaining classification, including listing of the applicable technical references to be applied for classification.

1.2 Organisation

This document is divided into four main chapters as follows:

- This chapter providing general information about classification principles and procedures
- Ch.2 providing general regulations and principles principles
- Ch.3 providing design and construction requirements.
- Ch.4 providing requirements for maintenance of class in the operational phase.

1.3 Objects covered

This document covers classification of offshore fish farming units or installations of the following design types:

- ship-shaped units or installations
- column-stabilised units or installations
- circular units or installations
- self-elevating units or installations (e.g. by using its deck structures for aquaculture purposes)
- floating units or installations other than above.

2 Definitions and abbreviations

2.1 Verbal forms

Table 1 Verbal forms

<i>Term</i>	<i>Definition</i>
shall	verbal form used to indicate requirements strictly to be followed in order to conform to the document
should	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
may	verbal form used to indicate a course of action permissible within the limits of the document

2.2 Definitions

Table 2 Definitions

<i>Term</i>	<i>Definition</i>
accredited	used by DNVGL in this context as being recognized or authorized by the National Authority
alteration	a change that does not affect the basic character or structure of the unit or installation it is applied to
assessment	an act of assessing, appraising or evaluating a condition of a product, process or system
builder	the party contracted to build a unit or installation in compliance with the society's rules
certificate	a document confirming compliance with the society's rules or with other rules and regulations for which the society has been authorized to act
certification	a service that comprises assessment of compliance with applicable requirements and issuance of a certificate if compliance is confirmed
class	class is assigned to and will be retained for units or installations, which the Society has found to be in compliance with applicable requirements of the Society's rules
class certificate	certificate confirming compliance with the Society's rules as applicable and at the time of survey
class entry	assignment of class to an existing unit or installation
class notation	an abbreviation or keyword expressing a specific feature relating to a unit or installation or its machinery, systems and equipment, or service area while referring to specific requirements in the Rules
classification	a service which comprises the development and maintenance of independent technical standards for units or installations, class rules and standards, and to verify compliance with the rules and standards throughout the unit's or installation's life The extent of and methods for verifying compliance will be decided by the Society to establish reasonable assurance that the relevant Rules are complied with.
close-up examination	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
coating conditions	<ul style="list-style-type: none"> — GOOD: condition with only minor spot rusting — FAIR: 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 — POOR: condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration
commissioning	a process of assuring that components, equipment and the systems are functioning in accordance with the functional requirements
concurrent surveys	surveys required to be concurrently completed shall have the same date of completion 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.

<i>Term</i>	<i>Definition</i>
condition of class	a requirement that specific measures, repairs or surveys shall be carried out within a specific time limit in order to retain class
condition on behalf of the Flag Administration	a requirement that specific measures, repairs or surveys shall be carried out within a specific time limit in order to retain the statutory certificate A condition on behalf of the flag administration will be issued only when the society has been authorised by the flag administration, see [4].
conditions	general term that includes both condition of class and condition on behalf of the flag administration
contract for construction	a contract between the prospective owner and the builder to build a unit or installation, see Sec.2 [1.3.2]
conversion	change that substantially alters the dimensions, carrying capacity or the type of the unit or installation
critical structural areas	areas that have been identified from calculations to require monitoring or from the service history of the subject unit or installation or from similar or sister unit or installations to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the unit or installation
customer	any person and/or company which has requested the society's service and/or has entered into a contract for services directly with the society
deficiency	a failing or shortcoming with respect to applicable requirements
designer	a party who created or developed documentation which is submitted to the Society for approval or information
documentation	drawings, descriptions, calculations, reports, procedures, certificates and similar information describing e.g. the design, installation, testing, operation, maintenance or status of an object
exceptional circumstances	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
emergency towing	towing related to an emergency situation normally caused by failure of the unit or installations own propulsion (compare with normal towing)
flag administration	the government of the state whose flag the unit or installation is entitled to fly
guidance notes	additional information containing advice which is not required for the assignment or retention of class, but with which the society, based on experience, advises compliance
independent tank	self-supporting tank which does not form part of the unit or installation's hull and does not contribute to the hull strength
independent gravity tank	a tank with design vapour pressure not exceeding 0.7 bar
interpretation	norms for fulfilling the associated principal requirements as defined by other regulatory bodies on matters which are left to the satisfaction of the flag administration or are vaguely worded 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.

<i>Term</i>	<i>Definition</i>
lay-up	term used for unit or installations that are out of commission In this state the offshore unit or installations may be at anchorage or permanently moored in a safe harbour.
main character of class	characters showing compliance with a defined set of classification rules for hull and/or machinery
main functions	In the context of these rules for classification: <ul style="list-style-type: none"> — structural strength — stability, watertight integrity and weathertightness — drainage and bilge pumping — ballasting — power generation — propulsion (as applicable) — steering (as applicable) — position keeping (as applicable)
main hoisting system	all major lifting equipment directly involved in lifting pipe, riser etc. into and out of the well, such as drawworks, hydraulic cylinders, top drive, links, elevators etc. Pipe handling equipment used for making up and breaking out pipe/stands are not considered main hoisting systems.
manufacturer	an organisation 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
mechanical completion	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
memorandum to owner	information related to the unit or installation, its machinery, systems and equipment or applicable requirements A memorandum to owner will be issued in relation to information that does not require any corrective action or survey.
mobile offshore unit	a buoyant construction engaged in offshore operations including drilling, production, storage or support functions, not intended for service at one particular offshore location, and which can be relocated without major dismantling or modification
newbuilding	a new unit or installation under construction at a builder
non-convention ships	a ship or a barge not covered by the international conventions (In these rules the term ship is used for similar units or installations).
offshore fish farm	floating unit or installation composed of type described by these Rules and an integrated production facility, by which fish are fed, treated and stored
offshore installation	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 one particular location for an extended period
overall examination	an examination intended to report on the overall condition of the structure
owner	the registered owner and/or manager of the unit or installation and/or any other organisation and/or person who has assumed the responsibility for operation of the unit or installation and who on assuming such responsibility has agreed to take over all the duties and responsibilities related to the unit or installation

<i>Term</i>	<i>Definition</i>
patrolling	an independent and unscheduled check that the applicable processes, activities and associated documentation of the building functions continue to comply with the rules and statutory requirements
plan approval	a systematic and independent examination of drawings, design documents or records by the society in order to verify compliance with the rules or statutory requirements where authorised by the flag administration The extent and method of plan approval will be decided at the discretion of the society.
plan approval staff	personnel authorized to carry out plan approval and to conclude whether or not compliance with the Rules or statutory instruments has been met
port state authority	the maritime authority in the country of the unit or installation's port of call
position mooring	anchoring system for position keeping at the unit or installation's working location
pressure vessel	a tank with design gas or vapour pressure exceeding 0.7 bar
procedural requirements	requirements for the process of assessing compliance with technical requirements Procedural requirements cover: <ul style="list-style-type: none"> — basis for design assessment, i.e. information or documentation requirements — requirements for certification of products — requirements for surveys to assign, maintain and retain class.
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	a quality management system and established procedures for production and control
quality survey plan	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, yard's 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.
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	a requirement in the rules or a statutory requirement that will enter into force for certain unit or installations in operation and under construction at a given date or at an upcoming survey The retroactive requirement will specify the required actions to be taken in order to retain class or statutory certification. Retroactive requirements 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.

Term	Definition
rules	independent standard that consist of all requirements, technical and procedural, adopted by the society as the basis for classification. and published in DNV GL's rules for classification and referred documents
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
Society	DNV GL AS and its affiliates carrying out classification and statutory certification
safety systems	<p>systems, including required utilities, which are provided to prevent, detect/warn of an accidental event/abnormal conditions and/or mitigate its effects</p> <p>Interpretation: The following should be considered as safety systems:</p> <ul style="list-style-type: none"> – PA/GA – fire-fighting systems – safety systems for essential or important services – safety systems are normally considered as on-demand functions. <p style="text-align: center;">---e-n-d---o-f---i-n-t-e-r-p-r-e-t-a-t-i-o-n---</p>
spaces	separate compartments including holds and tanks
statement of compliance	<p>a document confirming compliance with specified requirements for which the society has not been authorised to act</p> <p>Compliance is confirmed on the date as given in the statement.</p>
statutory certification	a service with the intention of confirming compliance with regulatory codes and regulations, in agreement with relevant flag administrations
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	<p>a systematic and independent examination of a unit or installation, materials, components or systems in order to verify compliance with the rules and/or statutory requirements</p> <p>Surveys will be carried out on the unit or installation, 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 survey.</p>
surveyor	personnel authorised 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
technical requirements	requirements for design and construction of a unit or installation, system or component, and the minimum requirements they shall meet during the operational lifetime
temporary conditions	design conditions not covered by operating conditions, e.g. conditions during fabrication, mating and installation phases, and dry transit phases
temporary quipment	equipment intended for use on board for a period not exceeding 30 months 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

<i>Term</i>	<i>Definition</i>
tentative rules and standards	provisional rules or standards to which DNV GL reserves the right to make immediate and/or retroactive adjustments in order to obtain the purpose intended
(normal) towing	drawing or pulling the unit or installation by a chain or line using a tug boat Normally towing is performed for unit or installations without any propulsion for (re-)location (compare with emergency towing).
transit conditions	all wet unit or installation movements from one geographical location to another
unit	in the context of these rules signifies an offshore fish farming unit
verification	a service that confirms through the provision of objective evidence (analysis, observation, measurement, test, records or other evidence) that specified requirements have been met
weathervaning	a unit or installation moored with yoke or turret and able to weathervane
witnessing	attendance of tests or measurements with the intention of verifying compliance with agreed test or measurement procedures

2.3 Abbreviations

Table 3 Abbreviations

<i>Term</i>	<i>Description</i>
BS	British Standard (issued by British Standard Institution)
CG	DNV GL Class guideline
CMC	certification of materials and components
CC	condition of class
CA	condition on behalf of the flag administration
DAF	Dynamic amplification factor
DFF	design fatigue factors
DP	design pressure
FMECA	failure mode effect and consequence analysis
FUI	fatigue utilisation factor
IACS	International Association of Classification Societies Unified rules, interpretations, guidelines and recommendations may be found on www.iacs.org.uk .
IC	inspection category
IIP	in service inspection program
IMO	International Maritime Organization
ISO	International Organisation for Standardization
HP	high pressure
LRFD	load and resistance factor design

<i>Term</i>	<i>Description</i>
NS	Norwegian standard
MC	mechanical completion
MO	memorandum to owner
MPI	magnetic particle inspection
NDT	non-destructive testing
OEM	original equipment manufacturer
OS	DNV GL Offshore standard
OTG	DNV GL Offshore technical guide
QSP	quality survey plan
RBI	risk based inspection
RCM	reliability cantered maintenance
RP	DNV GL Recommended practice
RR	retroactive requirement
SCF	stress concentration factor
SI	International System of units
SWL	safe working load
UT	ultrasonic testing
WSD	working stress design

3 Normative references

3.1 Normative references

This document includes references to other DNV GL 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 reference documents

Applicable DNV GL reference documents are listed in [Table 4](#) See [Ch.2 Sec. 1](#) for applicable editions.

Table 4 DNV GL reference documents

<i>Document code</i>	<i>Title</i>
DNVGL-OS-A101	Safety principles and arrangement
DNVGL-OS-B101	Metallic materials
DNVGL-OS-C101	Design of offshore steel structures, general - LRFD method
DNVGL-OS-C102	Structural design of offshore ships
DNVGL-OS-C103	Structural design of column-stabilised units - LRFD method

<i>Document code</i>	<i>Title</i>
DNVGL-OS-C104	Structural design of self-elevating units - LRFD method
DNVGL-OS-C105	Structural design of TLPs - LRFD method (when applicable)
DNVGL-OS-C106	Structural design of deep draught floating units - LRFD method
DNVGL-OS-C201	Structural design of offshore units - WSD method
DNVGL-OS-C301	Stability and watertight integrity
DNVGL-OS-C401	Fabrication and testing of offshore structures
DNVGL-OS-D101	Marine and machinery systems and equipment
DNVGL-RU-SHIPS Pt.4 Ch.8	Electrical installations
DNVGL-RU-SHIPS Pt.4 Ch.9	Control and monitoring systems
DNVGL-RU-SHIPS Pt.4 Ch.11	Fire safety
DNVGL-OS-E301	Position mooring
DNVGL-OS-E401	Helicopter decks
DNVGL-ST-0378	Standard for offshore and platform lifting appliances

3.3 Other references

Other normative references are given in [Table 5](#). See [Sec.Ch.2 Sec.1](#) for applicable editions.

Table 5 Non-DNV GL normative references

<i>Document code</i>	<i>Title</i>
IACS No.47	Shipbuilding and Repair Quality Standard, see www.iacs.org.uk

4 Informative references

4.1 DNV GL informative references

The publications listed in [Table 6](#) are referenced in the text of this document, and may be used as a source of supplementary services and information. See [Ch.2 Sec.1](#) for applicable editions.

Table 6 DNV GL informative references

<i>Document code</i>	<i>Title</i>
DNVGL-RU-OU-0102	Floating production, storage and loading units
DNV-STC-1.2	Type Approval
DNVGL-RU-SHIP Pt.6 Ch.4 Sec.10	Refrigeration plant

4.2 Other references

Other references are given in [Table 7](#). See [Ch.2 Sec.1](#) for applicable editions.

Table 7 Other references

<i>Reference</i>	<i>Title</i>
ISO 3166	Codes for the representation of names of countries and their subdivisions
ISO 4309	Cranes - Wire ropes - Care, maintenance, installation, examination and discard
ISO 9001	Quality management systems - Requirements
ISO 17359	Condition monitoring and diagnostics of machines - General guidelines
PD 5500	Specification for unfired fusion welded pressure vessels
NS 9415	Marine fish farms. Requirements for site survey, risk analysis, design, dimensioning, production, installation and operation
EN-ISO/IEC 17020	Conformity assessment- Requirements for the operation of various types of bodies performing inspection
	Norwegian Ministry of Fishery and Coastal Affairs: Act. of 7th. June 2005. No.77 (Aqua Culture Act)
NYTEK	Forskrift om krav til teknisk standard for flytende akvakulturanlegg

CHAPTER 2 GENERAL REGULATIONS AND PRINCIPLES

SECTION 1 CLASSIFICATION PRINCIPLES

1 Introduction

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 unit or installation.

Classification has gained worldwide recognition as representing an adequate level of safety and quality.

Classification implies an activity, in which a unit or installation 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.

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.

The general regulations and procedures described in [DNVGL-RU-OU-0101 Ch.1 Rules for drilling and support units](#) shall apply.

2 Applicable rules

2.1 General

These rules are intended for the classification of offshore fish farming units or installations of conventional designs fabricated in steel or other metallic material listed by [DNVGL-OS-B101](#), i.e.:

- ship-shaped type
- column-stabilized type
- self-elevating type
- cylindrical type
- deep draught type.

2.2 Equivalent safety standards

For other types of fish farming units or installations with design alternatives not explicitly covered by these Rules, alternative solutions may be accepted provided adequately documented in order to provide an overall safety standard equivalent with the rules.

2.3 Rule formalities

2.3.1 Unless stated otherwise, the coming into force date for these rules and the documents references by these rules as technical basis for classification shall be six (6) months after the date of publication.

2.3.2 In exceptional cases, where unacceptable service experience and/or theoretical findings clearly show that the 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.

2.3.3 DNV GL will consider alternatives found to represent an overall safety standard equivalent to that of the explicit rule requirements provided such alternatives have been worked out according to the principles of the rules. The alternative solution shall be adequately documented and will be reviewed for acceptance on basis of relevant references set forth by DNV GL.

