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OFFSHORE SERVICE SPECIFICATION  
DNV-OSS-102

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RULES FOR CLASSIFICATION  
OF FLOATING PRODUCTION  
AND STORAGE UNITS

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OCTOBER 2003

DET NORSKE VERITAS

# FOREWORD

DET NORSKE VERITAS (DNV) is an autonomous and independent foundation with the objectives of safeguarding life, property and the environment, at sea and onshore. DNV undertakes classification, certification, and other verification and consultancy services relating to quality of ships, offshore units and installations, and onshore industries worldwide, and carries out research in relation to these functions.

DNV Offshore Codes consist of a three level hierarchy of documents:

- *Offshore Service Specifications*. Provide principles and procedures of DNV classification, certification, verification and consultancy services.
- *Offshore Standards*. Provide technical provisions and acceptance criteria for general use by the offshore industry as well as the technical basis for DNV offshore services.
- *Recommended Practices*. Provide proven technology and sound engineering practice as well as guidance for the higher level Offshore Service Specifications and Offshore Standards.

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- A) Qualification, Quality and Safety Methodology
- B) Materials Technology
- C) Structures
- D) Systems
- E) Special Facilities
- F) Pipelines and Risers
- G) Asset Operation
- H) Marine Operations

## Amendments and Corrections

This document is valid until superseded by a new revision. Minor amendments and corrections will be published in a separate document on the DNV web-site; normally updated twice per year (April and October). To access the web-site, select short-cut options "Technology Services" and "Offshore Rules and Standards" at <http://www.dnv.com/>

The electronic web-versions of the DNV Offshore Codes will be regularly updated to include these amendments and corrections.

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## CHANGES IN THE RULES

The present edition of the rules includes amendments and additions decided by the Executive Board in September 2003 and supersedes the April 2002 edition.

The changes come into force 1 April 2004.

### Main changes

- **General**

The rules have been updated in line with new IACS requirements and feedback from the users on the previous issue. The main changes are described below.

### Chapter 1 Principles and Procedures for Classification

- Handling of alternatives and deviations.
- Rule basis for class in the operational phase.

### Chapter 2 Design and Construction Provisions

- Handling of industrial equipment under service notations (process equipment to be included in **Production Unit** class).

### Chapter 3 Classification in Operation

- Incorporation of IACS unified requirements Z15 "Hull, Structure, Equipment and Machinery Surveys of Mobile Offshore Drilling Units".
- A new sub-section on continuous hull survey.
- Special provisions for ageing units.
- Formalising the in-service inspection program (IIP) as part of the class documentation.
- The sub-section on thrusters surveys has been completely re-written to reflect current ship practice.
- The handling of industrial equipment under mandatory service notations has been clarified.
- The sub-section on periodical inspection of mooring systems for long term units has been extensively revised, introducing variations depending on the design, such as corrosion protection and or allowance and fatigue.

### Appendix C Underwater Inspection in Lieu of Dry-docking Survey

- A new Appendix C concerning underwater inspection, in lieu of dry-docking survey, has been introduced (IACS UR Z15).

### Corrections and Clarifications

In addition to the above mentioned rule changes, a number of corrections and clarifications have been made to the existing rule text.



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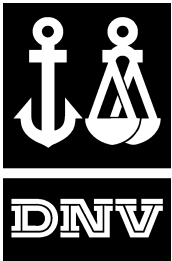
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RULES FOR CLASSIFICATION OF FLOATING  
PRODUCTION AND STORAGE UNITS

CHAPTER 1

**PRINCIPLES AND PROCEDURES FOR CLASSIFICATION**

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## SECTION 1 INTRODUCTION

### A. General

#### A 100 General

**101** This publication, DNV-OSS-102, presents DNV's Rules for Classification of Floating Production and Storage Units or Installations, stating the terms and procedures for assigning and maintaining classification, including listing of the applicable technical references to be applied for classification.

#### A 200 Organisation of DNV-OSS-102

**201** DNV-OSS-102 is divided into three main chapters as follows:

- *Chapter 1*: providing general information about classification principles and procedures
- *Chapter 2*: providing design and construction requirements for the newbuilding phase
- *Chapter 3*: providing requirements for maintenance of class in the operational phase.

#### A 300 Objects covered

**301** DNV-OSS-102 covers classification of offshore objects of the following designs:

- ship-shaped type
- column-stabilised type
- self-elevating type
- tension-leg type
- deep draught type

for the following services:

- hydrocarbon production
- hydrocarbon storage and offloading.

### B. Definitions

#### B 100 Verbal forms

**101** *Shall*: Indicates a mandatory requirement to be followed for fulfilment or compliance with the present service specification. Deviations are not permitted unless formally and rigorously justified, and accepted by all relevant contracting parties.

**102** *Should*: Indicates 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. Other possibilities may be applied subject to agreement.

**103** *May*: Verbal form used to indicate a course of action permissible within the limits of the service specification.

#### B 200 Definitions

**201** *Approval or approved*: Denotes acceptance by DNV of documentation showing design solutions, arrangements and/or equipment to comply with the rules.

**202** *Assigning class*: Originally signified designation of one of several classes to a ship based on its condition, ranging from good to bad. Today only the highest class is assigned, comprising the main class **1A1** for mobile offshore units and **OI** for permanently placed installations, together with an obligatory additional class notation, e.g. **Oil Production Unit**, where applicable.

Voluntary additional class notations may also be assigned cov-

ering special service, equipment or systems, e.g. **PROD** denoting a classed hydrocarbon production plant.

**203** The *Board*: Signifies the Executive Board of DNV through its Chairman who is the President and CEO of DNV.

**204** *CIBS*: Classification Information Breakdown Structure (coding system for documentation).

**205** *Classification*: Comprises those services rendered by DNV in accordance with the rules. Classification of offshore units is conducted in accordance with the requirements of the rules and any standards referred to by the rules.

**206** *Classification certificate*: Issued upon assignment or renewal of class. Its validity is five years subject to successful completion of annual and intermediate surveys.

**207** *Client*: The party having requested classification or having assumed ownership of a classed offshore unit or installation. In cases where owners have authorised another party to operate the unit or installation on their behalf, such party is regarded as the client.

**208** *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.

**209** *Contract*: The specific agreement between DNV and the client. It defines the extent of services requested by the client, and is concerned with:

- the classification of offshore units or installations, both newbuildings and in operation
- statutory work carried out on behalf of national maritime authorities
- equipment and materials.

**210** *Det Norske Veritas (DNV)*: An autonomous and independent foundation with the object of safeguarding life, property and the environment.

**211** *Floating offshore installation*: A buoyant construction engaged in offshore operations including drilling, production, storage or support functions, and which is designed and built for installation at a particular offshore location.

**212** *Guidance note*: Advice which is not mandatory for assignment of class, but with which DNV, in light of general experience, advises compliance. The client may decide whether to apply the note or not.

**213** *IACS*: The International Association of Classification Societies.

**214** *IMO*: The International Maritime Organization.

**215** *International maritime standards*: International IMO conventions, protocols, codes and resolutions, in so far as their purpose is safety and pollution prevention, excluding articles and regulations dealing with intergovernmental relations, legal and formal aspects.

**216** *LRFD methodology*: Load and resistance factor design methodology.

**217** *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.

**218** *Offshore installation*: A collective term to cover any construction, buoyant or non-buoyant, designed and built for installation at a particular offshore location.

**219 Overall examination:** An examination intended to report on the overall condition of the structure.

**220 Quality audit:** A systematic and independent examination to determine whether established work processes and quality systems are adhered to.

**221 Recognised classification society:** A classification society which is a full or associate member of IACS.

**222 The Rules:** All rule requirements accepted by the Board as basis for classification.

**223 The Society:** Signifies DNV.

**224 Statutory certificates:** IMO convention certificates issued on behalf of, or by, national authorities.

**225 Supplier or manufacturer:** Supplies materials, components, equipment and systems to newbuildings to be classed, or to classed units in operation, whose production is subject to design approval, surveys and testing in accordance with the rules.

**226 Temporary conditions:** Design conditions not covered by operating conditions, e.g. conditions during fabrication, mating and installation phases, dry transit phases.

**227 Tentative rules and standards:** Apply to new fields to which DNV reserves the right to make adjustments during a period in order to obtain the purpose intended.

**228 Transit conditions:** All wet unit movements from one geographical location to another.

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

**230 WSD methodology:** Working stress design methodology.

## C. Normative References

### C 100 General

**101** DNV-OSS-102 includes references to other DNV documents and recognised codes and standards which shall be used in conjunction with the requirements given in this document for assignment of class.