2.3.4 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. Any deviation from the requirements shall be documented and agreed between all contracting parties.

2.4 Interpretations

2.4.1 These rules and the technical standard as being referred to are based on internationally accepted principal requirements. In cases where these

- a) contain only functional requirements
- b) allow alternative solutions to prescriptive requirements or
- c) are generally or vaguely worded,

a DNV GL interpretation has been added.

2.4.2 The interpretations are not aiming at introducing additional requirements, but at achieving uniform application of the principal requirements. The interpretations can be regarded as norms for fulfilling the principle requirements.

2.4.3 The interpretations do not preclude the use of other alternative solutions. Such solutions shall be documented and approved for compliance to the principal requirement equivalent to the original interpretation.

2.5 Conversions and alterations

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

2.5.2 When conversions or alterations involves modifications which:

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

DNV GL will decide on the rules to be applied.

2.5.3 If the structure, machinery, systems and equipment shall be converted or altered, the changes shall be documented and be approved in the same manner as for new unit or installations.

Guidance note:

Alterations to the 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.

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2.5.4 Conversions or alterations shall take place under the supervision of a surveyor.

3 Interaction with national authorities

3.1 General

These rules are intended for fish farming units or installations operating under a maritime regime, where the classification concept is used as part of the certification or license regimes for obtaining compliance with applicable national requirements (e.g. aquaculture acts and regulations of the flag state administration, as required).

DNV GL will not verify compliance with statutory requirements unless authorized by the national authority/ flag state administration.

3.2 Non-convention units or installations

For units or installations that are not following a maritime regime, herein referred to as non-convention units or installations, the classification scope may be subject to additional requirements.

Guidance note:

In some cases it may be a matter of judgment if the unit/installation can be categorized to follow maritime regime and to which conventions, regulations and requirements the unit/installation shall be designed and operated.

The rules may also be used for non-convention units or installations.

It is recommended that relevant national authorities are contacted for such for such principal clarification.

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4 Class scope and notations

4.1 Scope

4.1.1 General

Classification follows the technical scope as described in [Ch.1 Sec. 3](#) and covers the design, construction, commissioning and operational phases of fish farming units or installations.

4.1.2 Associated topics normally not covered by the Rules

Table 1 Items not covered by these Rules:

- | |
|---|
| <ul style="list-style-type: none"> — Offshore fish farming installations (and units) where the floating collars are typically made of polymers, concrete or equivalent — Aquaculture: Net pens and associated equipment (except their fixations to the main structure which are class scope) — Aquaculture: Fish escape — Aquaculture: Fish feeding and production facilities — Aquaculture: Feedstock, its processes and operations |
|---|

4.2 Notations


4.2.1 General

Classed fish farming units or installations will be given a class designation consisting of:


- construction symbol
- main character of class
- basic design notation
- service notation
- special equipment and systems notations (as applicable)
- special feature notations (as applicable).

4.2.2 Construction symbols

The symbol  will be given to units or installations built under the supervision of DNV GL.


The symbol  will be given to units or installations built under the supervision of a recognised classification society and later assigned class with DNV GL.

4.3 Main character of class

4.3.1 The notation  **1A Offshore fish farming unit** will be given to self-propelled mobile fish farming units with hull and marine machinery and equipment found to be in compliance with the basic requirements of the applicable DNV GL offshore standards referred to in the rules.

Mobile fish farming units without main propulsion that are intended to be moved under tow will be given the additional notation **Non self-propelled**.

For mobile fish farming units that are additionally intended to be operated and moored on location, the additional class notation **POSMOOR** is mandatory.

4.3.2 The notation  **OI Offshore fish farming installation** will be given to non self-propelled fish farming installations intended for long term service at one site specific location for a prolonged period with hull, utility and safety systems found to be in compliance with the basic requirements of applicable DNV GL offshore standards referred to in the rules. Temporary conditions are not included unless specifically specified. When moored on location, the additional class notation **POSMOOR** is mandatory. Other types of position keeping systems is subject to special consideration.

4.3.3 For notation **OI** 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.

4.4 Structural design notations

Table 2 Class notations related to structural design

<i>Class notation</i>	<i>Description</i>	<i>Design requirements</i>	<i>Survey requirements</i>
Column-stabilised	A structure dependent on the buoyancy of widely spaced columns for floatation and stability in all modes of operation	Ch.3 Sec.1 and Ch.3 Sec.2	Ch.4
Self-elevating	A structure with hull of sufficient buoyancy for safe transport which is raised above sea surface on legs supported by the sea bed during operation	Ch.3 Sec.1 and Ch.3 Sec.2	Ch.4
Ship-shaped	Monohull ship and barge structures having displacement hulls with or without propulsion machinery	Ch.3 Sec.1 and Ch.3 Sec.2	Ch.4
Cylindrical	A cylindrical shaped displacement hull with or without machinery	Ch.3 Sec.1 and Ch.3 Sec.2	Ch.4
Deep draught	a SPAR, deep draught semi or other deep draught floating units. Spar can consist of multi-vertical columns, single column with or without moonpool (e.g. classic, truss and cell spar). May consist of multi-vertical columns with ring pontoon with or without a heave damping structure.	Ch.3 Sec.1 and Ch.3 Sec.2	Ch.4

4.5 Service restrictions for 1A

Units that are not approved for unrestricted service will have relevant service restrictions stated in the appendix to the classification certificate. These units will be given the class notation **R** to indicate that restrictions apply.

The notation **R** will be inserted after the main character of class.

Guidance note:

Example

Units built for compliance with the requirements and procedures of these rules shall be given the class notation e.g. **+1A R ship-shaped offshore fish farming unit**. Such restriction notation will not apply to installations (+OI) as relevant limiting service conditions are pre-defined, approved and subsequently stated in the "Appendix to classification certificate".

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4.6 Additional class notations related to special equipment and systems

Table 3-3 lists most relevant additional class notation for fish farming units. A complete list of additional class notations can be found in DNVGL Rules for classification: Offshore drilling and support units, [DNVGL-RU-OU-0101 Ch.2 Sec. 7](#).

Table 3 Additional class notations

<i>Class notation</i>	<i>Description</i>	<i>Qualifier</i>	<i>Rule reference</i>
Crane-offshore	Offshore, shipboard and platform cranes		DNVGL-RU-0101 Ch.2 Sec.7
DYNPOS	Dynamic positioning system	(...)	
E0	Periodically unattended machinery space		
ECO	Machinery centralized operated		
ES	Enhanced control and safety systems		
HELDK	Helicopter deck	<none>	
		S	
		H	
		F	
ISDS	Integrated software dependent systems	(...)	
POS Moor	Position mooring	(...)	
Recyclable	Inventory of hazardous materials part 1		
SPS	Special purpose ships		DNVGL-RU-SHIP Pt.6 Ch.5 Sec.7

CHAPTER 3 DESIGN AND CONSTRUCTION PROVISIONS

SECTION 1 DESIGN AND CONSTRUCTION REQUIREMENTS FOR 1A OFFSHORE FISH FARMING UNITS

1 General

1.1 Introduction

1.1.1 This section identifies design and construction requirements common to all types of mobile fish farming units. Units complying with these requirements will be assigned **1A Offshore fish farming 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 (CMC)
- survey during construction and installation
- survey during commissioning.

Further description of activity procedures are given in [DNVGL-RU-OU-0101 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 CMC.

1.2 Technical reference documents

1.2.1 Technical requirements are given by reference to selected:

- DNV GL offshore standards (OS)
- DNV GL class guidelines (CG)
- DNV GL recommended practices (RP)
- other DNV GL/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 [13].

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 shall 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

2.1.1 Safety principles and arrangement include the following discipline areas:

- design principles, including generic accidental loads
- arrangement
- communication
- escape

and should comply with the generic safety principles given in [DNVGL-OS-A101](#).

2.1.2 The basic safety requirements for all types of units shall be worked out to ensure a level of safety equivalent to that required by the International Convention for the Safety of Life at Sea, 1974(SOLAS), as amended, and which are covered by the following DNV GL ship rules;

- [DNV GL-RU-SHIP Pt.4 Ch.8 Electrical Installations](#)
- [DNV GL-RU-SHIP Pt.4 Ch.9 Control and monitoring systems](#)
- [DNV GL-RU-SHIP Pt.4 Ch.11 Fire safety](#).

(In the absence of specific requirements from three flag administration/national authority the unit shall comply with cargo ship requirements of Ch.II-2 of SOLAS 1974 as amended).

2.1.3

Other safety requirements for fish farming units of specific design shall be worked out to ensure a level of safety equivalent to that required by relevant chapters of the Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009 (IMO MODU Code), and which are covered by the following DNV GL offshore standards:

- DNVGL Offshore standards for structures, see [Table 1](#)
- [DNVGL-OS-C301 Stability and watertight integrity](#)
- [DNVGL-OS-D101 Marine and machinery systems and equipment](#).

2.2 Project design brief

Prior to starting up the approval process, the customer shall submit DNVGL for acceptance a project design brief for the various disciplines described in [1.1.2], which readily describe the design and operations philosophies/limitations. Any use of alternative design standards and/or risk mitigations shall be described and justified in order to ascertain that the design will be carried out within an overall safety standard

equivalent with the intention of the rules. The design assumptions and approved conditions will be included in the appendix to classification certificate.

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 fish farming units and its services covers the following aspects:

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

4.1.2 Excluded from the scope are:

- environmental events defined by an annual probability lower than 10^{-2}
- ice loads unless specifically specified
- earthquakes and other exceptional environmental events
- soil conditions, except for anchors as described by [DNVGL-OS-E301 Ch.2 Sec.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](#).

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 below.

Table 1 Overview of structural design requirements and methods

	WSD	LRFD
Ship-shaped type ¹⁾	DNVGL-OS-C102	DNVGL-OS-C102 Sec.13
Column-stabilized type	DNVGL-OS-C201	DNVGL-OS-C103
Self-elevating type	DNVGL-OS-C201	DNVGL-OS-C104
Cylindrical type		DNVGL-OS-C101
Deep draught type		DNVGL-OS-C101 DNVGL-OS-C106
¹⁾ Ship-shaped fish farming units of barge type that are intended to be permanently moored in sheltered waters shall as a minimum comply with the principles for hull design given in DNVGL-RU-SHIP Pt.5 Ch.11 Non self-propelled units		

5 Fabrication and testing of structures

5.1 Technical requirements

5.1.1 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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5.1.2 Ship-shaped units that are following the normal classification cycle, the requirements for fabrication and testing of the hull may be in accordance with the [DNVGL-RU-SHIP Pt.2 Ch.4](#), with the exemption of specific structural elements not covered by these, which application is subject to a case-by-case approval.

5.2 Supplementary classification requirements

Classification procedures specifically related to fabrication and testing of offshore structures are given in [DNVGL-OS-C401 Ch.3](#).

5.2.1 Classification procedures specifically related to fabrication and testing of offshore structures are given in [DNVGL-OS-C401 Ch.3](#).

5.2.2 Basis principles for the involvement of class during new building are given in [DNVGL-RU-OU-0101 Ch.1 Sec.4 \[1.5\]](#) to [DNVGL-RU-OU-0101 Ch.1 Sec.4 \[1.7\]](#).

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](#).

Guidance note:

Due care should be taken to ensure that the inclination of the unit in intact and damage condition prevents escape of fish.

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6.1.2 The flooding assumptions in damage condition, as described by [DNVGL-OS-C301](#), may not be directly transferable to some fish farming objects and will have to be especially considered and agreed with DNVGL.

6.1.3 If onboard computers for stability calculations are installed, these systems shall be approved in accordance with requirements in [DNVGL-RU-SHIP Pt.6 Ch.4 Sec.7](#).

7 Mooring and towing

7.1 General

7.1.1 Depending on type of unit, main class stipulates requirements for:

- temporary mooring
- towing.

Guidance note:

The above includes both normal and emergency towing. For the definitions of these and temporary mooring see [Ch.1](#).

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7.2 Temporary mooring

7.2.1 Self propelled units shall have an arrangement for temporary mooring.

For ship-shaped units the arrangement shall be in accordance with the [DNVGL-RU-SHIP Pt.3 Ch.11](#), for other structural designs in accordance with [DNVGL-OS-E301 Ch.2 Sec.4](#).

Equipment for barges will be considered case by case.

7.2.2 For fish farming units of ship-shaped, column-stabilised, cylindrical and deep draught types, that are additionally intended to be moored during in-service, the additional class notation **POSMOOR** is mandatory. Other types of position keeping systems, e.g. yoke, turrets, hawsers, etc. are subject to special consideration.

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

7.3 Towing

7.3.1 Mobile offshore fish farm units shall have an arrangement according [DNVGL-OS-E301 Ch.2 Sec.4](#). Ship-shaped units with propulsion shall have towing arrangement according to [DNVGL-RU-SHIP Pt.3 Ch.11](#).

7.3.2 The towing fittings for normal towing may also be used for emergency towing.

7.3.3 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 \[16\]](#).

7.4 Supplementary classification requirements

7.4.1 Classification procedures specifically related to mooring and towing are given in [DNVGL-OS-E301 Ch.3](#).

7.4.2 Certification requirements for equipment are given in [DNVGL-OS-E301 Ch.3](#).

8 Marine and machinery systems and equipment

8.1 Technical requirements

8.1.1 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](#).

8.1.2 Units not equipped with propulsion and steering arrangements for independent transit will be given the special feature notation **Non self-propelled**, and shall comply with [DNVGL-OS-D101](#) as applicable for such type of units.

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

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-RU-SHIP Pt.4 Ch.8](#).

10 Control and monitoring systems

10.1 Technical requirements

Control and monitoring 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-RU-SHIP Pt.4 Ch.9](#).

10.2 Supplementary classification requirements

11 Fire protection

11.1 Technical requirements

Fire protection include:

- passive fire protection
- active fire protection
- fire fighting systems

and shall be designed, manufactured, tested and installed in accordance with [DNVGL-RU-SHIP Pt.4 Ch.11](#) for cargo ships in absence of specific fire safety requirements from the flag administration/national authority.

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.

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12.1.3 In addition to the above ship-shaped units may apply for the class notation **BIS** for in water survey of the bottom, see [DNVGL-RU-SHIP Pt.6 Ch.9 Sec.1](#).

13 Summary of technical reference standards

Technical standards which shall be applied for assignment of main character of class for fish farming units are summarised in [Table 2](#).

Table 2 Technical reference standards for main character of class

Technical item	Reference standard	Applicable parts or comments
SAFETY PRINCIPLES AND ARRANGEMENT		
Design principles	DNVGL-OS-A101	Ch.2 Sec.1 <i>Design principles and accidental loads</i>
Arrangement		Ch.2 Sec.2 <i>Arrangement</i>
Escape and communication		Ch.2 Sec.5 <i>Escape and communication</i>
MATERIALS		
Metallic materials	DNVGL-OS-B101	

<i>Technical item</i>	<i>Reference standard</i>	<i>Applicable parts or comments</i>
STRUCTURAL DESIGN (select type as appropriate)		
Ship-shape structure	DNVGL-OS-C102	LRFD and WSD methodology
Column-stabilised type structure	DNVGL-OS-C103	LRFD methodology
	DNVGL-OS-C201	WSD methodology
Cylindrical units	DNVGL-OS-C101	LRFD methodology
	DNVGL-OS-C101	WSD methodology
HULL FABRICATION		
Fabrication, including welding and NDT	DNVGL-OS-C401 DNVGL-RU-SHIP Pt.2 Ch.4	Cover all types of floating units For ship-shaped units
STABILITY AND WATERTIGHT INTEGRITY		
Stability, watertight integrity, freeboard and weathertight closing appliances	DNVGL-OS-C301	Covers all types of structures
MOORING AND TOWING		
Temporary mooring, towing	DNVGL-RU-SHIP Pt.3 Ch.11	Ship-shaped units
	DNVGL-OS-E301	All other types of units
MARINE AND MACHINERY SYSTEMS AND EQUIPMENT		
Piping design, manufacturing and testing; platform piping systems; machinery piping systems; machinery and mechanical equipment	DNVGL-OS-D101	All relevant sections
ELECTRICAL SYSTEM EQUIPMENT		
Electrical systems including switchgear and controlgear assemblies, rotating machinery, static convertors, cables, installation and testing	DNVGL-RU-SHIP Pt.4 Ch.8	All relevant sections
INSTRUMENTATION AND TELECOMMUNICATION SYSTEMS		
Instrumentation systems including design principles, system design, computer based systems, component design and installation, and user interface	DNVGL-RU-SHIP Pt.4 Ch.9	All relevant sections
FIRE PROTECTION		
Fire protection including passive fire protection, active fire protection, fire fighting systems, fire and gas detection systems	DNVGL-RU-SHIP Pt.4 Ch.11	All relevant sections

SECTION 2 DESIGN AND CONSTRUCTION REQUIREMENTS FOR OI OFFSHORE FISH FARMING INSTALLATIONS

1 General

1.1 Introduction

1.1.1 Permanently positioned offshore fish farming installations may be classed as installations according to ✖ **OI Offshore fish farming installation.**

1.1.2 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.

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

- design approval
- certification of materials and components (CMC)
- survey during construction and installation
- survey during commissioning.

Further description of activity procedures are given in [DNVGL-RU-OU-0101 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 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 may 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

2.1.1 Safety principles and arrangement include the following discipline areas:

- design principles, including generic accidental loads
- arrangement
- escape.

2.1.2 The basic safety requirements for all types of fish farming installations shall be worked out to ensure a level of safety equivalent to that required by the International Convention for the Safety of Life at Sea (SOLAS), 1974 as amended, and which are covered by the following rules:

- DNVGL-RU-SHIP Pt.4 Ch.8 *Electrical installations*
- DNVGL-RU-SHIP Pt.4 Ch.9 *Control and monitoring system*
- DNVGL-RU-SHIP Pt.4 Ch.11 *Fire safety*.

(In the absence of specific fire safety requirements from the flag administration/national authority the installation shall comply with the cargo ship requirements of Ch.II-2 of SOLAS 1974 as amended).

2.1.3 Other safety requirements for fish farming installations of specific type shall be worked out to ensure a level of safety equivalent to that required by relevant chapters of the Code for Construction and equipment of Mobile offshore Drilling Units, 2009 (IMO Modu Code), and which are covered by the following DNVGL offshore standards:

- DNVGL offshore standards for structures, see [Table 1](#)
- DNVGL-OC-C301 *Stability and water integrity*
- DNVGL-OS-D101 *Marine and machinery systems and equipment*.

2.2 Project design brief

Prior to starting up the approval process, the customer shall submit DNVGL for acceptance a Project Design Brief for the various disciplines described in [1.1.2], which readily describe the design and operations philosophies/limitations. Any use of alternative design standards and/or risk mitigations shall be described and justified in order to ascertain that the design will be carried out within an overall safety standard equivalent with the intention of the Rules. The design assumptions and approved conditions will be included in the appendix to classification certificate.

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 types of fish farming installations and its services covers the following aspects:

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

4.1.2 Excluded from the scope are:

- environmental events defined by an annual probability lower than 10^{-2}
- ice loads unless specifically specified
- earthquakes and other exceptional environmental events
- soil conditions, except for anchors as described by [DNVGL-OS-E301 Ch.2 Sec.4](#).

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

	<i>WSD</i>	<i>LRFD</i>
Ship-shaped type ¹⁾	DNVGL-OS-C102	DNVGL-OS-C102 Sec.13
Column-stabilized type	DNVGL-OS-C201	DNVGL-OS-C103
Self-elevating type	DNVGL-OS-C201	DNVGL-OS-C104
Cylindrical type		DNVGL-OS-C101
Deep draught type		DNVGL-OS-C101 DNVGL-OS-C106
¹⁾ Ship-shaped fish farming installations of barge type intended to be permanently moored in sheltered waters shall as a minimum comply with the principles for hull design given in rules for ships DNVGL-RU-SHIP Pt.5 Ch.11 Non self-propelled units		

5 Fabrication and testing of offshore structures

5.1 Technical requirements

5.1.1 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.

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

5.1.2 Ship-shaped units that are following the normal classification cycle, the requirements for fabrication and testing of the hull may be taken in accordance with the [DNVGL-RU-SHIP Pt.2 Ch.4](#), with the exemption of specific structural elements not covered by these, which application is subject to a case-by-case approval.

5.2 Supplementary classification requirements

5.2.1 Classification procedures specifically related to fabrication and testing of offshore structures are given in [DNVGL-OS-C401 Ch.3](#).

5.2.2 Basis principles for the involvement of class during new building are given in [DNVGL-RU-OU-0101 Ch.1 Sec.4 \[1.5\]](#) to [DNVGL-RU-OU-0101 Ch.1 Sec.4 \[1.7\]](#).

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](#).

Guidance note:

Due care should be taken to ensure that the inclination of the installation in intact and damage condition prevents escape of the fish.

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

6.1.2 The flooding assumptions in damage condition, as described by [DNVGL-OS-C301](#) may not be directly transferable to some fish farming objects and will have to be especially considered and agreed with DNV GL.

6.1.3

If onboard computers for stability calculations are installed, these systems shall be approved in accordance with requirements in [DNVGL-RU-SHIP Pt.6 Ch.4 Sec.7](#).

7 Position keeping

7.1 General

For floating offshore installations of ship-shaped, column-stabilised, cylindrical and deep draught types being moored, the additional class notation **POSMOOR** is mandatory.

Other types of position keeping systems, e.g. yoke, hawsers, etc. are subject to special consideration.

7.2 Supplementary classification requirements

7.2.1 Classification procedures specifically related to mooring are given in [DNVGL-OS-E301 Ch.3](#).

7.2.2 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 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](#).

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

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

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 relevant for supplying marine systems related to ballasting, bilge, fire fighting, mooring and emergency services.

9.1.2 The electrical systems shall be designed, manufactured, tested and installed in accordance with [DNVGL-RU-SHIP Pt.4 Ch.9](#).

10 Control and monitoring systems

10.1 Technical requirements

Control and monitoring 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-RU-SHIP Pt.4 Ch.9](#).

11 Fire protection

11.1 Technical requirements

Fire protection include:

- passive fire protection
- active fire protection
- fire fighting systems

and shall be designed, manufactured, tested and installed in accordance with [DNVGL-RU-SHIP Pt.4 Ch.11](#) for cargo ships in the absence of specific fire safety requirements from the flag administration/national authority.

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 offshore fish farming installations are summarised in [Table 2](#).

Table 2 Technical reference standards for main character of class

<i>Technical item</i>	<i>Reference standard</i>	<i>Applicable parts or comments</i>
SAFETY PRINCIPLES AND ARRANGEMENT		
Design principles	DNVGL-OS-A101	Ch.2 Sec.1 <i>Design principles and accidental loads</i>
Arrangement		Ch.2 Sec.2 <i>Arrangement</i>
Escape and communication		Ch.2 Sec.5 <i>Escape and communication</i>
MATERIALS		
Metallic materials	DNVGL-OS-B101	
STRUCTURAL DESIGN (select type as appropriate)		
Ship-shape structure	DNVGL-OS-C102	LRFD and WSD methodology
Column-stabilised type structure	DNVGL-OS-C103	LRFD methodology
	DNVGL-OS-C201	WSD methodology
Cylindrical units	DNVGL-OS-C101	LRFD methodology
	DNVGL-OS-C201	WSD methodology
Deep Draught units	DNVGL-OS-C101	LRFD methodology
	DNVGL-OS-C201	WSD methodology
HULL FABRICATION		
Fabrication, including welding and NDT	DNVGL-OS-C401 DNVGL-RU-SHIP Pt.2 Ch.4	Cover all types of floating installations For ship-shaped units

<i>Technical item</i>	<i>Reference standard</i>	<i>Applicable parts or comments</i>
STABILITY AND WATERTIGHT INTEGRITY		
Stability, watertight integrity, freeboard and weathertight closing appliances	DNVGL-OS-C301	Cover all types of floating installations
MOORING AND TOWING		
Offshore mooring system	DNVGL-OS-E301 or API RP 2SK	Cover all types of moored installations
MARINE AND MACHINERY SYSTEMS AND EQUIPMENT		
Piping design, manufacturing and testing; platform piping systems; machinery piping systems; machinery and mechanical equipment	DNVGL-OS-D101	All relevant sections
<i>Technical item</i>		
<i>Reference standard</i>		
<i>Applicable parts or comments</i>		
ELECTRICAL SYSTEM EQUIPMENT		
Electrical systems including switchgear and controlgear assemblies, rotating machinery, static convertors, cables, installation and testing,	DNVGL-RU-SHIP Pt.4 Ch.8	All relevant sections
INSTRUMENTATION AND TELECOMMUNICATION SYSTEMS		
Instrumentation systems including design principles, system design, computer based systems, component design and installation, and user interface	DNVGL-RU-SHIP Pt.4 Ch.9	All relevant sections
FIRE PROTECTION		
Fire protection including passive fire protection, active fire protection, fire fighting systems, fire and gas detection systems	DNVGL-RU-SHIP Pt.4 Ch.11	All relevant sections

SECTION 3 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 or installations 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 classification 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 summarised in [Sec.3 \[17\]](#).

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 is mandatory for permanently moored units or installations, see [Ch.2 Sec.1 \[4.3.1\]](#) and [Ch.2 Sec.1 \[4.3.2\]](#). Otherwise the notation is optional and 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 notations aim to cover the reliability of the mooring system and equipment, for the purpose of ensuring safe position mooring.

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

<i>Class notation</i>	<i>Description</i>	<i>Qualifier</i>	<i>Description</i>
POSMOOR	Position mooring system	<none>	Passive position mooring system according the technical requirements of DNVGL-OS-E301 Ch.2
		A	Mooring system designed according to API 2SK
		V	Mooring system designed for positioning in vicinity of other structures
		TA	Thruster assisted mooring system dependent on manual remote thrust control system
		ATA	Thruster assisted mooring system dependent on automatic remote thrust control system
		R	Remaining thruster capacity after loss of most significant redundancy group

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 respectively **(TAR)** and **ATAR**).

2.3 Technical requirements

2.3.1 The technical requirements of [DNVGL-OS-E301 Ch.3 Sec.1](#) shall be complied with for assignment of the **POSMOOR** notations.

2.3.2 The technical requirements of API 2SK shall be complied for the qualifier **(A)**.

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

<i>Class notation</i>	<i>Description</i>	<i>Qualifier</i>	<i>Description</i>
DPS	Dynamic positioning system	A	Annual survey required
		0	Without redundancy
		1	With an independent joystick back-up and a position reference back-up
		2	With redundancy in technical design and with an independent joystick back-up
		3	With redundancy in technical design and with an independent joystick back-up, plus a back-up DP-control system in an emergency DP-control centre, designed with physical separation for components that provide redundancy
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, plus a back-up DP-control system in an emergency DP-control centre, designed with physical separation for components that provide redundancy
		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**-eries 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 units' or installations' operations or other characteristics.

3.2 Technical requirements

3.2.1 Technical requirements for the dynamic positioning notations shall be in accordance with the [DNVGL-RU-SHIP Pt.6 Ch.3 Sec.1](#).

3.2.2 Technical requirements for **DYNPOS-ER** are given in [DNVGL-RU-SHIP Pt.6 Ch.3 Sec.2](#).

3.2.3 For **DPS** notations granted through class entries, see [DNVGL-RU-SHIP Pt.6 Ch.3 Sec.1](#).

3.3 Certification of materials and components

The certification of equipment shall be in accordance with [DNVGL-RU-SHIP Pt.6 Ch.3 Sec.1](#).

4 Helicopter decks

4.1 General

4.1.1 Units or installations 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 4](#).

4.1.2 Objective

The objective of the **HELDK** notation is to ensure the safety and reliability of the helicopter deck structure and safety of the unit/installation in relation with helicopter operations and hangar facilities.

4.1.3 Scope

The scope of the notations is dependent on the qualifiers as listed in [Table 3](#).

Table 3 HELDK class notation

<i>Class notation</i>	<i>Description</i>	<i>Qualifier</i>	<i>Description</i>
HELDK	Helicopter deck	<none>	Structure
		S	Additional requirements to the safety of the unit or installation
		H	Additional requirements to helicopter safety
		F	Additional requirements to helicopter facilities

4.1.4 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)**.

4.2 Technical requirements

Technical requirements for **HELDK** shall comply with [DNVGL-OS-E401 Ch.2](#) and [DNVGL-RU-SHIP Pt.6 Ch.5](#) as listed below:

- [DNVGL-OS-E401 Ch.2 Sec.1](#) to [DNVGL-OS-E401 Ch.2 Sec.4](#) for notation **HELDK**
- [DNVGL-RU-SHIP Pt.6 Ch.5 \[5\]](#) for additional requirements for qualifier **(S)**

- DNVGL-RU-SHIP Pt.6 Ch.5 [6] for additional requirements for qualifier **(H)**
- DNVGL-RU-SHIP Pt.6 Ch.5 [7] for additional requirements for qualifier **(F)**.

4.3 Certification of materials and components

The certification requirements are described in [DNVGL-OS-E401](#) and [DNVGL-RU-SHIP Pt.6 Ch.5](#).

5 Crane installations

5.1 General

5.1.1 Objective

The additional optional class notation **Crane-offshore** sets requirements for a design standard for on-board permanently installed cranes.

5.1.2 Scope

The scope for additional class notation **Crane-offshore** provides requirements for cranes with respect to: safety and functionality, devices for locking the crane in a parked position and for supporting the crane structure.

Two terms are used in this section to describe the intended use of the crane, these are offshore crane for cargo handling outside the unit or installation while at sea and platform crane for cargo handling on the unit or installation.

5.1.3 Application

The additional class notation **Crane-offshore** applies to the selected cranes installed on units or installations.

Reference is given to the applicable structural standard (i.e. [DNVGL-OS-C101](#) to [DNVGL-OS-C201](#)) concerning supporting structure (e.g. pedestal), and [DNVGL-OS-C301](#) concerning stability.

A unit or installation found to be in compliance with the requirements in this section may be assigned the additional class notation **Crane-offshore**.

5.1.4 Definitions

Table 4 Definitions and abbreviation

<i>Term</i>	<i>Definition or abbreviation</i>
offshore crane	a lifting appliance on board a unit or installation intended for handling of loads outside the vessel while at open sea
platform crane	a lifting appliance on board a unit or installation intended for handling loads within and outside the unit or installation while in harbour and within the unit or installation while at sea

5.2 Technical requirements

5.2.1 Design loads

In addition to the specific design loads given in [DNVGL-ST-0378](#) *Standard for certification of offshore and platform lifting appliances*, loads due to unit/installation motions shall be considered. Design values of linear and angular accelerations are given in [DNVGL-OS-C101](#).

5.2.2 Parking and overturning

Devices shall be provided for all cranes in parked position (at sea) to be anchored to the hull structure. The anchoring devices shall be designed to withstand inertia forces due to ship motions and loads due to «out of service» winds. The strength calculations shall be based on accepted principles of statics and strength of materials, applying the safety factors as stipulated for load case III in the [DNVGL-ST-0378](#).

5.2.3 Sliding

In parked position (for a unit at sea) sliding is preferably to be prevented by means of anchoring devices. See [\[3.1\]](#). If sliding is intended to be prevented by friction between rail and wheels only, the coefficient of friction shall not be taken greater than 0.15.