### C 200 DNV reference documents

**201** The latest revision of the documents listed in Table C1 applies.

Table C1 DNV reference documents	
Reference	Title
DNV-OS-A101	Safety Principles and Arrangement
DNV-OS-B101	Metallic Materials
DNV-OS-C101	Design of Offshore Steel Structures, General
DNV-OS-C102	Structural Design of Offshore Ships
DNV-OS-C103	Structural Design of Column-Stabilised Units (LRFD method)
DNV-OS-C104	Structural Design of Self-Elevating Units (LRFD method)
DNV-OS-C105	Structural Design of TLPs (LRFD method)
DNV-OS-C106	Structural Design of Deep Draught Floating Units (LRFD method)
DNV-OS-C201	Structural Design of Offshore Units (WSD method)
DNV-OS-C301	Stability and Watertight Integrity
DNV-OS-C401	Fabrication and Testing of Offshore Structures
DNV-OS-D101	Marine and Machinery Systems and Equipment
DNV-OS-D201	Electrical Installations

Table C1 DNV reference documents (Continued)	
Reference	Title
DNV-OS-D202	Instrumentation and Telecommunication Systems
DNV-OS-D301	Fire Protection
DNV-OS-E101	Drilling Plant
DNV-OS-E201	Hydrocarbon Production Plant
DNV-OS-E301	Position Mooring
DNV-OS-E401	Helicopter Decks
DNV-RP-A201	Standard Documentation Types
DNV-RP-A202	Documentation of Offshore Projects
	Rules for Classification of Ships
	Rules for Certification of Lifting Appliances
	Rules for Certification of Diving Systems

### C 300 Other references

**301** The latest revision of the documents listed in Table C2 applies.

Table C2 Non-DNV normative reference documents	
Reference	Title
API RP 2SK	Design and Analysis of Stationkeeping Systems for Floating Structures
IACS	Shipbuilding and Repair Quality Standard

## D. Informative References

### D 100 DNV Offshore Service Specifications

**101** The publications in Table D1 are referenced in the text of this document, and may be used as a source of supplementary services and information.

**102** The latest revision of the documents listed in Table D1 applies.

Table D1 DNV informative references	
Reference	Title
DNV-OSS-101	Rules for Classification of Offshore Drilling and Support Units
DNV-OSS-103	Rules for Classification of LNG/LPG Floating Production and Storage Units or Installations
DNV-OSS-202	Verification for Compliance with UK Shelf Regulations
Classification Note 30.7	Fatigue Assessment of Ship Structures
Classification Note 72.1	Allowable Thickness Diminution for Hull Structures
Standard for Certification 1.2	Type Approval

### D 200 Other references

**201** The latest revision of the documents listed in Table D2 applies.

Table D2 Other references	
Reference	Title
API RP 8B	Inspection, Maintenance, Repair, and Remanufacture of Hoisting Equipment
BS 5430-1	Periodic inspection, testing and maintenance of transportable gas containers (excluding dissolved acetylene containers). Specification for seamless steel containers of water capacity 0.5 litres and above
PD 5500 (Previous BS 5500)	Specification for unfired fusion welded pressure vessels

## E. Abbreviations

### E 100 General

**101** The abbreviations given in Table E1 are used in this standard.

Table E1 Abbreviations	
<i>Abbreviation</i>	<i>In full</i>
API	American Petroleum Institute
BS	British Standard (issued by British Standard Institution)
DFF	Design fatigue factors
DNV	Det Norske Veritas
DP	dynamic positioning

Table E1 Abbreviations (Continued)	
<i>Abbreviation</i>	<i>In full</i>
IC	inspection category
IIP	in service inspection program
ISO	International Organisation for Standardisation
LRFD	load and resistance factor design
MPI	magnetic particle inspection
NDT	non-destructive testing
OS	Offshore standard
OSS	Offshore service specification
RP	recommended practice
SCF	stress concentration factor
WSD	working stress design

## SECTION 2

# CLASSIFICATION PRINCIPLES

### A. The Classification Concept

#### A 100 Introduction

**101** Classification is a comprehensive verification service providing assurance that a set of requirements laid down in rules established by DNV are met during design and construction, and maintained during operation of an offshore unit or installation.

Classification has gained world-wide recognition as representing an adequate level of safety and quality.

**102** Classification implies an activity, in which an offshore 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.

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

#### A 200 Entering into force and application of rules

**201** Rules and amendments accepted by the Board will come into force when decided by the Board, normally six (6) months after acceptance.

**202** The rules which are in force at the date of the written request for classification, are the basis for the assignment and maintenance of class.

Subsequent amendments not made mandatory according to 204 may be applied to objects under construction provided both builder and owner agree to such application.

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

**204** DNV will consider alternatives found to represent an overall safety standard equivalent to that of the rules. The alternative solution shall be adequately documented and will be reviewed for acceptance on the basis of relevant references set forth by DNV.

Approval may be revoked if subsequent information indicates that the chosen alternative is not satisfactory.

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

**206** In cases where detailed requirements are not given in the rules, specific solutions or decisions approved by DNV and its surveyors shall be based on the principles of the rules, and shall give a safety standard equivalent to that of the rules.

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

**208** In accordance with 204, DNV may consider the use of reliability methods as a means of documenting compliance to

class requirements.

**209** Periodical survey regulations for retaining class in the operational phase shall always be according to the current rules in force at the time of survey (given in Ch.3).

#### A 300 Basis for assignment of class

**301** Having assigned a specific class implies that DNV:

- has been satisfied that the object meets the rule requirements for the particular class
- will verify, through a system of surveys, that the requirements stipulated for retention of class are complied with.

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

**303** When assigning class to an offshore unit or installation which has not been built under supervision of DNV, but by another recognised classification society, DNV may on the basis of an overall safety consideration give exemptions from rule requirements.

**304** When assigning class to offshore units or installations belonging to a series, where others are under construction to class by another recognised classification society, DNV may on the basis of an overall safety consideration give exemptions from DNV rule requirements, and base the survey on the design approval done by the other recognised society. The same applies for a design previously accepted by another recognised society. A note to this effect may be included in the Appendix to the classification certificate.

**305** When assigning class to an offshore unit or installation registered in a flag state that undertakes approval and surveys of items covered by the rules, DNV may accept their decisions as basis for assigning class.

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

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

#### A 400 Basis for maintenance of class

**401** The requirements for retention of class are found in Sec.4 B. In addition, classification is based on the following:

##### *Valid statutory certificates*

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

##### *Maintenance of the unit or installation and its equipment*

The unit or installation, machinery installations and equipment shall be maintained at a standard complying with the requirements of the rules.

Installed systems or equipment carried on board in excess of the rule requirements, but otherwise covered by the rules, shall either be maintained in accordance with the rules, or be removed or disconnected in such a way as to ensure that the installed system or equipment cannot be used.

##### *Handling of the unit or installation*

The unit or installation, machinery installations and equipment shall be adequately manned and competently handled. Class



conditions regarding the use of the unit shall be observed.

#### *Recording of lightweight and centre of gravity*

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

### **A 500 Documentation**

**501** All information which may influence the judgement, decisions and requirements of DNV for the purpose of classification, shall be made available to DNV. It is the client's responsibility to ensure that such information is brought to the attention of DNV in a timely manner. Information may be made available by submitting documents or by surveys performed at the client's premises, onboard or at the premises of the client's sub-contractors.

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

### **A 600 Disclosure of information**

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

The supply of information may take place electronically and on a continual basis, e.g. by on-line access to DNV's databases.

#### **Guidance note:**

Table A1 indicates which parties will be entitled to various kinds of information.

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

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

**603** Internal communication, notes, calculations etc. pro-

duced within DNV in connection with classification will not be disclosed to other parties.

**604** Notwithstanding 601 to 603, authorised representatives of the national maritime authorities or of the audit team of IACS performing quality audits, will have access to such information. These representatives are to confirm in writing that they are not in any manner allowed to reproduce or communicate such information to other parties.

**605** Notwithstanding 601 and 603 DNV may disclose any information to a police authority upon a written request by the same.

### **A 700 Limitation of DNV's responsibility**

**701** The classification service is performed on the basic assumption that other parties involved (building yard, designers, manufacturers, sub-contractors, owners, etc.) fulfil their individual obligations. The classification service is not performed in substitution of other parties' role or obligations. Nothing contained herein or in any certificate, report or document issued in connection with or pursuant to these rules, shall relieve any designer, engineer, builder, manufacturer, yard, seller, supplier, owner, operator or other parties from any obligations or consequences of default whatsoever. In particular, compliance with the rules does not imply acceptance or commissioning of an offshore unit or installation. This is the exclusive responsibility of the owner.

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

### **A 800 Vertical contract audits and audits by national maritime authorities**

**801** For the purpose of conducting vertical audits performed by the audit team of IACS, and audits performed by the national maritime authorities of the flag state, access shall be provided to the unit or installation and/or to the premises of manufacturer or yard, as appropriate.