5.2.4 For a crane in operation, sliding shall not to take place unless the forces parallel to rails exceed 1.3 times the values for load case II in the [DNVGL-ST-0378](#). When this is not satisfied, sliding shall be prevented by a device locking the crane in position. The strength of this device shall be based on the safety factors for load case II/load combination II, as referred above.

5.3 Certification

For cranes that class notation **Crane-offshore** shall be applied to, the builder shall request the manufacturers to order certification as described in [Table 5](#).

Table 5 Certification requirements

<i>Object</i>	<i>Certificate Type</i>	<i>Issued by</i>	<i>Certification standard</i>	<i>Additional Description</i>
offshore crane	PC	Society	DNVGL-ST-0378	Product certificate after installation and testing onboard , see DNVGL-ST-0378
platform crane	PC	Society	DNVGL-ST-0378	Product certificate after installation and testing onboard , see DNVGL-ST-0378
PC - product certificate				

5.4 Testing

After completed installation onboard, functional testing and load testing of the crane shall be carried out as specified in the [DNVGL-ST-0378](#).

6 Offshore gangways

6.1 General

6.1.1 Units equipped with offshore gangways may be assigned class notation **Walk2work**.

6.1.2 Objective

The **Walk2work** clarifies that the gangway has been certified against [DNVGL-ST-0358](#) and that the unit or installation is fit for walk-to-work operations using the gangway.

6.1.3 Scope

The scope of the notation covers the gangway's safety and functionality, devices for locking the gangway in a parked position (at sea) and for supporting the gangway structure and testing of the gangway. In addition the notation covers the unit's or installation's stability and station keeping capabilities.

6.2 Technical requirements

The technical requirements of [DNVGL-RU-SHIP Pt.6 Ch.5 Sec.16](#) apply, taking into account main class stability requirements as defined in [DNVGL-OS-C301](#).

6.3 Certification of materials and components

The offshore gangway shall have a product certificate issues by the Society against [DNVGL-ST-0358](#).

7 Additional fire protection

7.1 General

7.1.1 Units or installations 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 6](#).

Table 6 Class notations for additional fire protection

<i>Class notation</i>	<i>Description</i>	<i>Qualifier</i>	<i>Description</i>
F	Additional fire protection	A	Accommodation space
		M	Machinery space

7.1.2 Objective

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

7.1.3 Scope

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

7.1.4 Application

The qualifiers can be applied individual or in combination.

7.2 Technical requirements

The requirements as stated in the [DNVGL-RU-SHIP Pt.6 Ch.5 Sec.4](#) shall be complied with for assignment of the class notations.

7.3 Certification of materials and components

There are no additional certification requirements.

8 Loading computer

8.1 General

8.1.1 Units or installations having a loading computer system to assist the master as a decision aid under damage and consequent flooding, may be given the class notation **LCS-DC**.

The letters LCS-DC are denoting Loading Computer System-Damage Control.

8.1.2 Objective

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

8.1.3 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 unit's or installation's 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.

8.2 Technical requirements

The requirements of the [DNVGL-RU-SHIP Pt.6 Ch.4 Sec.7](#) shall be complied with as applicable.

8.3 Certification of materials and components

The certification covers the loading computer system and the software installed.

9 Periodically unattended machinery space

9.1 General

9.1.1 Units or installations 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**.

9.1.2 Objective

The class notation **E0** denotes that the safety of the unit 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 unit or installation is equipped with instrumentation and automation equipment and systems enabling the continuous supervision of its machinery from a centralised control station.

9.1.3 Scope

The scope of the notation covers:

- engine control system
- alarm system
- safety system

— fire detection and alarm system.

9.2 Technical requirements

9.2.1 Assignment of class notations **E0** and **ECO** is based on compliance with the [DNVGL-RU-SHIP Pt.6 Ch.2 Sec.2](#), with qualifications given in [\[13.2.2\]](#).

9.2.2 References to the [DNVGL-RU-SHIP Pt.4 Ch.11](#) (fire protection) shall be replaced with [DNVGL-OS-D301](#) for unit application.

9.3 Certification of materials and components

Certification requirements are given in the [DNVGL-RU-SHIP](#).

10 Hull monitoring system

10.1 General

10.1.1 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 [DNVGL-RU-SHIP Pt.6 Ch.9 Sec.4](#).

10.1.2 Objective

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

10.1.3 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.

10.1.4 Application

See [DNVGL-RU-SHIP Pt.6 Ch.9 Sec.4](#) for qualifier definitions.

10.2 Technical requirements

Assignment of **HMON** class notations is based on compliance with the [DNVGL-RU-SHIP Pt.6 Ch.9 Sec.4](#).

11 Fatigue methodology for ship-shaped units or installations

11.1 General

11.1.1 Ship-shaped units or installations may be assigned class notation **FMS**.

11.1.2 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.

11.1.3 **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.

11.1.4 The **FMS** notation covers design, fabrication and operation of the unit or installation. 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.

11.2 Technical requirements

Assignment of class notation **FMS** is based on compliance with requirements in [DNVGL-RP-C206](#).

12 Noise, vibration and comfort rating notations

12.1 General

12.1.1 Units or installations 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 7 Class notations related to noise and vibration

<i>Class notation</i>	<i>Description</i>	<i>Qualifier</i>	<i>Description</i>
COMF-MOU	requirements for noise, vibration, illumination and indoor climate on board offshore facilities	1	Highest level of comfort
		2	Intermediate level of comfort
		3	Acceptable level of comfort
VIBR	Vibration level criteria for machinery, components, equipment and structure	<none>	

12.1.2 Objective

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

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

12.1.4 Scope

The scope of **COMF-MOU** covers noise, vibration, illumination and indoor climate as reflected by the qualifiers listed in [Table 7](#).

12.1.5 The scope of **VIBR** covers

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

12.1.6 Application

Units or installations arranged and equipped with the aim to reduce the impact of noise and vibration, illumination and indoor climate related to comfort on board may be assigned for the additional class notations as listed in [Table 7](#).

12.2 Technical requirements

12.2.1 The requirements of [DNVGL-OS-A301](#) shall be complied with as applicable for the notation **COMF-MOU**.

12.2.2 The requirements of the [DNVGL-RU-SHIP Pt.6 Ch.4 Sec.12](#) shall be complied with as applicable for the notation **VIBR**.

12.3 Certification requirements

The measurement equipment used for demonstrating the compliance with the limits of **COMF-MOU** shall be certified or type approved as detailed in [DNVGL-OS-A301 Ch.3 Sec.3](#).

13 Environmental notations

13.1 General

[Table 8](#) provides an overview of the environmental related notations.

Table 8 Class notations related to environment

<i>Class notation</i>	<i>Description</i>	<i>Qualifier</i>	<i>Description</i>
BWM	Ballast water management	E	Ballast water management system based on Exchange
		T	Ballast water management system on Treatment
Clean	Arrangements for controlling and limiting operational emissions and discharges	<none>	Basic operational requirements
		Design	Additional operational requirements. Design requirements for protection against accidents and for limiting their consequences.
Recyclable	Safe and environmentally sound recycling of units or installations		Covering the development of Inventory of Hazardous Materials Part 1

13.2 Objective

13.2.1 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.

13.2.2 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.

13.2.3 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.

13.3 Technical requirements

13.3.1 BWM

The requirements given in the [DNVGL-RU-SHIP Pt.6 Ch.7 Sec.1](#) shall be complied with for assignment of the class notation **BWM** following the different qualifiers as specified.

13.3.2 Clean Design

The requirements given in the [DNVGL-RU-SHIP Pt.6 Ch.7 Sec.2](#) shall be complied with for assignment of the class notations with the deviations as given in [\[19.3.4\]](#).

13.3.3 For the application of **Clean(Design)** for offshore fish farming units and installations, 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 these units or installations (i.e. if 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.

13.3.4 Recyclable

The requirements given in the [DNVGL-RU-SHIP Pt.6 Ch.7 Sec.4](#) shall be complied with for assignment of the class notation **Recyclable**.

14 Integrated software dependent systems

14.1 General

14.1.1 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 9](#).

Table 9 ISDS Class notations

<i>Notation</i>	<i>Description</i>
ISDS [system1,...,system n]	Units having undergone enhanced software-dependent system integration for the system(s) according to DNVGL-OS-D203

14.1.2 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.

14.1.3 Scope

The systems covered by the notation shall 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.

14.1.4 Application

Any combination of selected systems can be made.

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

14.1.6 Unless otherwise agreed the confidence levels of [DNVGL-OS-D203 Ch.3 Sec.1 Table 1](#) apply.

14.2 Technical requirements

There are no additional technical product requirements.

14.3 Certification requirements

There are no additional certification requirements.

15 Special feature notations

15.1 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.

15.2 Propulsion

15.2.1 Objective

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

15.2.2 Scope

For **Non self-propelled** 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)**, **POS Moor**, as auxiliary installation, or not used at all).

15.2.3 Application

The **Non self-propelled** notation can be applied for any units defined under 1A , see [Ch.3 Sec.1](#).

15.3 Tailshaft monitoring

15.3.1 Objective

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

15.3.2 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.

15.3.3 Application

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

15.3.4 Technical requirements

The technical requirements from [DNVGL-RU-SHIP Pt.6 Ch.9 Sec.5](#) apply.

15.3.5 Certification requirements

There are no specific certification requirements.

15.4 Special feature notation **BIS**

15.4.1 Objective

The **BIS** notation indicates that the ship-shaped unit or installation is prepared for in-water survey.

15.4.2 Scope

The **BIS** notation covers:

- on board documentation
- marking of ship's side and bottom
- rudder, tailshaft and thrusters.

15.4.3 Application

Units or installations prepared for in-water survey during building may be given the notation **BIS**.

15.4.4 Technical requirements

The technical requirements in the [DNVGL-RU-SHIP Pt.6 Ch.9 Sec.1](#), shall be complied with.

15.4.5 Certification requirements

There are no additional certification requirements.

16 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 10](#).

Table 10 Summary of reference documents for system and special facility notations

<i>Notation</i>	<i>Description</i>
BWM	DNVGL-RU-SHIP Pt.6 Ch.7 Sec.1
Clean	DNVGL-RU-SHIP Pt.6 Ch.7 Sec.2
COMF-MOU	DNVGL-OS-A301
Crane-offshore	DNVGL-ST-0378
DYNPOS	DNVGL-RU-SHIP Pt.6 Ch.3 Sec.1
DYNPOS(ER)	DNVGL-RU-SHIP Pt.6 Ch.3 Sec.2
DPS	DNVGL-RU-SHIP Pt.6 Ch.3 Sec.1
E0/ECO	DNVGL-RU-SHIP Pt.6 Ch.2 Sec.2
F	DNVGL-RU-SHIP Pt.6 Ch.5 Sec.4
FMS	DNVGL-RP-C206
HELDK	DNVGL-OS-E401
HMON	DNVGL-RU-SHIP Pt.6 Ch.9 Sec.4

<i>Notation</i>	<i>Description</i>
ISDS	DNVGL-OS-D203
LCS(DC)	DNVGL-RU-SHIP Pt.6 Ch.4 Sec.7
POSMOOR	DNVGL-OS-E301
Recyclable	DNVGL-RU-SHIP Pt.6 Ch.7 Sec.4
TMON	DNVGL-RU-SHIP Pt.6 Ch.9 Sec.5
VIBR	DNVGL-RU-SHIP Pt.6 Ch.8 Sec.1

CHAPTER 4 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 fish farming units or installations shall be surveyed as described in rules for self-elevating units [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 by the owner in cooperation with the classification society in advance of the renewal survey.

1.2.2 Plans and procedures for underwater surveys (or underwater inspection in lieu of dry-docking survey) shall 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 necessary based on experience.

1.2.3 Annual and special surveys may be carried out on location based on approved procedures for accessing, outlined in a maintenance system and survey arrangement, without interrupting the function of the unit or installation.

See [DNVGL-RU-OU-0101 Ch.2 Sec.1 \[12\]](#) 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/installations shall be subjected to periodical surveys in accordance with requirements of this chapter confirming that the hull, machinery, equipment and systems remain in satisfactory condition and in compliance with approval according to accepted standards.

2.1.2 Periodical surveys will belong to one of the following categories for the various 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 for 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 mandatory additional class notations (e.g. **POSMOOR** and/or **DYNPOS/DPS**)
- 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 or 15 year interval.
- 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 year 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/compartments can not be credited towards both intermediate and renewal survey.
- Units that are re-commissioned after being laid-up will be specially considered.

2.4.5 Miscellaneous main class surveys.

Surveys related to miscellaneous main class surveys are:

- propeller shaft and connection
- geared and podded thrusters for propulsion or dynamic positioning
- boiler and steam drum/steam separator
- thermal oil heater
- towing and temporary mooring equipment.

Schedule and scope for these surveys are described in more detail in [Sec.4](#).

2.4.6 Statutory surveys.

If the installation is to carry flag, i.e. statutory requirements following MODU code and/or SOLAS apply. For survey requirements, schedule and scope, reference is made to latest version of MODU code and/or SOLAS.

2.5 Class notations

2.5.1 Optional class notations where specific surveys have been defined are listed in [Table 1](#).

Table 1 Surveys for optional class notations

<i>Class notation</i>	<i>Description</i>	<i>Survey type</i>	<i>Conjunction with main class survey</i>	<i>Survey requirements</i>
CLEAN	Arrangements for controlling and limiting operational emissions and discharges	Annual	Annual	Sec.6 [12]
Crane-offshore	Comprises offshore - and/or onboard cranes	Annual	N/A	Sec.6 [9]
		Complete (5 years)	N/A	
		Intermediate	Intermediate	
		Complete (5 years)	Renewal	
DPS	Dynamic positioning system	Annual	N/A	Sec.6 [3]
		Complete (5 years)	N/A	
		Complete (5 years)	Renewal	
DYNPOS	Dynamic positioning system	Annual	N/A	Sec.6 [3]
		Complete (5 years)	N/A	
E0	Periodically unattended machinery space	Annual	Annual	Sec.6 [10]
		Complete (5 years)	Renewal	
ECO	Machinery centralised operation	Annual	Annual	Sec.6 [10]
		Complete (5 years)	Renewal	
		Complete	Renewal	
F	Additional fire protection	Complete (2.5 years)	Intermediate and renewal	Sec.6 [8]
HELDK	Helicopter deck	Complete (5 years)	Renewal	Sec.6 [5]
HMON	Hull monitoring system	Annual	Renewal	Sec.6 [11]
ISDS	Integrated Software Dependent Systems	Annual	Annual	Sec.6 [15]
		Complete	Renewal	
LCS	Loading computer system	Annual	Annual	Sec.6 [9]

<i>Class notation</i>	<i>Description</i>	<i>Survey type</i>	<i>Conjunction with main class survey</i>	<i>Survey requirements</i>
POSMOOR	Position mooring system	Annual	N/A	Sec.6 [2]
		Complete (5 years)	N/A	
Recyclable	Inventory of Hazardous Materials Part 1	Complete (5 years)	Renewal	Sec.6 [14]
TMON	Tailshaft monitoring	Annual	Annual	Sec.6 [14]
VIBR	Vibration level limitation	Complete (5 years)	Renewal	Sec.6 [12]
RM	Refrigerating plant	Complete	Renewal	

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

<i>Class notation</i>	<i>Description</i>
BIS	Built for In-water Survey
COMF	Requirements for noise, vibration and indoor climate
FMS	Fatigue methodology for ship-shaped units

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 Structure 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.