**Table A1 Disclosure of information**

<i>Information in question</i>	<i>Owner</i>	<i>Flag Administration</i>	<i>Port State Authority</i>	<i>Insurance Company *</i>	<i>Yard or suppliers</i>
Newbuildings:					
a) Approved "as carried out" structure related drawings	2)	1)			4)
b) Approved "as carried out" system and component drawings	2)	2)			2)
Units in operation:					
a) Class and statutory certificates issued by DNV	4)	1)	1)	3)	
b) Survey and certificate status including text of conditions of class	4)	4)	1)	1) **	
c) Survey reports	4) + 1)	1)	2)	3)	
Other information:					
Correspondence with yard or owner	2)	2)		2)	2)
1) Upon request 2) When accepted by owner or yard and copyright holder as applicable 3) When accepted by owner or through special clause in insurance contract 4) Automatically available * Insurance company means P&I clubs and hull/structure & machinery underwriters ** Overdue conditions of class, only					

## SECTION 3 CLASSIFICATION SCOPE AND NOTATIONS

### A. Scope of Classification

#### A 100 General

**101** The rules and referred standards define acceptance criteria for design, construction, survey and testing of offshore units and installations, their marine, machinery and utility installations, systems and equipment, applicable to the new-building and operational phase.

#### A 200 Rule parts

**201** The present offshore service specification states terms and procedures for assigning and maintaining class for production and storage units, as well as listing the applicable technical reference documents stipulating technical requirements for classification. These may be DNV offshore standards, other DNV standards and internationally recognised codes.

#### A 300 Rule particulars

**301** These rules with reference standards give requirements in the following areas:

##### Hull and main structure

- strength
- materials and welding
- corrosion protection
- constructional fire protection
- weathertight and watertight integrity
- stability and floatability
- tank arrangement.

##### Marine, machinery and utility installations and equipment

System installations and equipment, including their related auxiliary functions, with respect to strength and performance as applicable to the following functions:

- power generation
- propulsion (for **1A1** main class)
- steering (for **1A1** main class)
- fire and gas protection, detection and fire extinction
- drainage and bilge pumping
- ballasting
- anchoring and mooring
- hazardous area categorisation (if applicable).

Other machinery installations, regardless of their contribution to the main functions stated above, when located in enclosed hull compartments.

Other installations stated in the rules.

### B. Class Notations

#### B 100 General

**101** Classed units and installations will be given a class designation consisting of:

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

#### B 200 Construction symbols

**201** The symbol  $\boxtimes$  will be given to units and installations built under the supervision of DNV.

**202** The symbol  $\boxplus$  will be given to units and installations built under the supervision of a recognised classification society and later assigned class with DNV.

#### B 300 Main character of class

**301** The notation **1A1** will be given to mobile offshore units with hull and marine machinery and equipment found to be in compliance with the basic (common) requirements of the applicable DNV offshore standards referred to in the rules.

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

**303** For **OI** main class there may be cases where the client 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 will be specified in the class agreement and reflected in the class notations for the installation.

#### B 400 Basic design notations

**401** The basic design notation indicates the type of structure. The notations currently in use are given in Table B1.

Table B1 Basic design notations	
Basic design notation	Description
<b>Ship-shaped Unit or Installation</b>	Monohull ship and barge type units or installations having displacement hulls with or without propulsion machinery.
<b>Column-stabilised Unit or Installation</b>	Unit or installation dependent on the buoyancy of widely spaced columns for floatation and stability for all modes of operation.
<b>Self-elevating Unit or Installation</b>	Unit or installation with hull of sufficient buoyancy for safe transport which is raised above sea surface on legs supported by the sea bed during operation.
<b>Deep Draught Installation</b>	Floating structure having a relatively deep draught to obtain high heave eigenperiod avoiding resonance responses. A deep draught unit or installation can have single or multi-vertical columns, with or without moonpools.
<b>Tension Leg Installation</b>	A buoyant installation connected to a fixed foundation by pre-tensioned tendons.

**402** For types of objects not properly characterised by the listed notations, the basic notations:

✕ **1A1 Mobile Offshore Unit**

✕ **OI Floating Offshore Installation**

may be used.

## B 500 Service notations

**501** Units or installations constructed according to DNV rules for offshore classification, arranged for a particular service and found to be in accordance with the relevant requirements for such service, will be given a corresponding service notation.

**502** Service notations currently in use are defined in Table B2.

Table B2 Service notations	
Notation	Description
<b>Oil Production</b>	Unit or installation with production of hydrocarbons as a main function
<b>Oil Storage</b>	Unit or installation with storage of hydrocarbons as a main function

**503** The service notations in Table B2 shall be considered mandatory for the relevant types of units or installations.

**504** Classification services related to LNG/LPG production and storage are presented in DNV-OSS-103.

## B 600 System and special facility notations

**601** Units or installations having special facilities, systems or equipment found to satisfy specified class requirements will be given a corresponding class notation. Notations currently in

use are given in Table B3.

Table B3 Additional system and special facility notations	
Notation *)	Description
<b>DYNPOS-AUTS</b>	Dynamic positioning system without redundancy
<b>DYNPOS-AUT</b>	Dynamic positioning system with an independent joystick back-up and a position reference back-up
<b>DYNPOS-AUTR</b>	Dynamic positioning system with redundancy in technical design and with an independent joystick back-up
<b>DYNPOS-AUTRO</b>	Dynamic positioning system with redundancy in technical design and with an independent joystick back-up. Plus a back-up dynamic positioning control system in an emergency dynamic positioning control centre, designed with physical separation for components that provide redundancy
<b>BOW LOADING</b>	Bow loading arrangement
<b>CRANE</b>	Equipped with crane(s)
<b>DEICE or DEICE-C</b>	Unit equipped with de-icing or anti-icing systems
<b>DRILL</b>	Drilling plant
<b>E0</b>	Unit equipped for unattended machinery space
<b>ECO</b>	Unit equipped for operation of machinery from centralised control station
<b>F-A</b>	Additional fire protection of accommodation space
<b>F-AM</b>	Additional fire protection of accommodation and machinery space
<b>F-M</b>	Additional fire protection of machinery space
<b>F-C</b>	Additional fire protection of cargo space
<b>F-AC</b>	Additional fire protection of accommodation and cargo space
<b>F-MC</b>	Additional fire protection of machinery and cargo space
<b>F-AMC</b>	Additional fire protection of accommodation, machinery and cargo space
<b>HELDK</b>	Helicopter deck structure
<b>HELDK-S</b>	Helicopter deck structure including safety aspect related to the unit
<b>HELDK-SH</b>	Helicopter deck structure including safety aspect related to the unit and to the helicopter
<b>HMON-1</b>	Provided with basic hull monitoring system
<b>HMON-2</b>	Provided with comprehensive hull monitoring incorporating measurement of environmental conditions
<b>ICE-L</b>	Strengthened for ice condition operation
<b>ICS</b>	Unit equipped with integrated computer system
<b>OFFLOADING</b>	Hydro carbon offloading system
<b>POSMOOR</b>	Passive position mooring system
<b>POSMOOR-V</b>	Mooring system designed for positioning in the vicinity of other structures
<b>POSMOOR-TA</b>	Thruster assisted mooring system dependent on manual remote thrust control system
<b>POSMOOR-ATA</b>	Thruster assisted mooring system dependent on automatic remote thrust control system
<b>PROD</b>	Hydrocarbon production plant
<b>SBM</b>	Unit with implemented management system

Table B3 Additional system and special facility notations (Continued)	
Notation *)	Description
<b>SPM</b>	Single point mooring
<b>STL</b>	Submerged turret loading
<b>VCS-1, VCS-2 or VCS-3</b>	System for control of vapour emission from cargo tanks
*) For ship-shaped units intended to navigate or operate in waters with ice conditions, the class notations in accordance with Rules for Classification of Ships, Pt.5 Ch.1. may be assigned.	

**602** Ship-shaped units may also be assigned relevant class notations given in the DNV Rules for Classification of Ships.

### B 700 Special feature notations

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

**702** Special feature notations currently in use are listed in Table B4.

Table B4 Special feature notations	
Notation	Description
<b>SUB</b>	Column-stabilised unit strengthened for operation when resting on sea bed
<b>HOT (...°C)</b>	Structures built for high temperature cargo
<b>COAT-1 COAT-2</b>	Specification of corrosion prevention in ballast tanks
<b>TMON</b>	Tailshaft condition monitoring arrangement

### B 800 Limitations of class

**801** When, under 303, the client for an **OI** classed installation wishes to limit the scope of classification to selected areas and items only, the parts of the installation which are covered by classification will be indicated in the classification certificate. The purpose of the notation **Limitation of Class** is to indicate such limitations, if applicable.

Example:

— *Structure*: Classification is limited to cover main structure.

### B 900 Compliance with shelf state legislation

**901** When DNV is requested to carry out verification in accordance with shelf state regulations for the complete unit or installation or parts of the unit or installation, an additional notation may be assigned to the relevant class designations, consisting of the relevant country code and the issue of shelf regulations used as basis for verification in brackets, for example:

**PROD(N).**

**902** Country code notations currently in use, are listed in Table B5.

Table B5 Notations for shelf state verification	
Basic design notation	Description
<b>Production Unit or Installation(N)</b>	Verified for compliance with DNV's interpretation of relevant Norwegian shelf state requirements.
<b>Storage Unit or Installation(N)</b>	
<b>PROD(N)</b>	
<b>UKVS</b>	Verified for compliance with DNV's interpretation of relevant UK shelf requirements according to DNV-OSS-202.

**903** For further information on procedures and scope of verification for shelf requirements, see DNV offshore service specifications for shelf state compliance services listed in Table B5.

### B 1000 Combination of notations

**1001** Class notations shall be combined as follows:

⌘ **1A1** <limitation of class, if any><basic design notation> <service notation> **Unit**  
<system and special facility notations> <special feature notations>

Example:

⌘ **1A1 Column-stabilised Production Unit**  
**POSMOOR SUB.**

## SECTION 4 CLASSIFICATION PROCEDURE

### A. Assignment of Class

#### A 100 Request for classification

**101** A request for classification shall be submitted in writing by the client.

#### A 200 Requirements for workshops and yards

**201** Builders shall operate a quality management system applicable to the scope of their work. The system shall be documented and contain descriptions and procedures for quality critical aspects.

**202** Builders unknown to DNV shall demonstrate their capability to carry out fabrication of adequate quality in accordance with the rules before construction is started.

**203** Builders shall maintain a traceable record of non-conformities and corrective actions and make this available to DNV on request.

##### Guidance note:

Builders are encouraged to obtain ISO 9000 series quality system certification through DNV accredited quality system certification services.

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

**204** Welding of important structures, machinery installations and equipment shall be carried out by approved welders, with approved welding consumables and at welding shops accepted by DNV.

**205** During fabrication and construction work, DNV surveyors shall have safe access to the works at all reasonable times, insofar as the work affects classification. The client shall ensure, through contracts with the parties concerned or otherwise, that such access is possible, and that DNV is notified as to when and where the surveyor's attendance is needed.

#### A 300 Information about subcontractors and suppliers of products

**301** The following documentation from the builder (workshop and yard) and from subcontractors shall be submitted to DNV at the start of a classification project:

- list of subcontractors to the building yard
- list of suppliers of materials and components, including subcontractors if applicable.

#### A 400 Requirements for manufacturers

**401** Manufacturers of materials, components and equipment for main class shall be approved according to criteria established by DNV, as applicable.

**402** Any required quality control of materials, components and equipment, shall be traceable and documented in writing. Further, quality control shall be carried out by qualified personnel at facilities and with equipment suitable for that control.

#### A 500 Requirements for suppliers of services

**501** Firms providing services on behalf of the owner, such as measurements, tests and maintenance of safety systems and equipment, where the results may form the basis for the surveyor's decisions, shall be approved by DNV.

Where surveyors use such services in making decisions affecting statutory certifications, the suppliers are subject to approval by DNV in cases where DNV is authorised by the relevant administration to do so. For such services DNV may accept approvals done by the administration, or duly authorised organi-

sations acting on behalf of the administration.

#### A 600 Requirements for calibration of equipment

**601** Measuring and test equipment used in services by manufacturers, builders, repairers or owners, where the results may form the basis for the surveyor's decisions, shall have a documented calibration status.

#### A 700 Document approval

**701** The builder or manufacturer shall make available to DNV the following documentation according to documentation lists supplied by DNV upon receipt of class request, before production commences:

- a) Documentation required for approval. Moreover, DNV may specify alternative or additional requirements.
- b) Corresponding technical descriptions, calculations and data, including material specifications.

Any documents submitted for re-approval shall be specially marked to identify the revised parts.

The builder, with which DNV has the classification contract, is responsible for co-ordinating that drawings and other documents are submitted, and for distributing any approval comments that may have been given.

**702** When a unit or installation, which is not built under supervision of DNV, shall be classified, the information required in 701 shall, in general, be submitted for approval. The extent of documentation approval for a unit or installation, which is classed, or which was previously classed with another recognised classification society, will be decided on a case by case basis.

**703** Documentation that has been found to comply with the rule requirements will be provided with a statement of approval. Conditions and limitations of the approval will be stated as agreed in the classification contract.

**704** The approval may be revoked at any time if subsequent information indicates that the design solution was contrary to the rule requirements or intentions.

**705** The English language shall be used in drawings and specifications submitted for approval. The possibility of using the local language shall be agreed on a case by case basis.

**706** When drawings and documents are submitted as electronic files, the format and transfer method shall be agreed on a case by case basis.

#### A 800 Survey

**801** When a unit or installation is built under the supervision of DNV, the following will be verified:

- that the construction and dimensions comply with the rule requirements and the approved documentation, and that the required materials are used
- that the materials, components and systems have been certified in accordance with the rules
- that the work is carried out in compliance with the rules and with good engineering practices. IACS "Shipbuilding and Repair Quality Standard - Part A" is regarded as an example of a standard regarding hull structures describing such good engineering practices
- that satisfactory tests are carried out to the extent and in the manner prescribed by the rules.

Supervision will be carried out at the building yard and/or the

sub-suppliers at the discretion of DNV, which also decides the extent and method of control.

**802** The verification method applied by DNV at the building yard or at the manufacturers will be based on a combination of audits of an accepted quality system and visual inspections and tests.

**803** When a unit or installation, which has not been built under the supervision of DNV, shall be classified, DNV will carry out surveys to confirm:

- that the design and dimensions comply with the approved documentation
- that the materials, components and systems are in accordance with the rules
- that the workmanship is in compliance with the applicable rules and with good engineering practice.

Functional tests will be carried out as deemed necessary by DNV.

**804** For units or installations built under the supervision of another recognised society the requirements of 803 will normally be considered as complied with for the main class.

**805** When an existing unit or installation is to be classified, it is in general to undergo all periodical surveys pertaining to the age and type of unit or installation.

The extent of surveys will be decided by DNV in each separate case.

#### **A 900 Functional testing**

**901** A test programme shall be prepared by the builder. The programme shall specify systems and components to be tested, and the testing procedure. The programme shall include sea trials with machinery and equipment installed (as applicable).

**902** The tests shall give evidence of satisfactory operation in accordance with the rules. When testing the control and safety system, failure modes shall be simulated as realistically as possible.

**903** Unless otherwise agreed, the testing required by the rules shall be carried out in the presence of a surveyor. Data shall be recorded according to the test programs and as considered necessary by the surveyor.

#### **A 1000 Certification of materials, components and systems**

**1001** The scope of classification includes certification of materials, components and systems intended for the unit or installation. The rules define the extent of the certification that is needed for classification. The objective of the certification is to ensure that materials, components and systems used in units or installations to be classed by DNV conform to the rules and referenced standards within the framework of the rules.

The certification is a conformity assessment normally including both design and production assessment.

The production assessment includes inspection and testing during production and/or of the final product.

**1002** The design assessment of the materials, components and systems shall either be on a “case by case” basis or follow the procedure for type approval.

**1003** When the “case by case” procedure is used, documentation of the design shall be submitted for assessment for every application as required in the rules. A design assessment letter or design verification report shall be issued by DNV when compliance with the requirements for the design for the actual application is confirmed.

**1004** When the type approval procedure is used, documentation of the design and the results of type testing as required in type approval programmes and the rules, shall be submitted for assessment. A type approval certificate shall be issued by

DNV when compliance with the requirements for the design is confirmed. The type approval certificate has a validity of 2 or 4 years depending on type of material, component and system.

**1005** The production assessment of materials, components and systems shall either be on a “case by case” basis or on the basis of an agreed Manufacturing Survey Arrangement (MSA).

**1006** When the “case by case” procedure is used, the survey and testing shall be performed on the basis of approved design documentation for the actual application and as required in the rules. Compliance with the approved design documentation and the requirements shall be documented through certificates as required in the rules.

**1007** When the production assessment is based on an MSA, the survey and testing shall be performed on the basis of approved design documentation and in accordance with requirements and procedures laid down in the MSA. Compliance with the approved design documentation and the requirements shall be documented through certificates as specified in the MSA or as required in the rules.

**1008** Certification of materials, components and systems shall be documented by the following types of documents:

- 1) DNV Product certificate (NV):  
A document signed by a DNV surveyor stating:
  - conformity with rules or standard requirements
  - that tests are carried out on the certified product itself
  - that tests are made on samples taken from the certified product itself
  - that tests are performed in presence of the surveyor or in accordance with special agreements.
- 2) Works certificate (W):  
A document signed by the manufacturer stating:
  - conformity with rules or standard requirements
  - that tests are carried out on the certified product itself
  - that tests are made on samples taken from the certified product itself
  - that tests are witnessed and signed by a qualified department of the manufacturers.
- 3) Test report (TR):  
A document signed by the manufacturer stating:
  - conformity with rules or standard requirements
  - that tests are carried out on samples from the current production.

The applicable rules or standards will specify which of the above mentioned documentation will be required.