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

2.1.3 All spaces shall be made safe for access, i.e. gas freed, ventilated and illuminated, and prepared for the surveyor to examine the structure in a safe and practical way. One or more of the following means for access, acceptable to the surveyor, shall be provided:

- permanent staging and passages through structures
- temporary staging and passages through structures
- lifts and moveable platforms
- hydraulic arm vehicles such as conventional cherry pickers
- boats or rafts
- portable ladder
- other equivalent means.

2.1.4 Rafts or boats alone may be allowed for survey of the under deck areas for tanks or spaces, if the depth of the webs is 1.5 m or less.

If the depth of the webs is more than 1.5 m, rafts or boats alone may be allowed only:

- a) when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage, or
- b) if a permanent means of access is provided in each bay to allow safe entry and exit.

This means:

- access directly from the deck via a vertical ladder and a small platform fitted approximately 2 m below the deck in each bay or
- access to deck from a longitudinal permanent platform having ladders to deck in each end of the tank. The platform shall, for the full length of the tank, be arranged in level with, or above, the maximum water level needed for rafting of under deck structure. For this purpose, the ullage corresponding to the maximum water level shall be assumed not more than 3 m from the deck plate measured at the midspan of deck transverses and in the middle length of the tank.

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:

Guidance note 1:

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

Guidance note 2:

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 shall be carried out by the surveyor, not using the remote inspection technique method.

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

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

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 responsible person for any approved service supplier (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 protection 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 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.

The minimum requirements for thickness measurements are presented in [Ch.3 Sec.3 \[4.3\] Table 8](#) through [Ch.3 Sec.3 \[4.3\] Table 10](#) for the respective unit types.

2.2.5 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 performed 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.

2.2.6 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.

Areas found with substantial corrosion, which are not repaired, shall be recorded for thickness measurements at subsequent annual surveys.

2.2.7 The examination may be extended also in cases when:

- information is available of defects suffered on similar structure or details in similar tanks/compartments on similar units
- the structure under survey has been approved with reduced scantlings due to an approved corrosion control system
- suspect areas identified shall be recorded for examination at subsequent annual surveys.

2.2.8 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.

2.2.9 In the design of column-stabilised, self-elevating, deep draught and cylindrical structures 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 or installations, corrosion addition is included as part of the DNV GL rules for ships, but in addition combined with a corrosion protection system similar for mobile offshore units.

The corrosion diminution criteria as given in [DNVGL-CG-0172](#) shall be applied. Alternative methods may be accepted in agreement with the society.

2.2.10 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 below.

Table 1 Conditions of protective coating

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. (See IACS UR Z87/MSC.1/Circ 1330) However, soft and semi hard coatings, if already applied, may be accepted as result of a condition based assessment including a review of the organizational set-up to maintain adequate corrosion protection.
Coating condition GOOD	Condition with only minor spot rusting.
Coating condition FAIR	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.
Coating condition POOR	Condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

2.2.11 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.

2.2.12 The above also applies to tanks of stainless steel. If not otherwise specified, the same applies for recoated structures (by epoxy coating or equivalent, alternatively a type approved coating, e.g. semi-hard), providing 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 following 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 it is referred to [DNVGL-RP-C301](#). 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.

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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 [DNVGL-RU-SHIP Pt.4 Ch.4 Sec.1 \[6.2\]](#).

Guidance note:

For installation and testing see [DNVGL-RU-SHIP Pt.4 Ch.4 Sec.1 \[3\]](#)

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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.

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** or **OI**) 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 Self-propelled** 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(AUTR)**, **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 below.

1.2 In-service inspection program

1.2.1 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.

Guidance note:

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 GL rules for ships.

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1.2.2 The default basic scope for development of IIP for MOU is given in [Table 1](#) through [Table 2](#). Depending on the level of the design documentation, the basic scope might be altered.

Guidance note:

The basis scope for self-elevating units is given in [DNVGL-RU-OU-0104 Ch.6](#).

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If the design documents the structural fatigue utilisation with considerable margins or if the unit has FMS notation (see [RU-OU-0102 Ch.2 Sec.6 \[15.1\]](#)), the basic requirements for NDT inspection can be modified/reduced compared to the basic scope.

When the unit is operating in other environmental conditions than considered in the design, the inspection scope might as well be modified/changed, accounting for the actual application of the unit.

The owner/operator has the responsibility to provide the necessary documentation for class approval, when modification of the basic in-service inspection program is requested.

Guidance note:

The standard in-service inspection program (IIP) is a generic based program based on gained experience and accumulated knowledge from years of MOUs (and ships) surveys.

This inspection plan - level 1 - development, is a simple version of RBI (risk based inspection – where risk = probability of failure × consequence of failure. This is denoted basic RBI. This way of preparing the inspection program is mainly used where the design and fabrication information is limited (e.g. class transfer).

The second level, qualitative RBI, is based on the above basic RBI with the addition of design and fabrication particulars for the specific vessel. This might be detailed fatigue results, ultimate strength utilization, coating system applied etc. which will be combined as basis for preparing the in-service inspection plan. This approach is applied for units built according to DNV GL Rules and standards where experience from construction yard and approval centre are applied in preparing the inspection plan.

The third level is to prepare the in-service inspection program using a quantitative, refined probabilistic approach where uncertainties wrt. different parameters affecting degradation; i.e. related to fatigue, coating, corrosion and wear and tear are analysed for determination of inspection intervals which secure the necessary safety level to be maintained.

The quantitative approach is performed as an advisory service as requested by owner/operator and the modified inspection plan is to be approved by class before being applied as the in-service inspection class plan.

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1.2.3 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 (defined as level 2 for the IIP).

1.2.4 The extent of examination specified in the referred tables may be refined by use of RBI methodologies (defined as level 3 for the IIP).

Guidance note:

At the 1st annual or intermediate survey after construction, column-stabilised 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-C210 Probabilistic methods for planning of inspection for fatigue cracks in offshore structures](#) and [DNVGL-RP-C302 Risk based corrosion management](#).

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1.2.5 Detailed locations for thickness gauging will be prepared based on the condition of the unit and following the applicable tables in [Sec.3 \[4\]](#). Measurements shall be recorded and stored in DNV GL's structure integrity management (SIM) tool.

Table 1 Basis scope for development of IIP for ship-shaped units

		Type of survey											
		AS				IS				RS			
		INT		EXT		INT		EXT		INT		EXT	
		V	NDT	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT
Special areas for inspection ¹⁾ (SP) – connections:													
SP1	Moonpool openings	C				A		A		A	A	A	A
SP2	Turret	A				A		A		A	A	A	A
Attachments of:													
SP5	Crane pedestals and top flange	A		A		A	X	A	X	A	A	A	A
SP6	Anchor windlasses	X		A		X		A		A		A	X
SP7	Anchor chain fairleads	C				B		C		A		A	C
SP8	Helideck support	X		X		X		C		A		A	C
SP9	Other attachment/support connections e.g. sponsons, life-boat support structure and fishing gear equipment	X		X		X		X		A		A	X
Primary areas for inspection (PR): ²⁾													
PR4	Deck structure and turret	X		X		X		X		A		A	
PR6	Crane/gangway pedestal	X		A		A		A		A		A	
PR7	Lifeboat platforms support			A				A				A	
PR8	Helideck support structure	X		X		X		A		A		A	
PR9	Other support structures	X		X		X		X		A		A	
<p>A = 100% ⁴⁾</p> <p>B = 50% ³⁾</p> <p>C = 25% ³⁾</p> <p>X = Spot check 2-5% ³⁾</p> <p>V = Visual inspection including close visual inspection of special areas.</p> <p>NDT = Non-destructive testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ECI) of selected stress concentrations and fatigue sensitive details.</p> <p>Notes:</p> <p>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]</p> <p>2) Primary areas for inspection (PR) are elements which are essential to the overall structural integrity of the unit.</p> <p>3) See listing in [4.3.2]</p> <p>4) - of the total number of these parts.</p> <p>5) The inspection extent might be reduced (be less than 100%) if based on design documentation, see [1.2.6].</p>													

Table 2 Basis scope for development of IIP for column-stabilised units

		Type of survey											
		AS				IS				RS			
		INT		EXT		INT		EXT		INT		EXT	
		V	NDT	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT
Special areas for inspection ¹⁾ (SP) – Connections;													
SP1	Horizontal bracing	A				A			A ⁷⁾	A	A	A	A
	Pontoon to pontoon	A				A				A	A	A	A
SP2	Vertical diagonal bracing	B				A				A	A	A	A
SP3	Columns to pontoon	X				C				A	X	A	C ³⁾
	Column to deck	X				C				A	X	A	C ³⁾
SP4	Main barge girder/bulkhead.	X		X		X		X		A		A	X ⁸⁾
Attachments of:													
SP5	Crane pedestals and top flange	A		A		A	X	A	X	A	A	A	A
SP6	Anchor windlasses	X		A		X		A		A		A	C ⁴⁾
SP7	Anchor chain fairleads and anchor bolsters	C		X		B		C		A		A	C ⁴⁾
SP8	Helideck support	X		X		X		C		A		A	X
SP9	Other attachment/support connections, e.g. life boat support structures and fishing gear equipment	X		X		X		X		A		A	X
Primary areas for inspection (PR); ²⁾													
PR1	Horizontal bracings	A				A				A		A	
PR2	Vertical diagonal bracings	C				C				A		A	
PR3	Column and pontoon shell	X				C				A		A	
PR4	Upper hull girders/bulkheads	X		X		X		X		A		A	
PR6	Crane/gangway pedestal	X		A		A		A		A		A	
PR7	Lifeboat platforms support			A				A				A	
PR8	Helideck support structure	X		X		X		A		A		A	
PR9	Other support structures	X		X		X		X		A		A	

	Type of survey											
	AS				IS				RS			
	INT		EXT		INT		EXT		INT		EXT	
	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT
<p>A = 100% ⁶⁾ B = 50% ⁵⁾ C = 25% ⁵⁾ X = Spot check 2-5% 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</p> <p>Notes:</p> <ol style="list-style-type: none"> 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 bulkheads 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]. 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

	Type of survey												
	AS (see IACS z15 3.3.5)				IS				RS				
	INT		EXT		INT		EXT		INT		EXT		
	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT	
<i>Special areas for inspection</i> ¹⁾ (SP) – connections:													
SP1	Leg to spudcan ⁶⁾												
					X ⁹⁾			X		A	A	A	A
SP2	Leg nodes and splices below the waterline ⁶⁾												
			X					A				A	X ³⁾
SP3	Leg nodes and splices above the waterline												
			X					A				A	X ³⁾
SP3	Connections of primary members in jack house												
			A					A	X			A	A
SP4	Leg guides (IACS Z15 3.3.6)												
			X					A				A	
SP4	Main barge girder/bulkhead connections												
	X		X		X		X		A		A		X

		Type of survey											
		AS (see IACS z15 3.3.5)				IS				RS			
		INT		EXT		INT		EXT		INT		EXT	
		V	NDT	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT
	Plating in way of leg well (IACS Z15 3.3.6)							A				A	
<i>Attachments of:</i>													
SP5	Crane/gangway pedestals and top flange	A		A		A	X	A	X	A	A	A	A
SP7	Windlass and anchor chain/wire fairleads	C				B		C		A		A	C ⁸⁾
SP8	Helideck support	X		X		X		C		A	X	A	C
SP9	Other attachment/support connections, e.g. life boat support structures and fishing gear equipment.	X		X		X		X		A	X	A	X
<i>Primary areas for inspection (PR):²⁾</i>													
PR1	Spudcans ⁶⁾							A		A		A	
PR2	Legs below the waterline ⁶⁾			X				A		A ⁷⁾		A	
	Legs above the waterline			X				A		A ⁷⁾		A	
PR3	Jack houses			A				A				A	
PR4	Main barge (deck structure) girders/bulkheads	X				X				A		A	
PR6	Crane/gangway pedestal	X		A		A		A		A		A	
PR7	Lifeboat platform structure			A				A				A	
PR8	Helideck support structure	X		X		X		A		A		A	
PR9	Other support structures	X		X		X		X		A		A	

	Type of survey											
	AS (see IACS z15 3.3.5)				IS				RS			
	INT		EXT		INT		EXT		INT		EXT	
	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT	V	NDT
<p>A = 100% ⁵⁾</p> <p>B = 50% ⁴⁾</p> <p>C = 25% ⁴⁾</p> <p>X = Spot check 2-5% ⁴⁾</p> <p>V = Visual inspection including close visual inspection of special areas.</p> <p>NDT = Non-destructive testing, normally magnetic particle inspection (MPI) and/or eddy current (ET) of selected stress concentrations and fatigue sensitive details.</p> <p>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 Sec.4 [3.2.1].</p> <p>2) Primary areas for inspection (PR) are elements which are essential to the overall structural integrity of the unit. See listing in Sec.4 [3.2.1].</p> <p>3) At levels which have been in way of lower guided in operation, upper guides in transit and in way of spudcans.</p> <p>4) - of the total number of these parts.</p> <p>5) The inspection extent might be reduced (be less than 100%) if based on design documentation, see Sec.4 [3.2.1].</p> <p>6) See DNVGL-RU-OU-0104 Ch.6 Sec.5 [3], spudcan and leg survey.</p> <p>7) For plate type legs, square or circular; examine also the pin holes IACS Z15 2.3.3).</p> <p>8) May be waived if unit permanently operating on the field.</p> <p>9) Governing for units after second renewal. See DNVGL-RU-OU-0104 Ch.6 Sec.5 [3.3]</p>												

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 [DNVGL-RU-OU-0101 Ch.1 Sec.1 \[2.2\]](#).

The survey for the temporary equipment shall only confirm class involvement as specified in [DNVGL-RU-OU-0101 Ch.1 Sec.5 \[2.7\]](#).

Guidance note:

The structural survey extent should follow the unit specific IIP as described in [\[1\]](#).

Survey requirements on towing and temporary mooring systems are covered by the separate survey scheme as described in [Sec.4 \[8\]](#). Survey requirements on position mooring equipment and systems are covered by the **POSMOOR** notation as described in [Sec.6 \[2\]](#).

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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, deep draught and cylindrical units or installations 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) shall 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 shall be examined.

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 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, windows including deadlights, freeing ports, shutters, windows including deadlights, etc., as well as an external inspection of scupper valves and sanitary valves.

The closing devices for all air intakes and openings into accommodation spaces, service spaces, machinery spaces, control stations and approved openings in superstructures and deckhouses shall be examined.

(See IACS Z15 3.3.3)

2.2.6 External and internal weather and watertight doors, hatches and dampers shall be examined and function tested. Tightness test to be carried out if found necessary.

2.2.7 Sea water inlets and discharges shall be examined from the internal side of the unit.

2.2.8 Remote control system for valves in bilge including emergency, ballast and cooling water systems shall be surveyed and tested.

2.2.9 It shall be checked as far as practically possible that draught marks are legible. Functionality and proper working of draught measurement gauges shall be confirmed.

2.2.10 Manual and automatic fire doors and dampers shall be examined and function tested.

2.2.11 Ventilation ducts and operation of ventilation including emergency stop for engine and boiler rooms to be verified.

2.2.12 Emergency escape breathing device (EEBD) shall be verified in order.

2.2.13 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 DNVGL, the requirements in [2.2.8] and [2.2.13] 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---

2.2.14 The appendix to the classification certificate and the documents referred to therein, shall be verified and kept available onboard the unit.

2.2.15 It shall be confirmed that the unit is operating within its approved design envelope as included in the appendix to classification certificate.

2.2.16 Where the unit has an impressed current cathodic protection system, the annual overview readings from the system shall be examined.

2.2.17 Condition of protective coating shall be reported on according [Sec.2 \[2.2.8\]](#). 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.

2.2.18 Suspect areas (substantial corrosion previously defined) or areas where substantial corrosion is found at the survey being carried out, shall have thickness measurements extended following [Table 4](#) as guidance.