**1009** Where the rules require Works certificate (W) or Test report (TR), the surveyor may at any time require tests to be carried out in his presence and/or check elements of the quality control in operation.

**1010** For identification and traceability, certified products shall be stamped in accordance with the marking given in the product certificate and as specified by the applicable rules or standards.

**1011** For certain components and systems as defined in the rules, the certification may be based on defined internationally recognised standards and certification schemes that cover the overall quality, safety and environmental standard of the rules. Compliance with the requirements of the standard shall be documented as required by the standard.

**1012** To ensure an efficient, cost effective and correct certification process, a general certification agreement is normally to be established with manufacturers delivering NV certified products.

The general certification agreement may be part of a manufacturing survey arrangement (MSA).

The general certification agreement shall include information on the procedures for design and production assessment and on transfer of information and experience between the manufacturer and DNV.

#### **A 1100 Manufacturing survey arrangement**

**1101** When the procedures and processes of a building yard's or a manufacturer's quality system meet the quality, safety and environmental standard of the rules, a manufacturing survey arrangement (MSA) may be established with the yard or the manufacturer as an alternative to the verification and production assessment described in the applicable rules.

**1102** The agreed MSA shall be described in a document stating the requirements, scope, acceptance criteria, documentation and the roles of DNV and the yard or the manufacturer in connection with the production assessment.

**1103** When it is agreed through an MSA that the majority of the required surveys and tests are being completed without the presence of a surveyor, it is conditional upon the manufacturer having in operation a quality system certified by an accredited certification body to ISO 9002, or equivalent.

**1104** When establishing an MSA, an initial assessment of the manufacturer's ability to control product quality and to comply with the scope, requirements and criteria laid down in the MSA shall be performed. The extent and frequency of periodical assessments of the manufacturer shall be included in the MSA.

**1105** An MSA is normally given a validity of 4 years. When the MSA is based on a certified quality system, the MSA automatically becomes invalid if the quality system certification is no longer valid.

#### **A 1200 Type approval**

**1201** Type approval is a procedure for design assessment. Type approval can be applied to a:

- product
- group of products
- system.

This procedure should normally be used for design assessment of standard designs.

**1202** The type approval procedure will normally consist of the following elements:

- design approval
- type testing
- issuance of type approval certificate.

The type approval procedure used by DNV is described in Standard for Certification 1.2.

**1203** For certain products, equipment and systems as defined in the rules, type approval is sufficient as the assessment needed for conforming product quality, i.e. production assessment is not required.

**1204** For certain products, equipment and systems as defined in the rules, type approval is a mandatory procedure for design assessment.

**1205** For products, equipment and systems manufactured for stock, type approval shall be the normal procedure for assessment of design.

**1206** For type approved products, where the basis for approval is the rules, documentation of the product need not be submitted for approval for each offshore unit or installation unless otherwise stated as a condition on the type approval certificate. In such cases only the arrangement or system plans, interface plans and those plans mentioned on the type approval certificate shall be submitted for approval.

#### **A 1300 Acceptance of control by national authorities**

**1301** In cases where the administration of a flag state reviews plans, carries out type approval, and surveys the unit or installation and/or its components and equipment in accordance with the rules requirements, consideration will be given to the acceptance of this control as basis for the assignment of class.

#### **A 1400 Certificate of interim class**

**1401** When the surveyor is of the opinion that the requirements corresponding to the class in question have been met, he will document the completion of the building supervision by issuing the certificate of interim class, which is valid until the administration of DNV has confirmed the class and issued the classification certificate.

**1402** At the discretion of the surveyor the building supervision may be considered to be completed with some minor items unverified, provided conditions of class are issued to the effect that the remaining work, surveys or other measures shall be completed within a specified time. At the same time the surveyor will document the completion of the newbuilding supervision by issuing the certificate of interim class as indicated in 1401.

**1403** In case of classification of an existing unit or installation not built under the supervision of DNV, or classification of an existing unit or installation previously classed by DNV, the surveyor will issue the certificate of interim class when he is satisfied that the applicable requirements have been met.

#### **A 1500 Classification certificate**

**1501** When the administration of DNV has examined the surveyor's report and is satisfied that the requirements have been met, class will be assigned and a classification certificate will be issued.

Provided the requirements for maintenance of class will be complied with, and unless the class has been withdrawn in writing at an earlier stage, the classification certificate will be valid for 5 years.

#### **A 1600 Appendix to the classification certificate**

**1601** An "Appendix to the classification certificate" will be issued stating assumptions for the assignment of class and conditions regarding the use of the unit or installation, which were established or assumed at the time of assignment of class.

#### **A 1700 Entry in the "Register of vessels classed by DNV"**

**1701** When an offshore unit or installation has been assigned class, its main particulars and details of class will be entered in the Register. In addition to the class notations, an appropriate type descriptive note may be entered in the Register.

**1702** For units or installations built under the supervision of DNV, the class is entered with a statement of the year and month from which the periodical surveys will be dated. For other units or installations a notation is made of the year and month of completion of the survey mentioned in 805.

**1703** If the unit or installation is not immediately commissioned upon completion of the building supervision, the unit or installation is subject to a condition survey at the time when it enters service. Provided the result of this survey is in all respects satisfactory, subsequent periodical surveys will date from the time of the condition survey.

#### **A 1800 Decline of application for classification**

**1801** DNV reserves the right to decline an application for classification or reclassification where the prior history or condition of the unit or prior experience with the owner indicates this to be appropriate.

## B. Retention of Class

### B 100 General

**101** In order to retain a unit's class, the owner shall:

- submit complete and correct information on the unit or installation and its use, which would be of significance to DNV for assessment of the condition of the unit or installation in relation to the rules and referred standards
- submit complete and correct information on the ownership and management of the unit or installation, addresses and corresponding administrative information pertinent to the relations with DNV
- subject the unit or installation to prescribed periodical and renewal surveys, surveys of damage, repairs, conversions and alterations
- subject the unit or installation to unscheduled surveys when deemed necessary by DNV
- carry out conditions of class specified by DNV in accordance with the rules within the given time limit
- pay all fees and expenses due to DNV. The owner has, with his or her managers, charterers and operators, a joint and several liability for any such fees and expenses. If a request for work is made by any other than the owner, that party will, in addition to the owner, be responsible for the payment of the relevant fees.

**102** It is the duty of the owner to request surveys from DNV and to provide the assistance and safe access required to the extent necessary for completion of the surveys in accordance with the rules.

**103** It is a prerequisite for retention of class that:

- the statutory certificates (as applicable) are valid at all times
- the surveys prescribed in the statutory regulations are carried out within the time frames prescribed
- the certificates are issued by DNV when so authorised or else by the flag administration itself, except for the safety radio certificate (if a separate certificate) where DNV may accept the certificate issuance by any organisation authorised by the flag administration.

#### Guidance note:

In case of dually classed units or installations, DNV may accept statutory certification by the 'dual' class society, upon agreement.

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**104** In co-operation with port states or shelf state authorities, a surveyor will attend on board a classed unit or installation when so requested by a port state or shelf state authority, in order to assist in the rectification of reported deficiencies or other discrepancies related to classification.

Prior to attendance on board, the surveyor will inform the owner or owner's representative. Where appropriate, the unit or installation's flag state will be notified of such attendance and survey.

### B 200 Periodical and renewal surveys

**201** A unit or installation shall be subjected to surveys with frequency and extent given in the rules.

Surveys carried out by national authorities of the flag state may be accepted as basis for the retention of the class.

### B 300 Survey of damage

**301** If the hull, machinery installations, systems or equipment covered by classification sustain damage to such an extent that it may be presumed to lead to a condition of class, DNV shall be informed without delay. The unit or installation shall be surveyed as considered necessary by DNV for ascertaining the amount of damage.

### B 400 Repairs

**401** When hull, machinery installations, systems or equipment is covered by classification and is to be subjected to repairs of any significance, then the work shall be carried out by qualified personnel and in compliance with the applicable rules, and with good engineering practices under the supervision of a surveyor.

#### Guidance note:

IACS "Shipbuilding and Repair Quality Standard - Part B" is regarded as an example of a standard concerning hull structures that describes such good engineering practice. Guidelines for hull repairs can be found in Classification Note 72.1.

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**402** If repairs (e.g. during voyage) stipulated in 401 are to be carried out without the attendance of a surveyor, a repair plan should be approved by DNV in advance.

Repairs shall only be carried out to an extent and by methods which at any time do not seriously affect the main functions of the unit or installation and its watertight and structural integrity.

**403** In cases where repairs are carried out without attendance of a surveyor, documentation with respect to quality of materials used, and the qualification of personnel having carried out the repairs, shall be available when the surveyor is called for acceptance.

### B 500 Procedures for maintenance

**501** When referring to maintenance procedures in the rules, these are normally meant to be procedures recommended by the supplier of the relevant equipment or systems or to other applicable recognised standards for the equipment or system in question.