Table 4 Thickness measurements, extent and pattern in way of areas with substantial corrosion

<i>Area/structural member</i>	<i>Extent of measurement</i>	<i>Pattern of measurement</i>
Plating	Suspect area and adjacent plates	5 points over 1 m ²
Stiffeners	Suspect area	3 points in line across web 3 points in line across flange
See IACS UR Z7 Table 2		

Guidance note:

See [Sec.2 \[2.2\]](#) for the extend of thickness measurements.

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

2.2.19 Means of escape

Means of escape from working and accommodation spaces to muster location, helideck and lifeboat embarkation deck shall be verified in order.

2.2.20 For units with bow or stern loading arrangement emergency escape routes from the associated control station shall be verified in order.

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 rules for self-elevating units, [DNVGL-RU-OU-0104 Ch.6](#).

2.3.6 Additional requirements for units of other shape

The requirements for ship-shaped units shall 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 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 220°C
- 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 shall be proved satisfactory (quickclosing valves).

(See 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 Survey of boilers (oil/gas fired, exhaust heated, composite, electric heated and steam generators) shall be carried out according to [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.2](#).

These requirements are also applicable to steam/thermal oil heated steam generators.

2.4.7 The bilge and ballasting system and related subsystems, such as remote operation of pumps, valves and tank level indication 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 should be disabled. The test is applicable for all **EO/ECO** units (built at any time) and all units constructed on or after 1 July 1998, where electricity is necessary for propulsion and steering.

For DP3 units 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.

- 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
- verify that the document schedule of batteries is kept up to date.

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2.4.11 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 and shutdown functions
- remote back-up means of operation
- manual override
- 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](#).

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2.4.12 Additional requirements ship-shaped units

No additional requirements.

2.4.13 Additional requirements for column-stabilised units

No additional requirements.

2.4.14 Additional requirements for self-elevating units

A total overview of all relevant requirements is given in [DNVGL-RU-OU-0104 Ch.6 Sec.4](#).

2.4.15 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 fish farming 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. (See IACS Z15 4.1.3)

3.2 Structure and equipment

3.2.1 All units

Particular attention shall be given to corrosion prevention systems in ballast spaces, free flooding areas and other locations subjected to sea water from both sides.

3.2.2 Suspect areas identified shall be recorded for examination at subsequent annual surveys. Areas found with substantial corrosion, which are not repaired, shall also be recorded for thickness measurements at subsequent annual surveys.

3.2.3 For units over 5 years of age, the unit ballast tanks as specified in [3.2.5] to [3.2.7] respectively shall 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.

(See IACS Z15 4.3)

3.2.4 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.

3.2.5 Additional requirements for ship-shaped units

The specific areas as mentioned in [3.2.3], 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)

3.2.6 Additional requirements for column-stabilised units

The specific areas as mentioned in [3.2.3] are representative ballast tanks in footings, lower hull, or free-flooding compartments as accessible, and at least two ballast tanks in columns or pontoons.

(See IACS Z15 4.3.4)

3.2.7 Additional requirements for self-elevating units

A complete overview is given in DNVGL-RU-OU-0104 Ch.6 Sec.4.

3.2.8 Additional requirements for units of other shape

Requirements for ship-shaped units shall 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.

Guidance note:

Survey requirements on towing and temporary mooring systems are covered by the separate survey scheme as described in [Sec.4 \[8\]](#). Survey requirements on position mooring equipment and systems are covered by the voluntary notation **POSMOOR** as described in [Sec.6](#).

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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 and installations.
- [DNVGL-OS-C103 App.A](#) for column-stabilised units or installations
- [DNVGL-OS-C104 App.A](#) for self-elevating units or installations.
- [DNVGL-OS-C106 App.A](#) for deep draught and cylindrical units or installations.

4.2 All units or installations

4.2.1 An annual survey (see [\[2\]](#)), shall be carried out as part of the renewal survey.

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 [\[4.3\]](#), [\[4.3\]](#) and [\[4.5\]](#) for respectively ship-shaped and column stabilized units.

Additional thickness measurements may be required where wastage is evident or suspect as evaluated during surveys.

4.2.3 Air pipe heads on exposed decks shall be externally and internally examined following the guidance note below. According to the results of the examination, the surveyor may require examination of other air pipe heads.

Guidance note:

<i>Vessel type</i>	<i>1st renewal survey</i>	<i>2nd renewal survey</i>	<i>3rd renewal survey</i>
Ship-shaped	Preferably serving ballast tanks as follows: <ul style="list-style-type: none"> – one port and one starboard, forward – one port and one starboard, serving spaces aft. 	<ul style="list-style-type: none"> – all within 0.25 L from the forward end – at least 20% of those serving spaces aft, preferably serving ballast tanks 	all air pipe heads. Exemption may be considered for air pipe heads where there is substantiated evidence of replacement within the previous five years.
All other units	Four randomly chosen, preferably serving ballast tanks	25% of all the air pipes randomly chosen	

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4.2.4 All tanks and compartments and free-flooding spaces throughout the unit shall be examined externally and internally for excess wastage or damage.

The survey shall include all structures, piping systems outside machinery area , i.e. plating and framing, valves, coupling, anodes, equipment for level indication, bilges and drain wells, sounding, venting, pumping and drainage arrangements.

Suspect and/or critical structural areas should be examined and may be required to be tested for tightness, non-destructive tested or thickness gauged.

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 5](#).

Independent tanks in machinery spaces shall be externally examined including the tank supporting structures.

Table 5 Minimum requirements for internal examination of service tanks ^{1) 2) 3)}

Tank	Age of unit, years			
	0 to 5	5 to 10	10 to 15	above 15
Fuel oil/diesel oil				
— engine room/machinery space	— None	— None	— One	— One
— area outside engine room/machinery space	None	One	Two ⁴⁾	Half, minimum two ⁴⁾
Lube oil	None	None	None	One
Fresh water ⁵⁾	None	One	All	All
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 shall 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 (grey water) and sewage (black water) shall be subject to internal examination as given in [4.2.5]. (See IACS UR Z7)				

4.2.8 The watertight integrity of internal tanks, bulkheads, decks and other compartments shall be verified by visual inspection.

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 Pressure vessels, compartments and/or critical structural areas may be required pressure tested for tightness if found necessary due to actual suspect status condition as evaluated at survey.

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 can be performed as given in the guidance note below.

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 tank top is carried out.

Independent tanks in machinery spaces shall be tested as deemed necessary.

Guidance note:

<i>Tanks ¹⁾ to be tested</i>	<i>Test head or pressure</i>	<i>Remark</i>
Ballast tanks	Top of air pipe	
Cargo holds adapted for carriage of ballast	Near the top of cargo hold hatch coaming	³⁾
Bilge water holding tanks	Top of air pipe	²⁾ alternatively as for fuel oil tanks
Fuel oil tanks	Head of liquid to the highest point that liquid will rise under service conditions	^{2), 3)}
Lub. oil tanks	Head of liquid to the highest point that liquid will rise under service conditions	²⁾
Fresh water tanks	Head of liquid to the highest point that liquid will rise under service conditions	^{2), 3)}
Sewage (black and grey water) tanks	Top of air pipe	As deemed necessary by the surveyor
Tanks containing other liquids	Head of liquid to the highest point that liquid will rise under service conditions	As deemed necessary by the surveyor
<i>Notes:</i>		
1) Gravity tanks of integral type		
2) Tanks within machinery spaces may be specially considered based on external examination of the tank boundaries and a confirmation from the master stating that no leakages or other defects have been observed during operation of the vessel.		
3) Tanks within the cargo area may be specially considered based on a satisfactory external examination of the tank boundaries and a confirmation from the master stating that the pressure testing has been carried out according to the requirements with satisfactory results.		

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4.2.10 Remote level indicating systems for ballast tanks shall be surveyed and function tested.

4.2.11 Underwater parts and items

External surfaces of the hull, keel, stem, stern frame, and rudder shall 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 and their fastenings (as applicable).

Sea chests, sea strainers, other sea inlets, and discharges (above and below the waterline) with nozzles, valves, including sanitary valves and scupper valves, shall be selectively cleaned to the satisfaction of the attending surveyor and examined.

Propeller shaft bearing, rudder bearing, and steering nozzle clearances (as applicable) shall be ascertained and reported upon.

Alternative survey methods may be accepted upon special consideration provided equivalency to opening up is achieved.

4.2.12 Signboards

The presence of required signboards shall be verified.

4.2.13 Corrosion protection

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.

4.2.14 Major appurtenances

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 6](#).

Table 6 Minimum Requirements for Thickness Measurements for Ship-shaped Units at Renewal survey

<i>Renewal survey no.1 Age 0-5 years</i>	<i>Renewal survey no.2 Age 5-10 years</i>	<i>Renewal survey no.3 Age 10-15 years</i>	<i>Renewal survey no.4 and subsequent Age >15 years</i>
1) Suspect areas throughout the unit.	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 tank as deemed necessary. 5) Selected air pipes and ventilator coamings on exposed main deck.	1) Suspect areas throughout the Unit 2) A minimum of three transverse sections (Girth Belts) of deck, bottom, side, and longitudinal-bulkhead plating in way of the moon pool and other areas within the amidships 0.6L, together with internals in way (including in perimeter ballast tanks, where fitted in way of belts). 3) Moon pool boundary bulkhead plating. 4) Internals 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 super-structure 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.

<i>Renewal survey no.1 Age 0-5 years</i>	<i>Renewal survey no.2 Age 5-10 years</i>	<i>Renewal survey no.3 Age 10-15 years</i>	<i>Renewal survey no.4 and subsequent Age >15 years</i>
<p><i>Notes:</i></p> <p>1) if considered necessary by the attending surveyor.</p> <p>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.</p>			

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 etc.
- Highly utilised areas supporting anchor line fairleads and winches, crane pedestals, flare towers/booms etc.
- Other support areas as 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, 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 or installations

4.4.1 Thickness measurements shall be carried out as shown in [Table 7](#).

Table 7 Minimum requirements for thickness measurements – column-stabilised units

<i>Id.</i>	<i>Area</i>	<i>Renewal survey no.1 Age 0-5 years</i>	<i>Renewal survey no.2 Age 5-10 years</i>	<i>Renewal survey no.3 Age 10-15 years</i>	<i>Renewal survey no.4 and subsequent Age >15 years</i>
1	All	Suspect areas	Suspect areas	Suspect areas	Suspect areas

<i>Id.</i>	<i>Area</i>	<i>Renewal survey no.1 Age 0-5 years</i>	<i>Renewal survey no.2 Age 5-10 years</i>	<i>Renewal survey no.3 Age 10-15 years</i>	<i>Renewal survey no.4 and subsequent Age >15 years</i>
2	Structural components of special and primary areas for inspection	Areas with indication of wastage.	Areas with indication of wastage.	Areas with indication of wastage.	Areas with indication of wastage.
3	Bracings		Representative plates in splash zone. Internals as deemed necessary.	Representative plates and internals in splash zone. Representative plates and stiffeners at the connection to column/pontoon and bracings (k-nodes).	Representative plates and internals in splash zone. Representative plates and stiffeners at the connection to column/pontoon and bracings (k-nodes).
4	Columns		Representative plates in splash zone. Internals as deemed necessary.	Representative plates and internals in splash zone. Selective plates and stiffeners of selective seawater tanks.	Representative plates and internals in splash zone. Selective plates and stiffeners of selective seawater tanks.
5	Pontoons			One girth belt of each pontoon. Selective tank top plates of selective seawater tanks.	Two girth belts of each pontoon. Selective tank top plates of all seawater tanks.
6	Column and/or Pontoon seawater tanks used for trimming the vessel			Representative plates and stiffeners.	Representative plates and stiffeners.
7	Chain lockers			Representative plates and stiffeners.	Representative plates and stiffeners.
8	Exposed upper hull where box or I beams receive major concentrated loads			Representative plates and stiffeners.	Representative plates and stiffeners.
9	Main supporting structure of heavy substructures and equipment. e.g. crane pedestal, lifeboat platform and helicopter deck			Representative plates and stiffeners.	Representative plates and stiffeners.

<i>Id.</i>	<i>Area</i>	<i>Renewal survey no.1 Age 0-5 years</i>	<i>Renewal survey no.2 Age 5-10 years</i>	<i>Renewal survey no.3 Age 10-15 years</i>	<i>Renewal survey no.4 and subsequent Age >15 years</i>
10	Structural components of special category other than under 3-9 above. (These areas are normally identified in the IIP)			Representative plates and stiffeners.	Representative plates and stiffeners.
11	Air pipes and ventilators			Selected air pipes and ventilator coamings on exposed main deck.	All air pipes and ventilator coamings on exposed main deck.
<p>Notes:</p> <p>1) and 2) if considered necessary by the attending surveyor</p> <p>3) to 11) mandatory thickness measurements, number and extent of thickness measurement requirements may be modified by the surveyor considering the corrosion protection condition and arrangements.</p>					

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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Inspection area categorisation

4.4.2 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.
- Highly stressed areas 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, 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, 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.

Guidance note:

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, shall be submitted for approval immediately after the test.

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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 [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 [4.4.3].

Guidance note:

It is a provision that the preceding lightweight surveys have documented that the unit was maintaining an effective weight control programme. 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.

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4.5 Specific requirements for self-elevating units or installations

4.5.1 For thickness measurements shall in general be carried out as presented in [Table 8](#).

Table 8 Minimum requirements for thickness measurements – Self elevating units

<i>Id.</i>	<i>Area</i>	<i>Renewal survey no.1 Age 0-5 years</i>	<i>Renewal survey no.2 Age 5-10 years</i>	<i>Renewal survey no.3 Age 10-15 years</i>	<i>Renewal survey no.4 and subsequent Age >15 years</i>
1	All	Suspect areas	Suspect areas	Suspect areas	Suspect areas
2	Structural components of special and primary category	Areas with indication of wastage.	Areas with indication of wastage.	Areas with indication of wastage.	Areas with indication of wastage.
3	Legs		Representative chords and bracings/ plate and stiffeners in way of splash zone.	Representative chords and bracings/ plate and stiffeners in way of splash zone and at connections to mat/ spudcan.	Representative chords and bracings/ plate and stiffeners in way of splash zone and at connections to mat/ spudcan. Representative chords and bracings/ plate and stiffeners in other levels.
4	Mat or spudcan connections to legs and main structural bulkheads of mat or spudcan.		Representative plates, bulkheads and stiffeners.	Representative plates, bulkheads and stiffeners.	All plates, bulkheads and stiffeners
5	Jackhouse and load transfer area (external and in way of preload tanks) including leg wells and lower guides.		Representative plates and stiffeners	Representative plates and stiffeners	All plates and stiffeners.
6	Upper hull exposed deck and bottom plating.		Representative plates.	Representative plates	All plates.
7	Upper hull "box" or "I" type sections Main supporting structure.			Representative plates and stiffeners.	Representative plates and stiffeners.
8	Preload tanks		Representative structure of one preload (seawater) tank.	Representative structure of two preload (seawater) tanks.	Representative structure of all preload (seawater) tanks.

<i>Id.</i>	<i>Area</i>	<i>Renewal survey no.1 Age 0-5 years</i>	<i>Renewal survey no.2 Age 5-10 years</i>	<i>Renewal survey no.3 Age 10-15 years</i>	<i>Renewal survey no.4 and subsequent Age >15 years</i>
9	Main supporting structure of heavy substructures and equipment. e.g. crane pedestal, lifeboat platform and helicopter deck.			Representative plating and stiffeners.	Representative plating and stiffeners.
10	Structural components of special or primary category other than under 3-7 above. (These areas are normally identified in the IIP).			Representative plating and stiffeners.	Representative plating and stiffeners.
11	Air pipes and ventilators			Selected air pipes and ventilator coamings on exposed main deck.	All air pipes and ventilator coamings on exposed main deck.
12	Plating of sea chest.				All plating of sea chest
<p><i>Notes:</i></p> <p>1) and 2) if considered necessary by the attending surveyor.</p> <p>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.</p>					

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.

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Inspection area categorisation

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, 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 Ch.8 Sec.4 \[3\]](#).

4.6 Specific requirements for units of other shape

The requirements for ship-shaped units shall 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 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 **Non self-propelled** units or installations (e.g. 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.

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 transfer of control to local control stations.

Guidance note:

For units with notation **EO** or **ECO**, see [Ch.3 Sec.6 \[9.2\]](#).

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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, shall be proved satisfactory (by a combination of testing and review of maintenance records).

(See IACS UR Z15, 2.8.2)

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.

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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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1.2 Survey extent

Propeller shaft survey is scheduled according to complete survey (5 years) for:

- Oil lubricated tail shaft arrangement with approved sealing devices
- Water lubricated tail shaft arrangement with:
 - continuous corrosion resistant metallic liner

- propeller shaft of approved corrosion resistant material
- propeller shaft with approved protection arrangement
- approved combination of the above.

Guidance note:

For service inspection details see [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.1 \[1.6.6\]](#).

For tailshaft condition monitoring see [DNVGL-RU-SHIP Pt.7 Ch.7 Sec.1 \[17\]](#).

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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.

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.

2.3 Survey extent

Propeller connection survey is scheduled according to complete survey (5 years) for:

- keyed propeller connections.

Propeller connection survey is scheduled according to complete survey (15 years) for:

- keyless propeller connections
- flanged propeller connections.

Guidance note:

For service inspection details see [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.1 \[1.6.7\]](#).

For tailshaft condition monitoring see [DNVGL-RU-SHIP Pt.7 Ch.7 Sec.1 \[17\]](#).

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3 Survey of geared thrusters for main propulsion and positioning

3.1 General

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 [DNVGL-RU-SHIP 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, here after 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 [DNVGL-CP-0484 App.B \[5\]](#).

4.1.4 At each overhaul, all relevant parts of the components made accessible shall be presented for survey by the Society, see [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.5 \[5.2\]](#).

Assembly and mounting on board shall be verified and tested.

4.2 Scheduled surveys

See [DNVGL-RU-SHIP 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 [DNVGL-RU-SHIP 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 [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.5 \[7\]](#).

7 Survey of towing and temporary mooring equipment

7.1 General

7.1.1 At Annual survey the towing and temporary mooring equipment shall be subject to visual inspection and review of certificates and maintenance records.

7.1.2

At the second and subsequent renewal surveys of the temporary mooring equipment, chain cables shall be gauged with respect to corrosion diminution.

7.2 Inspection Scope

7.2.1 Towing equipment

Towing equipment shall be subject to visual inspection and review of certificates and maintenance records. NDT may be requested depending on condition and service history.

7.2.2 Temporary mooring equipment

Temporary mooring equipment shall be subject to visual inspection and review of certificates and maintenance records.

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 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.

The chain lockers, holdfasts, hawse pipes and chain stoppers shall be examined and drainage arrangement of the chain lockers tested.

Function testing of the temporary mooring systems shall be performed.

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.

Units which arrive at location under their own propulsion shall be equipped with a permanent temporary mooring system for the voyage as per [Ch.2. Sec.1 \[7.3.1\]](#), unless an exemption is granted.

After hook-up on location the required renewal survey function testing and inspection cannot always be carried out due to field restrictions like water depth, anchor situated above wellheads, proximity to mooring lines/risers, etc.

The temporary mooring equipment is then to be maintained in class and subject to necessary maintenance; with the exemption of testing. In these cases a memo to owner will be issued stating; "Temporary mooring equipment as listed in this MO shall be subject to inspection and testing as per scope for renewal survey prior to leaving location under its own propulsion".

Alternatively, upon owner request, the Society can accept the equipment to be temporarily taken out of class until the unit leaves the field.

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SECTION 5 PERIODICAL SURVEY EXTENT FOR THE 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.3**. The detailed scope is given in the following sub-sections.

2 Offshore fish farming units and installations

2.1 Application

2.1.1 The requirements in this sub-section apply to units or installations with class notations **Offshore fish farming unit** or **Offshore fish farming installation**.

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 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 The following arrangement issues shall be subjected to a general survey:

- condition of measures preventing escalation of process incidents to the aquaculture areas
- typical measures taken to oil spillage collection, additional fire detectors, fire water system, structural fire protection, piping, and cables,
- any damage from green sea on structures and equipment covered by the class.
- condition of access for inspection, maintenance and fire fighting of spaces and aquaculture areas covered by class
- 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 The fire detection system shall be surveyed and function tested:

- 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 detectors and their cables

- a test of shutdown actions by fire system to an extent as required by the surveyor.

2.3.4 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.
- Monitors, hydrants and hose equipment shall be visually surveyed in general (**1A**).
- Survey and testing of deck foam system.
- Verify certificates confirming the physical and chemical condition of the foam concentrate.

2.3.5 Fixed fire extinguishing systems

Condition of fixed fire extinguishing system in any engine and/or boiler room not included in main class shall be verified as deemed necessary by the surveyor.

2.3.6 Instrumentation and telecommunication system

Function test of overall safety related alarms shall be done (typical fire, mustering, evacuation alarms).

2.4 Complete periodical

2.4.1 Structure and equipment ship-shaped units or installations. 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.

2.4.2 Extended close-up examination shall be carried out according to the following tables from the [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.4](#):

- [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.4 Table 18](#) for single hull oil storage units
- [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.4 Table 21](#) for double hull oil storage units.

2.4.3 Structure and equipment ship-shaped units or installations.

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.

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 **ME**.

2.1.2 Annual survey consist of documentation review and 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.

2.1.3 Renewal survey will require appropriate cleaning with good access and adequate lighting. The complete mooring system equipment for position keeping on location is subject to comprehensive survey, including function testing, opening up and NDT of selected parts of the mooring equipment installed.

2.1.4 Continuous survey. Alternatively, the owner may opt for a continuous survey of mooring lines 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 [DNVGL-RU-OU-0101 App.C](#).

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2.2 Annual survey

2.2.1 Position mooring equipment shall be inspected as follows:

There shall 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
- that no twist is present between fairlead and windlass.

Guidance note:

Twist in chain can severely reduce the capacity of the mooring line, as it locks the chain links and significantly increases the stresses in the most loaded chain link.

As a guidance the twist between the fairlead and windlass should not exceed a 5 degree interlink twist when the fairlead are at maximum skew angle, and under no circumstances shall the interlink twist cause restriction in the movement of chain in windlass and fairlead.

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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.

2.3 Renewal survey

2.3.1 General

The complete mooring system for position keeping on location is subject to comprehensive survey, including function testing, opening up and NDT of selected parts of the mooring equipment installed.

2.3.2 A documentation review shall be carried out in order to verify that all mooring components have correct certification and that the service history of the mooring components are recorded. Inspection scope level is based on the available service records.

2.3.3 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.

2.3.4 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.

2.3.5 All joining shackles of Kenter or similar design which have been in service for more than five years, shall be dismantled and magnetic particle (MT) or liquid penetrant testing (PT) shall 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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2.3.6 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 shall 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.

2.3.7 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 [2.3.2] 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.

2.3.8 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.

Guidance note:

Magnetic inductive testing in order to detect possible fracture of strands may be accepted on a case by case basis.

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2.3.9 It is advised that checkpoints are made for every 100 m. If areas of special interest are detected, the distance should be significantly reduced.

2.3.10 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.

2.3.11 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.

2.3.12 In addition to [2.3.10] 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.

2.3.13 Winches and fairleads

The fairleads shall be inspected visually and by ROV as far as possible. All fairleads shall be inspected. Fairlead bearings shall be verified in working order and verified turning freely. Wear in bearings shall be checked.

2.3.14 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.

2.3.15 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.

2.3.16 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.

2.3.17 Proper spooling of the wire on the winch drum shall be verified and drums and spooling gear adjustments made if required.

2.3.18 Windlasses and winches and fairleads, including brake torques, shall be function tested.

2.3.19 The system for emergency release of the winch brake shall be tested. The visual and audible alarm shall be confirmed. The activation of the deluge system over the anchor windlasses shall be tested

3 Position mooring system

3.1 Application

3.1.1 The requirements in this sub-section apply to units with class notation **POSMOOR**.

3.1.2 The requirements in [3.3] and [3.5] are applicable to units with qualifiers **(TA)** or **(ATA)** only.

3.1.3 If the unit is in DP mode and not in position mooring 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 shall be carried out before the mode is taking into use.

3.2 Annual survey

3.2.1 Accessible and visible parts of the unit's mooring system for position keeping on location shall be inspected. Requirements in [2.2] with respect to annual survey of equipment under notation **ME** apply, in addition to below.

3.2.2 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 operating envelope is described in the appendix to the classification certificate.

Guidance note:

The above implies that a site specific mooring analysis should be submitted to DNV GL if the unit is to operate on a location where one or several of the following items are not according to the documentation submitted when the **POS Moor** notation was granted:

- water depth outside the original range
- environmental condition is more severe
- different mooring pattern and pretension
- new inserts in the mooring system and/or change in mooring line length
- introduction of Mooring Line Buoyancy Elements (MBLE) or clump weights in one or several of the mooring lines.

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3.2.3 The mooring line records shall be reviewed.**Guidance note:**

The mooring line record review should include verification that all parts of the mooring line assembly including pre-laid mooring lines hold valid certificates.

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3.2.4 The service history of the mooring components shall be reviewed.**Guidance note:**

Service history should include logging of position of e.g. chain links over windlass and fairleads. Any damages, as well as records from incidents with damage potential, should be recorded.

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3.2.5 The calibration certificates for the load cells to be verified on board, (see [DNVGL-OS-E301 Ch.2 Sec.4 \[14\]](#)).**3.2.6** The length and tension measurements, including alarm settings shall be verified.**3.2.7** Winch control to be verified from all operator stations.**3.2.8** The mooring lines from windlass towards fairleads shall be surveyed. See [\[2.2.1\]](#) with respect to requirements to twist in line.**3.3 Annual survey- thruster assisted systems****3.3.1** System maintenance documentation, including information regarding hardware and software changes, shall be reviewed.**Guidance note:**

This requirement includes, in addition to the position mooring control system and other systems necessary for performing position keeping, e.g. thruster control system.

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3.3.2 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 position mooring and references systems, sensors and mode change system.**3.3.3** The technical condition of the position mooring system shall be verified during the survey.

Guidance note:

Verification of the technical condition of the position mooring system denotes testing to verify that the position mooring system is capable of positioning the unit, and thus validating that system functionality is in place. This includes thruster operation, tension and line length indication system and alarm settings.

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3.3.4 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.

3.3.5 Capacity of UPSs and other battery systems serving the position mooring control system, including its peripherals, shall be verified.

3.3.6 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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3.3.7 Emergency stop of thrusters from the position mooring control center shall be tested. If the survey is carried out when the unit is undergoing regular operations and there is a possibility of introducing unacceptable risks, then testing may be exempted.

3.3.8 The Simulation facility shall be verified as far as possible.

3.3.9 Thruster operation shall be function tested.

3.4 Complete survey

3.4.1 The complete mooring system for position keeping on location shall be subject to a comprehensive survey, including opening up and NDT of selected parts of windlasses and winches and fairleads. The requirements listed under scope for complete survey of the Notation **ME** in [2.3] applies. In addition the additional requirements under annual **POSMOOR** survey listed in [3.2] applies.

3.5 Complete survey – thruster assisted systems

3.5.1 With the unit in position mooring 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.

3.5.2 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.

3.5.3 Emergency stop of the position mooring thrusters from the position mooring control center to be tested.

3.5.4 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 is recorded in the survey report, and a condition of class or memo to owner is 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.

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3.5.5 Alarm for loss of position and heading out of limit shall be demonstrated. Line break alarm shall be tested.

3.5.6 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.

3.5.7 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.

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3.5.8 Capacity of UPSs and other battery systems serving the position mooring control system including its peripherals shall be verified by testing. Alarm for loss of charging power shall also be verified.

3.5.9 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:

The requirement to have an updated FMEA analysis on board is only valid for units with class request after 1. July 2004.

FMEA testing is required for vessels which have redundancy requirements in thruster systems, power systems and/or control systems as part of their mooring analysis. If the vessel also operates in DP mode, the testing carried out as part of the DP FMEA may not need retesting, but FMEA tests specific for position mooring operations need to be completed. This includes tension measurement failures, communication and power failures in the anchor winch control system

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3.5.10 Correct functioning of the consequence analysis facility shall be verified as far as possible.

4 Dynamic positioning systems

4.1 General

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

4.1.2 The requirements in this sub-section apply to units with class notation **DYNPOS** or **DPS**.

4.2 Specific requirements

4.2.1 Qualifier (A)

For units with qualifier 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.

4.2.2 An updated FMEA report with a corresponding FMEA test program shall be kept onboard, and shall be used as basis for the testing.

4.2.3 For units in position mooring

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 shall be carried out before the mode is taking into use.

4.3 Annual and complete survey

See [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[12\]](#).

5 Helicopter deck

5.1 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](#).

5.2 Complete survey

See [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[8\]](#).

6 Crane

6.1 Application

6.1.1 The requirements in [\[9.2\]](#) and [\[9.3\]](#) apply for vessels with additional class notation **Crane-offshore**.

6.1.2 Crane-offshore applies to any type of offshore crane intended for cargo handling outside the vessel while at sea and to any type of platform crane intended for cargo handling on the vessel. For a vessel with more than one crane installed, class notation **Crane-offshore** may be applied to selected cranes only. The selected cranes will be identified in the appendix to the classification certificate.

6.1.3 Additional requirements: [DNVGL-ST-0378 Sec.14](#), Standard for offshore and platform lifting, Testing and test certificates marking.

6.1.4 Additional requirements for the qualifier **(N)** are given in [DNVGL-SI-0166 Ch.3](#).

6.1.5 Scope

The systems covered are in accordance with [Ch.2 Sec.7 \[9\]](#) and include following:

- structure
- machinery
- control and monitoring systems
- safety systems.

6.2 Annual survey

6.2.1 Objective

The intent of the annual survey is to verify satisfactory condition of the equipment without any intrusive interventions, given that the vessel is in operation. It is assumed that normal operations are on-going.

6.2.2 Scope

The extent of the annual survey shall be as follows:

- Spot check review of the vessel's records of routine inspections/tests, the planned maintenance system and the repair/overhaul/modification records.
- Review documentation for equipment installed since last survey, including third party equipment.

General Visual survey shall be carried out on all parts of the lifting appliances in order to detect any abnormalities or deviations from the normal conditions

Where records are available showing that relevant items have been recently tested, these can be examined and applied as part of the evaluation.

6.2.3 General requirements

Generally, the visual examination may be carried out without dismantling. However, dismantling shall be performed as considered necessary by the attending surveyor.

6.2.4 Any changes to the systems (new equipment, overhauls, repairs and modifications) shall be surveyed and the relevant documentation to be approved.

6.2.5 Crane condition monitoring shall be carried out in accordance with an approved program if part of the planned maintenance system. See [Sec. 7](#) for further details. Crane condition monitoring will normally be approved on a case by case basis.

6.2.6 Preparation

Applicable equipment shall be made available for survey according to scope. Special attention shall also be made to the inspection program, SHE safety measures, safe access and crane cleanliness.

6.2.7 Structure

The structure shall be examined as follows:

- Boom structure

A general visual examination shall be carried out with emphasis on the structural condition of boom heel, boom top, cradle support area, bracings.