### B 600 Conversions and alterations

**601** If hull, machinery installations, equipment or systems covered by classification are to be converted or altered, the changes shall be documented and approved by DNV in advance.

When changes to the unit's displacement exceed 5%, new global load and response analyses shall be documented to demonstrate sufficient structural strength including fatigue capacity. Required minimum fatigue life for joint details shall normally be taken as 15 years.

**602** Alterations to hull, machinery and equipment made possible by amendments of the applicable rules may be undertaken provided the general safety and performance standard required for retention of class will be maintained.

**603** The conversion or the alteration shall take place under the surveyor's supervision in the same manner as for new constructions.

**604** Units or installations which undergo conversions or alterations shall satisfy the following:

- comply with all requirements applicable when the unit or installation was first built
- repairs, alterations and modifications of a major character and related outfitting shall meet the requirements in force at the time of conversion as far as DNV deems reasonable and practicable.

**605** By modifications of a major character is to be understood major conversions defined as a conversion of an existing unit or installation:

- which substantially alters the dimensions or carrying capacity of the unit or installation
- which changes the service type of the unit or installation



- the intent of which in the opinion of DNV is substantially to prolong its life.

**606** Repairs, alterations and modifications shall not impair the safety standard of the unit or installation.

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

#### **B 700 Change of ownership**

**701** A unit or installation retains class when transferred to another owner. In the case of such transfer the previous owner shall give DNV a written notice immediately. Until this has been done, communication with binding effect will be sent to the previous owner.

#### **B 800 Conditions of class and memoranda**

**801** If it is found that the unit's hull, machinery and or equipment have sustained damage, become defective or deficient relative to the applicable requirements, DNV will issue a written statement in the form of a condition.

**802** A condition of class (CC) will be issued if the condition is related to requirements set by the rules. A CC is subject to specified rectification (e.g. repairs) or operation (e.g. survey) and shall be carried out within a given time limit, in order that the unit retains class. If the defect or deficiency is of a nature that requires immediate rectification, then this will be specifically communicated to the owner or his representative.

**803** A condition on behalf of the administration (abbreviated CA) will be issued if the condition is related to requirements given by the national authority and is outside the scope of classification.

**804** If DNV deems it necessary to carry out examinations in order to ascertain whether damage defect or insufficiency has been sustained or is imminent, a condition (CC or CA) will be issued.

**805** A Memorandum to owner (abbreviated MO) is information related to the unit, its machinery and equipment or to rule requirements. An MO will be issued in relation to items that are considered to be of no immediate material significance regarding safety. An MO may supplement information given otherwise, e.g. in the Appendix to the classification certificate (see A1500) or the Register of vessels classed with DNV (see A1601).

An MO may, for example, be used in the following cases:

- exemptions from rule requirements
- limitations on the use of the unit or its equipment
- deficient or lack of documentation
- defects or deficiencies of no concern to class
- technical measurements or examinations required
- suspended voluntary class notations
- equipment in excess of class requirements taken out of use.

**806** A time limit may be given if an action is required by the owner under the MO. If the required action is not carried out within the given time limit, the MO will be replaced by a CC.

**807** Conditions and memoranda are given in writing to the owners. Conditions may be made verbally, provided that the representative of the owner(s) accepts the condition and the surveyor ensures that the condition has been rectified before the survey has been completed.

**808** DNV may at any time alter a condition, memorandum or information if this is considered appropriate.

#### **B 900 Survey reports and survey status**

**901** The surveyor will prepare and submit to the owner reports on all surveys which have been carried out and issue CC

and MO, when relevant.

**902** DNV will make available survey and certificate status reports to owners via the DNV Internet website. It is the owner's responsibility to obtain this information from the DNV Internet website. Survey and certificate status reports, on paper, will be distributed by special request only.

### **C. Validity and Issuance of the Classification Certificate**

#### **C 100 Validity of the certificate**

**101** When the renewal surveys for hull, machinery installations and equipment have been satisfactorily completed, the validity of the classification certificate will be extended by the attending surveyor.

**102** When the administration of DNV has examined the surveyor's report and is satisfied that the applicable requirements have been met, the retention of class will be confirmed by the issuance of a new classification certificate.

**103** The validity of the classification certificate given in 102 will be 5 years, provided that the annual and intermediate surveys are carried out at intervals and within the time windows required by the rules, and that satisfactory completion of these surveys have been confirmed by endorsement on the classification certificate.

#### **C 200 Issuance of certificate**

**201** For renewal surveys completed within 3 months before the expiry date of the existing certificate, the new certificate will be valid to a date not exceeding 5 years from the expiry date of the existing certificate.

**202** For renewal surveys completed after the expiry date of the existing certificate, the new certificate will be valid to a date not exceeding 5 years from the expiry date of the existing certificate.

**203** For renewal surveys completed more than 3 months before the expiry date of the existing certificate, the new certificate will be valid to a date not exceeding 5 years from the completion date of the renewal survey.

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

**205** In cases where the renewal surveys are carried out concurrently with major conversions and/or alterations requiring a long conversion time, the validity of the new certificate will normally be 5 years from the date of the completion and/or alteration.

### **D. Suspension and Withdrawal of Class**

#### **D 100 General**

**101** DNV may suspend or withdraw class in cases where the assumptions as the basis for classification, or the provisions for retention of class, have been violated.

**102** The decision to suspend or withdraw class is made by the administration of DNV. However, in cases of automatic suspension, no individual decision is made. Suspension or withdrawal of class may take effect immediately or after a specified period of time.

**103** If the owner's default only affects conditions related to special notations, the suspension or withdrawal may be limited to these class notations only.

**104** When it is considered that an owner's failure to comply

with the rule requirements is sufficiently serious or fraudulent the suspension or withdrawal of class may, at the discretion of DNV, be extended to include other units controlled by the same owner.

#### **D 200 Suspension of class**

**201** If the renewal surveys for hull, machinery installations and equipment related to main character of class are not carried out before the expiry date of the classification certificate, and if no postponement has been granted, the class will be automatically suspended with immediate effect unless the surveys are under completion.

**202** If the annual or intermediate surveys are not carried out within 3 months from the anniversary date of the classification certificate the class is automatically suspended with immediate effect.

**203** DNV may further decide to suspend class if the unit or installation is not submitted to the required periodical surveys also in cases when this is due to force majeure cases, for instance a major casualty.

**204** In addition to the conditions laid down in 201, 202 and 203 main class or additional class notations may also be suspended with immediate effect by the administration of DNV in cases where repair of deficiencies have not been dealt with in an appropriate manner within the time limits given by the surveyor.

**205** Where a suspension of class has come into effect DNV will:

- notify the owner in writing
- notify the proper authorities in the country where the unit or installation is registered
- make an entry to this effect in the “Register of vessels classed with DNV”.

#### **D 300 Withdrawal of class**

**301** The class will be withdrawn at the owner's request.

**302** If the outstanding surveys specified in 201, 202 and 203 or required repairs as given in 204 are not carried out within a specified time after the class suspension, DNV may decide to withdraw class.

**303** If a unit or installation proceeds to sea without having rectified a condition of class which was required to be dealt with before leaving port, the class will be withdrawn with immediate effect.

**304** If the outstanding debt owed to DNV is not paid within a fixed date, DNV may withdraw class with one month's written notice. This also applies when the obligation to pay rests with a yard or with previous owners. In special cases a shorter

notice may be given.

**305** If the owner makes a general assignment for the benefit of his creditors or if any proceedings are commenced in court or any order or judgement is given by any court for a liquidation, winding up of the owner, DNV may withdraw the class with immediate effect.

**306** Where a withdrawal of class has come into effect DNV will:

- notify the owner in writing
- notify the proper authorities in the country where the unit or installation is registered
- make an entry to this effect in the “Register of vessels classed with DNV”.

#### **D 400 Reclassification**

**401** If the outstanding surveys leading to class suspension as given in 201, 202 and 203 or required repairs as given in 204 are carried out within a specified time and the result of this survey is such that no condition of class is given and furthermore that there is no overdue periodical surveys or conditions of class at that time, the class will be reinstated and the existing classification certificate retains its validity.

**402** In all other cases than that given in 401, and if the circumstances leading to withdrawal of class no longer exist, class may only be reinstated based upon a written request from the owner. The survey extent will in such instances be dependent upon the classification status at the time of suspension or withdrawal.

**403** When the surveyor is satisfied that the applicable requirements given in 402 have been met, he will issue a certificate of interim class which will remain valid until the administration of DNV has confirmed the class and issued the classification certificate.

**404** When the class is reinstated, DNV will confirm the reinstatement in writing to the owners and to the authorities in the country where the unit or installation is registered and make the information available to any third party upon request.

### **E. Appeals**

#### **E 100 Decisions taken by DNV**

**101** The client may request that a decision by DNV is to be taken up for reconsideration by one or more surveyors specially appointed. The expenses incurred are to be paid by the party making the appeal. If the earlier decision is revoked, the expenses will be covered by DNV.

## SECTION 5 LEGAL PROVISIONS

### A. Liability and Jurisdiction

#### A 100 Limited liability

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

In this provision "DNV " shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers,

employees, agents and any other acting on behalf of Det Norske Veritas.

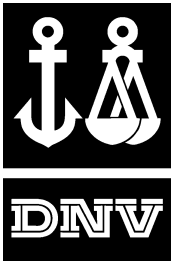
#### A 200 Governing law

**201** These rules, the classification of the object and the relationship between DNV and other parties shall be governed by Norwegian law.

#### A 300 Venue

**301** Any dispute arising in relation to or as a consequence of these rules shall only be resolved by the courts of Norway, the Municipal Court of Oslo being the proper venue.





RULES FOR CLASSIFICATION OF FLOATING  
PRODUCTION AND STORAGE UNITS

CHAPTER 2

**DESIGN AND CONSTRUCTION PROVISIONS**

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## SECTION 1

# DESIGN AND CONSTRUCTION REQUIREMENTS FOR 1A1 MOU MAIN CLASS

### A. General

#### A 100 Introduction

**101** This section identifies design and construction requirements common to all types of mobile offshore units. Units complying with these requirements will be assigned a main character of class **1A1** followed by a description of the basic design concept of the unit, e.g. column-stabilised unit.

**102** The following discipline areas are covered within main class:

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

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

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

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

**104** 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
- documentation requirements for classification
- supplementary requirements which shall be applied in conjunction with the technical reference documents for assignment of class
- requirements for certification of materials and components.

#### A 200 Technical reference documents

**201** Technical requirements are given by reference to selected:

- DNV offshore standards
- DNV recommended practices
- other DNV rules and standards
- internationally recognised codes and standards.

**202** The technical reference documents which shall be applied are given in the following subsections and are summarised in Table L1.

#### A 300 General assumptions

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

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

DNV 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.

#### A 400 Documentation

**401** Documentation required for review and approval is given by DNV-RP-A201 and DNV-RP-A202.

**402** For assignment of main class **1A1**, documents marked with class notation **1A1** in DNV-RP-A202 shall be submitted.

**403** Detailed document requirements for the individual technical discipline areas are given in the relevant subsections.

### B. Safety Principles and Arrangement

#### B 100 General

**101** Safety principles and arrangement include the following discipline areas:

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

#### B 200 Design principles

**201** The requirements given in DNV-OS-A101, Sec.1 and Sec.2, shall be complied with.

#### B 300 Arrangement

**301** Arrangement of the unit shall be in accordance with the requirements of DNV-OS-A101, Sec.3.

#### B 400 Escape and evacuation

**401** Escape and evacuation shall be in accordance with DNV-OS-A101, Sec.6.

#### B 500 Documentation requirements

**501** Documents listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS (Classification Information Breakdown Structure) codes shall be submitted for review:

- 20 Hull and structure general
- 210 Compartments
- 301 Engine room
- 350 Accommodation general
- 380 Safety general
- 386 Means of escape
- 388 Evacuation and life-saving.

### C. Materials

#### C 100 Technical requirements

**101** 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 DNV-OS-B101 unless otherwise stated in the relevant technical reference documents.

## **C 200 Supplementary classification requirements**

**201** Certification requirements for materials are given in DNV-OS-B101, Ch.3.

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

## **D. Structural Design**

### **D 100 Technical requirements**

**101** Structural design shall comply with the following design codes depending on hull shape and applied design methodology.

**102** Ship-shaped structures shall comply with DNV-OS-C102.

**103** Column-stabilised structures shall comply with DNV-OS-C103 when applying the LRFD methodology.

Alternatively the design shall comply with DNV-OS-C201 when applying the WSD methodology.

**104** Self-elevating structures shall comply with DNV-OS-C104 when applying the LRFD methodology.

Alternatively the design shall comply with DNV-OS-C201 when applying the WSD methodology.

**105** Earthquake, ice and soil conditions are not included in class scope of work for self-elevating units unless specifically specified.

**106** Tension leg structures shall comply with DNV-OS-C105 when applying the LRFD methodology.

Alternatively the design shall comply with DNV-OS-C201 when applying the WSD methodology.

**107** Deep draught structures shall comply with DNV-OS-C106 when applying the LRFD methodology.

Alternatively the design shall comply with DNV-OS-C201 when applying the WSD methodology.

**108** Transit conditions are included in the structural design scope of work. Temporary conditions are not included unless specifically specified. See definitions in Ch.1 Sec.1 B.

### **D 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS codes shall be submitted for review:

- 221 Ship structural design
- 222 Column-stabilised unit structural design
- 223 Self-elevating unit structural design
- 224 Tension leg unit structural design
- 225 Deep draught unit structural design.

## **E. Fabrication and Testing of Offshore Structures**

### **E 100 Technical requirements**

**101** Requirements for:

- welding procedures and qualification of welders
- fabrication and tolerances
- testing

— corrosion protection systems

shall be in accordance with DNV-OS-C401.

#### **Guidance note:**

Application of coating, steel surface preparation with respect to application of coating and fabrication, installation of sacrificial anodes and impressed current systems are not included in the Society's scope of work unless upon special agreement.

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### **E 200 Documentation requirements**

**201** Documentation listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS codes shall be submitted for review:

— 23 Materials.

### **E 300 Supplementary classification requirements**

**301** Classification procedures specifically related to fabrication and testing of offshore structures are given in DNV-OS-C401, Ch.3.

## **F. Stability and Watertight/Weathertight Integrity**

### **F 100 Technical requirements**

**101** Requirements for:

- intact and damaged stability
- watertight integrity
- freeboard
- weathertight closing appliances.

shall be in accordance with DNV-OS-C301.

### **F 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS codes shall be submitted for review:

- 26 Openings and closing appliances
- 28 Stability and loadline.

## **G. Mooring and Towing**

### **G 100 General**

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

- position mooring
- temporary and emergency mooring
- towing.

**102** For units with the additional class notation **POS-MOOR**, the requirements for emergency and temporary mooring are normally covered within this notation.

**103** For units with the additional class notations **DYNPOS-AUTS**, **DYNPOS-AUT**, **DYNPOS-AUTR** or **DYNPOS-AUTRO** for dynamic positioning, the requirements for emergency and temporary mooring given below shall be complied with.

**104** If required by flag administrations, DNV can perform certification of the complete mooring equipment according to the **POSMOOR** notation or the relevant national regulations.

### **G 200 Ship-shaped units**

**201** Ship-shaped units shall have an arrangement for tempo-



rary mooring complying with Rules for Classification of Ships, Pt.3 Ch.3 Sec.2.

**202** Equipment for drilling barges will be considered in each case.

### **G 300 Column-stabilised units**

**301** Column-stabilised units which may engage in sea voyage, shall have an arrangement for temporary and emergency mooring complying with DNV-OS-E301, Ch.3.

### **G 400 Self-elevating, tension leg and deep draught units**

**401** Tension leg and deep draught units are not required to have temporary or emergency mooring.

**402** Self propelled self-elevating units shall have an arrangement for temporary and emergency mooring complying with DNV-OS-E301, Ch.3.

### **G 500 Towing**

**501** All type of units shall have arrangement and devices for towing complying with DNV-OS-E301, Ch.3.

### **G 600 Documentation requirements**

**601** Documents listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS codes shall be submitted for review:

- 241 Anchoring
- 242 Mooring
- 243 Towing.

### **G 700 Supplementary classification requirements**

**701** Classification procedures specifically related to mooring and towing are given in DNV-OS-E301, Ch.3.

**702** Certification requirements for equipment are given in DNV-OS-E301, Ch.3.

## **H. Marine and Machinery Systems and Equipment**

### **H 100 Technical requirements**

**101** 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 DNV-OS-D101.

#### **Guidance note:**

Recognised codes and standards which can be applied for piping and equipment are listed in DNV-OS-D101.

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### **H 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS codes shall be submitted for review:

- 24 Anchoring, mooring and towing
- 30 Machinery, marine systems and safety, general
- 31 Propulsion
- 32 Steering
- 34 Machinery systems
- 36 Marine systems.

### **H 300 Supplementary classification requirements**

**301** Classification procedures specifically related to marine and machinery systems and equipment are given in DNV-OS-D101, Ch.3.

**302** Certification requirements for equipment are given in DNV-OS-D101, Ch.3.

## **I. Electrical Systems and Equipment**

### **I 100 Technical requirements**

**101** 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 DNV-OS-D201.

### **I 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS codes shall be submitted for review:

- 33 Electrical power.

### **I 300 Supplementary classification requirements**

**301** Classification procedures specifically related to electrical systems and equipment are given in DNV-OS-D201.

**302** Certification requirements for equipment are given in DNV-OS-D201.

## **J. Instrumentation and Telecommunication Systems**

### **J 100 Technical requirements**

**101** Instrumentation and telecommunication systems and equipment include:

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

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

### **J 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS codes shall be submitted for review:

- 37 Navigation, communication, integrated and special control.