- Main frame (king)
 - A general visual examination shall be carried out with emphasis on the slewing ring support structure, boom hinge, winch support, A-frame support.
- Frame structure.
 - A general visual examination shall be carried out with emphasis on the frame foot, wire rope sheave system and frame top.

6.2.8 Machinery

The following be examined for satisfactory condition:

- hook block, hook shaft and hook bearing
- sheaves, shaft and bearings
- wire rope and attachments.

Guidance note:

See also ISO 4309 Maintenance, installation, examination and discard.

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- winches, rope drum, gear, fixation and frame
- luffing system, winches, rope drum, gear, frame and fixations or cylinder with fixations
- slewing system, machinery
- slewing ring and tightness of bolts. Documentation of the condition of the slewing ring shall be examined, OEM program or other recognized program. The program shall as a minimum include grease testing, gap measurement
- brakes, including function testing and correct adjustment
- couplings main part and bushing, including function testing.

Guidance note:

If the coupling is type gear, tooth or spline, the wear must be specially considered and the coupling considered to be opened for examination.

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6.2.9 Control systems

Examination and functional testing shall be carried out as found necessary by the attending surveyor for the following:

- Electric systems
 - Resistance measurement of electrical systems, motors, switchboards/cabinets, cables, cables protections, condition of all switches, controllers internal and external.
- Hydraulic systems
 - Leakages in hydraulic system, pumps, motors, cylinders, valves, piping, safety valves.

6.2.10 Safety systems

Functional tests shall be carried out for the controls, limiting and indicating devices in order to ensure that they are functioning and calibrated correctly for safe operation.

Guidance note:

Typical functional tests are

- rated capacity limiters and indicators
- motion limiters and indicators
- performance limiters and indicators
- emergency stop function
- AOPS, MOPS, heave comp, ESD, F&G, slack wire rope detection
- failure in control system, failure in safety system, blackout/shut-down.

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6.2.11 Testing

Functional tests shall be carried out for all crane motions, (e.g. hoisting, travelling, traversing, telescoping, slewing and luffing) at the rated speeds and without lifting loads, in order to check for any abnormalities and/or defects. Functional testing shall also be performed with a suitable load, not exceeding the safe working load, as considered by the surveyor.

It shall be verified that the load charts are permanently displayed and visible for the crane operator.

6.3 Complete survey (5-yearly, Renewal)**6.3.1 Objective**

The intent of the complete survey is to confirm that the equipment and systems are fit for operation for another 5 years.

6.3.2 Scope

More intrusive inspections and more comprehensive testing shall be carried out. Normally the crane will be tested to the original design limits.

Original certificates and records of the routine inspections/tests and the maintenance/repair/overhaul records shall be presented for review.

6.3.3 Load tests shall be carried out on basic crane motions, such as hoisting, travelling, traversing, telescoping, luffing and slewing, while suspending a test load (where permitted), in order to check for any abnormalities and/or defects. The test load should not exceed the rated capacity.

6.3.4 Load testing with overload as described in [DNVGL-ST-0378 Sec.14](#). The overload shall be handled with slow speed. All movements shall be tested.

6.3.5 The following components shall be dismantled and made available for examination by NDE:

- boom foot/heel bearings
- fixed sheaves
- load bearing axle pin/shaft and housing
- gear boxes taking part in the lifting operation
- brakes
- couplings
- hook block.

Guidance note:

An alternative to dismantling items for examination is to perform in place inspection according to OEM recommendation or a safe remaining life assessment according to ISO 12482, in addition to visual and NDE inspection. This assessment shall be verified and accepted by the Society, and can be used as a base for examination of relevant parts of the crane. If the lifespan is near to its expiry, the society shall be consulted, before the lifting appliances can be certified for continued use. See DNV GL guidance note for safe crane condition monitoring on request.

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6.3.6 Structure

An overall examination shall be carried out with particular emphasis on structural condition A-frame, boom structure, crane frame, boom foot/heel and other load bearing connections.

Thickness measurements of structural parts shall be carried out as far as deemed necessary.

6.3.7 Slewing system.

Slewing bearing ring shall be dismantled (not single ball bearing) and made available for visual examination. Internal fillets, raceway shall be subjected to NDE.

Guidance note:

Exemption to opening-up of a bearing will be granted provided:

- if the crane has an approved securing device (retainer) fitted the opening-up is not required or
- the slewing bearing has been specially adapted and approved by DNV GL for non-destructive crack detection or
- a company is available possessing method, skill and specially trained operators within non-destructive crack detection of bearings in question. The company, operators and qualification tests to be approved by DNV GL in each case or
- a procedure including regular clearance measurements established when the crane was new, grease sampling and fatigue evaluations are adopted in agreement with the crane and slewing bearing manufacturer or
- a safe remaining life assessment according to ISO 12482 has been established, in addition to visual and NDE inspection. This assessment shall be verified and accepted by the society, see also DNV GL guidance note for safe crane condition monitoring on request.

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20% of the holding down bolts taken in the most loaded sector of the crane shall be removed, examined and subject to NDE. If any significant defects are found during this examination another 20% are drawn. If any of this second set is found to be defective then all bolts shall be drawn.

Guidance note:

If the first 20% are found to be acceptable and the examination is stopped, a maintenance schedule should be established for examining the remaining 80% during the 5 years period. An alternative to dismantling is to perform a fastener elongation measurement using ultrasonic (UT).

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Flatness and condition of slew-bearing mounting flanges shall be checked as far as possible.

6.3.8 Brakes

The brake shall be dismantled and examined.

6.3.9 Couplings

Couplings shall be dismantled and examined.

7 Offshore gangways**7.1 General**

The requirements in this sub-section apply to ships with class notation **Walk2work**.

7.2 Surveys

Annual and complete surveys at an interval of 5 years shall be i.a.w. [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[39\]](#).

7.3 Repairs and modifications

Repairs and modification of the gangway shall follow [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[39.5\]](#).

8 Additional fire protection arrangements

8.1 General

The requirements in this sub-section apply to ships with class notation **F**.

8.2 Complete survey

Complete surveys at an interval of 2.5 years shall be i.a.w. [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[11\]](#).

9 Loading computers for damage control

9.1 Application

The requirement in this sub-section applies to units with class notation:
LCS(DC).

9.2 Annual survey and complete surveys

It shall be checked that the approved in-service test programme for all sensors has been followed.

10 Periodically unattended machinery space and machinery centrally operated

10.1 Application

The requirements in this sub-section apply to units with class notations **E0** and **ECO**.

10.2 Annual and complete surveys

Annual and complete surveys shall be i.a.w. [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[25\]](#).

11 Hull monitoring system

11.1 Application

The requirements in this sub-section apply to units with class notation **HMON**.

11.2 Objective

The purpose of the survey is to ensure the maintenance of the hull monitoring system as specified for the class notation.

11.3 Annual survey

See [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[14\]](#).

12 Noise, vibration and comfort rating

12.1 Application

The requirements in [16.2] and [16.3] apply to units with the class notations **VIBR** respectively **COMF-MOU**.

12.2 Vibration

12.2.1 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.

12.2.2 At each Renewal survey 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.

12.3 Comfort rating

12.3.1 Alterations and modifications

If approved arrangements, equipment or procedures are altered, up dated documentation shall be resubmitted for approval.

12.3.2

Measurements shall be made after any significant modifications on board the installation in the following situations:

- when changes have been made for the process itself
- when some of the equipment with impact of the working environment on board is modified.

12.3.3 Renewal survey

The renewal survey shall be based on measurement surveys according to predefined programs.

12.3.4 Logbooks of the inspections and measurements as described in [DNVGL-OS-A301 Ch.3 Sec.2 \[4\]](#) shall be examined.

13 Environmental notations

13.1 Ballast water management systems

13.1.1 Application

The requirements in [18.1] apply for vessels with the notation **BWM** and/or **Clean**.

13.1.2 Annual, intermediate and complete surveys

Annual, intermediate and complete surveys shall be carried out i.a.w. [DNVGL-RU-SHIP Pt.7 Ch.18 Sec.6 \[22\]](#).

13.2 Clean or Clean Design

13.2.1 Application

The requirements in [18.2] apply to units with class notation **Clean**.

13.2.2 Annual survey

See [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[16\]](#).

13.3 Recycling

13.3.1 Application

These requirements in this sub-section apply for units with the class notation **Recycling**.

13.3.2 Annual survey

Complete surveys shall be carried out in line with [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[35\]](#).

13.3.3 At replacement, or significant repair of the structure, equipment, systems, fittings, arrangements and material, the owner may request an occasional survey as described in [DNVGL-RU-SHIP Pt.7 Ch.1 Sec.6 \[35\]](#).

14 Integrated software dependent systems

14.1 General

14.1.1 Application

The requirements in this sub-section apply to units with the class notation **ISDS**.

14.1.2 Objective

The purpose of the survey is to ensure the confidence that has been built into the unit is actually maintained.

14.1.3 Modifications

The owner shall 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.

SECTION 7 ALTERNATIVE SURVEY ARRANGEMENTS

1 Introduction

A survey arrangement applies to a specific area (discipline) or type of equipment on a unit. When implemented it will define all roles and responsibilities applicable for that specific area or equipment and how this shall be followed up on the unit during the operations phase. The standard survey arrangement will always be implemented by default, but alternative survey arrangements may also be accepted as an option. Survey arrangements are applicable to periodical surveys for main class and selected optional class notations.

Survey arrangements are defined and available for the following areas:

- machinery equipment, see [2]
- structure, see [3].

2 Machinery survey arrangements

2.1 General

2.1.1 Introduction

The different machinery survey arrangements are based on the society's machinery list in accordance with [DNVGL-RU-OU-0101 Ch.3 Sec.7 Table 1](#) and as specified for the unit. The difference between them 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.3 \[5\]](#) shall be followed.

2.1.2 Machinery survey arrangements

The following survey arrangements are available for class related machinery items:

- machinery renewal, see [Sec.3 \[5\]](#) (Default)
- machinery continuous (MC) [DNVGL-RU-OU-0101 Ch.3 Sec.7 \[2.2\]](#)
- machinery planned maintenance system (MPMS) [DNVGL-RU-OU-0101 Ch.3 Sec.7 \[2.3\]](#)
- machinery planned maintenance system – reliability centred (MPMS RCM) [DNVGL-RU-OU-0101 Ch.3 Sec.7 \[2.4\]](#)
- offshore condition monitoring (offshore CM) [DNVGL-RU-OU-0101 Ch.3 Sec.7 \[2.5\]](#).

3 Structural survey arrangements

3.1 General

The structural survey arrangements are based on the IIP, see [Sec.3 \[1.2\]](#) in accordance with type of unit. The difference between the arrangements 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:

- renewal, see [\[4.2\]](#) (default)
- structural continuous survey arrangement (SC), see [\[4.3\]](#)
- structural integrity management (SIM), see [\[4.4\]](#).

3.2 Renewal (periodic)

3.2.1 The renewal survey arrangement will if no other agreement is made be applied as basis for the survey plan and scope for the unit.

3.2.2 Periodical surveys 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. See [Sec.1](#) for further information.

3.3 Structural continuous

3.3.1 Structural continuous (SU) is a survey arrangement whereby the survey items in the structure (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.

3.3.2 Applicable survey requirements as detailed in [Sec.2 \[2\]](#) to [Sec.2 \[4\]](#).

3.4 Structural integrity management

3.4.1 Structural integrity management (SIM) is a survey arrangement offered as an integral part for the in-service inspection program, implemented for classification compliance. The continuous survey arrangement shall be applied in combination with the SIM in order to obtain the intended benefit for the owner. The SIM performance will be reviewed based on the owners reporting in the system (SIM-tool) and by verifying the condition of the structure and maintenance on board the unit.

3.4.2 SIM survey arrangement allows for up to half of the structural items, covered by the units structural inspection program, to be inspected by owners qualified personnel. The parts to be inspected by the owner will be decided based on inspection history and current structural condition. Critical areas, areas with poor condition and/or substantial corrosion are normally not included in owners scope.

3.4.3 A survey plan shall be developed identifying areas that will be surveyed by class and owner. The plan will be continuously monitored during the class period and adjusted based on inspection results and accumulated knowledge.

3.4.4 Approval of the arrangement shall include a documentation review covering a description of the following:

- inspection responsibilities and functions
- SIM tool for inspection reporting
- SIM responsible person on board
- training programme/plan for involved personnel
- inspection manual/instruction including reporting, ratings and acceptance criteria
- communications plan that outlines the owner's information shearing with the Society.

3.4.5 Inspection by the owner shall be performed by qualified personnel. Qualified personnel shall successfully have attended and completed:

- SIM training course arranged by the society
- tutored survey on board covering relevant inspection technics/areas.

Guidance note:

NS 415-1 certification or certification based on equivalent standard may be applied partly to document sufficient qualifications. Personnel qualifications will usually be linked to a specific owner or unit manager.

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3.4.6 The following conditions shall be complied with before the survey arrangement is valid:

- approved inspection program and reporting system (SIM-tool database reporting mandatory)
- qualified inspection personnel
- successful initial (implementation) survey, (see [4.3.8]).

3.4.7 Initial survey

An initial 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 initial survey is carried out.

3.4.8 The initial survey will include verification of the following:

- responsible person have sufficient knowledge in line with approved arrangement
- correct use according to approved inspection program and reporting system
- inspection performed only by qualified inspection personnel
- 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 between owner and the Society.

Upon successful approval of the arrangement (document review) and completion of the initial survey; a SIM survey arrangement certificate will be issued to the unit.

3.4.9 Annual audit

To maintain the validity of the SIM survey arrangement, an annual audit of the arrangement has to be performed by the Society. The purpose of this survey is to ensure proper use of the arrangement and to verify the general condition and maintenance level with special attention to the hull and structure.

3.4.10 The audit will include the following:

- structural inspections inside class scope
- NDT of critical structures
- verification of owners inspections
- verification of proper use of the SIM survey arrangement.

The attending surveyor may if found necessary, require a re-survey of any structural item inspected by the owner.

3.4.11 Damages (major findings)

Damage and findings related to structural items shall always be reported to the Society according to approved procedure and into the SIM-tool database as a finding.

3.4.12 Cancellation of the survey arrangement

In case of change of manager/owner of the unit, the survey arrangement is usually cancelled. The arrangement may also be cancelled if it is evident that the conditions of the arrangement (procedure, and reporting) are not complied with. Any changes to the arrangement shall be subject to class approval.

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 (CM).

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 [DNVGL-CP-0484 App.A \[1\]](#) *Firms engaged in ultrasonic thickness measurements of ship's structure.*

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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 [DNVGL-CP-0484 App.A \[3\]](#) *Service suppliers carrying out in-water survey of ships, high speed and light craft and mobile offshore units* and [DNVGL-OTG-08 UWILD](#) Guidance.

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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 [DNVGL-CP-0484 App.B \[4\]](#) *Firms engaged in non-destructive testing (NDT) on offshore projects and offshore units/components.*

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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 [DNVGL-CP-0484 App.B \[12\]](#) *Renewal survey examination of mooring chain intended for mobile offshore units* .

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1.6 Condition monitoring

Condition monitoring as part of DNV GL's periodical surveys of machinery components and equipment , can be carried out by a company approved by the Society.

Guidance note:

For more information, see [DNVGL-CP-0484 App.B \[5\]](#) *Service Suppliers Engaged in condition monitoring of machinery onboard Ships and Mobile Offshore Units*.

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CHANGES – HISTORIC

There are currently no historical changes for this document.

About DNV GL

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, technical assurance, software and independent expert advisory services to the maritime, oil & gas and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our experts are dedicated to helping our customers make the world safer, smarter and greener.

SAFER, SMARTER, GREENER