### **J 300 Supplementary classification requirements**

**301** Classification procedures specifically related to instrumentation and telecommunication systems are given in DNV-OS-D202, Ch.3.

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

## **K. Fire Protection**

### **K 100 Technical requirements**

**101** Fire protection includes:

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

and shall be designed, manufactured, tested and installed in accordance with DNV-OS-D301, Sec.1 to Sec.6.

### **K 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **1A1** under the following CIBS codes shall be submitted for review:

- 380 Vessel safety general
- 381 Fire and explosion prevention
- 382 Fire resistance
- 383 Fire detection and alarm
- 385 Fire fighting.

### **K 300 Supplementary classification requirements**

**301** Classification procedures specifically related to fire protection are given in DNV-OS-D301, Ch.3.

**302** Certification requirements for equipment are given in DNV-OS-D301, Ch.3.

## **L. Summary of Technical Reference Standards**

### **L 100 General**

**101** Technical standards which shall be applied for assignment of main character of class for mobile offshore units are summarised in Table L1.

<b>Table L1 Technical reference standards for main character of class (1A1 MOU)</b>		
<i>Technical item</i>	<i>Reference standard</i>	<i>Applicable parts or comments</i>
<b>SAFETY PRINCIPLES AND ARRANGEMENT</b>		
Design principles	DNV-OS-A101	Sec.1: General
Arrangement		Sec.2: Design Principles and Assessment
Escape and evacuation		Sec.3: Arrangement
		Sec.6: Escape and Evacuation
<b>MATERIALS</b>		
Metallic materials	DNV-OS-B101	
<b>STRUCTURAL DESIGN (select type as appropriate)</b>		
Ship-shaped structure	DNV-OS-C102	
Column-stabilised type structure	DNV-OS-C103	LRFD methodology
	DNV-OS-C201	WSD methodology
Self-elevating type structure	DNV-OS-C104	LRFD methodology
	DNV-OS-C201	WSD methodology
<b>HULL FABRICATION</b>		
Fabrication including welding and NDT	DNV-OS-C401	Covers all types of structures
<b>STABILITY AND WATERTIGHT INTEGRITY</b>		
Stability, watertight integrity, freeboard and weathertight closing appliances	DNV-OS-C301	Covers all types of structures
<b>MOORING AND TOWING</b>		
Temporary mooring, emergency mooring, towing	Rules for Classification of ships, Pt.3 Ch.3 Sec.2	Ship-shaped units
	DNV-OS-E301	Ch.3 for all other types of units
<b>MARINE AND MACHINERY SYSTEMS AND EQUIPMENT</b>		
Piping design, manufacturing and testing; platform piping systems; machinery piping systems; machinery and mechanical equipment	DNV-OS-D101	All sections
<b>ELECTRICAL SYSTEM EQUIPMENT</b>		
Electrical systems including switchgear and controlgear assemblies, rotating machinery, static convertors, cables, installation, testing, and electric propulsion	The relevant DNV standard for electrical installations	All sections
<b>INSTRUMENTATION AND TELECOMMUNICATION SYSTEMS</b>		
Instrumentation systems including design principles, system design, computer based systems, component design and installation, and user interface	DNV-OS-D202	All sections
<b>FIRE PROTECTION</b>		
Fire protection including passive fire protection, active fire protection, fire fighting systems, fire and gas detection systems	DNV-OS-D301	Sec.1: Introduction Sec.2: Passive Fire Protection Sec.3: Active Fire Protection of Specific Areas Sec.4: Fire Fighting Systems Sec.5: Fire and Gas Detection Systems Sec.6: Miscellaneous Items

## SECTION 2

### DESIGN AND CONSTRUCTION REQUIREMENTS FOR ✕ **OI** FLOATING OFFSHORE INSTALLATION MAIN CLASS

#### A. General

##### A 100 Introduction

**101** Permanently placed non-selfpropelled floating offshore installations may be classed as offshore installations according to ✕ **OI** main class as an alternative to ✕ **1A1 MOU** main class given in Sec.1.

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

**103** 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.

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

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

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

**105** 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
- documentation requirements for classification
- supplementary requirements which shall be applied in conjunction with the technical reference documents for assignment of class
- requirements for certification of materials and components.

##### A 200 Technical reference documents

**201** Technical requirements are given by reference to selected:

- DNV offshore standards
- DNV recommended practices
- other DNV rules and standards
- internationally recognised codes and standards.

**202** The technical reference documents which shall be applied are given in the following subsections and are summarised in Table L1.

**203** If the client for specific reasons should desire to employ codes and standards other than those referred to and recommended by DNV, DNV 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.

##### A 300 General assumptions

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

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

##### A 400 Documentation

**401** Documentation required for review and approval is given by DNV-RP-A201 and DNV-RP-A202.

**402** For assignment of main class **OI**, documents marked with class notation **OI** in DNV-RP-A202 shall be submitted.

**403** Detailed document requirements for the individual technical discipline areas are given in the relevant subsections.

##### A 500 Certification of materials and components

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

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

#### B. Safety Principles and Arrangement

##### B 100 General

**101** Safety principles and arrangement include the following discipline areas:

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

##### B 200 Design principles

**201** The requirements given in DNV-OS-A101, Sec.1 and Sec.2, shall be complied with.

##### B 300 Arrangement

**301** Arrangement of the installation shall be in accordance with the requirements of DNV-OS-A101, Sec.3.

##### B 400 Escape and evacuation

**401** Escape and evacuation shall be in accordance with DNV-OS-A101, Sec.6.

##### B 500 Documentation requirements

**501** Documents listed in DNV-RP-A202 marked with class notation **OI** under the following CIBS (Classification Information Breakdown Structure) codes shall be submitted for review:

- 210 Compartments
- 301 Machinery spaces
- 350 Accommodation general
- 380 Safety general
- 386 Means of escape
- 388 Evacuation and life-saving.

## C. Materials

### C 100 Technical requirements

#### 101 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 DNV-OS-B101 unless otherwise stated in the relevant technical reference documents or specially agreed according to A203.

### C 200 Supplementary classification requirements

**201** Certification requirements for materials are given in DNV-OS-B101, Ch.3.

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

## D. Structural Design

### D 100 Technical requirements

**101** Structural design shall comply with the following design codes depending on hull shape and applied design methodology.

**102** Ship-shaped structures shall comply with DNV-OS-C102.

**103** Column-stabilised structures shall comply with DNV-OS-C103 when applying the LRFD methodology.

Alternatively the design shall comply with DNV-OS-C201 when applying the WSD methodology.

**104** Self-elevating structures shall comply with DNV-OS-C104 when applying the LRFD methodology.

Alternatively the design shall comply with DNV-OS-C201 when applying the WSD methodology.

**105** Tension leg structures shall comply with DNV-OS-C105 when applying the LRFD methodology.

Alternatively the design shall comply with DNV-OS-C201 when applying the WSD methodology.

**106** Deep draught structures shall comply with DNV-OS-C106 when applying the LRFD methodology.

Alternatively the design shall comply with DNV-OS-C201 when applying the WSD methodology.

**107** Transit conditions are included in the structural design scope of work. Temporary conditions are not included unless specifically specified. See definitions in Ch.1 Sec.1 B.

### D 200 Documentation requirements

**201** Documents listed in DNV-RP-A202 marked with class notation **OI** under the following CIBS codes shall be submitted for review:

- 221 Ship structural design
- 222 Column-stabilised unit structural design
- 223 Self-elevating unit structural design
- 224 Tension leg unit structural design
- 225 Deep draught unit structural design.

## E. Fabrication and Testing of Offshore Structures

### E 100 Technical requirements

#### 101 Requirements for:

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

shall be in accordance with DNV-OS-C401.

#### Guidance note:

Application of coating, steel surface preparation with respect to application of coating and fabrication, installation of sacrificial anodes and impressed current systems are not included in the Society's scope of work unless upon special agreement.

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### E 200 Documentation requirements

**201** Documentation listed in DNV-RP-A202 marked with class notation **OI** under the following CIBS codes shall be submitted for review:

- 23 Materials.

### E 300 Supplementary classification requirements

**301** Classification procedures specifically related to fabrication and testing of offshore structures are given in DNV-OS-C401, Ch.3.

## F. Stability and Watertight Integrity

### F 100 Technical requirements

#### 101 Requirements for:

- intact and damaged stability
- watertight integrity
- freeboard
- weathertight closing appliances

shall be in accordance with DNV-OS-C301.

### F 200 Documentation requirements

**201** Documents listed in DNV-RP-A202 marked with class notation **OI** under the following CIBS codes shall be submitted for review:

- 26 Openings and closing appliances
- 28 Stability and loadline.

## G. Mooring and Towing

### G 100 General

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

**102** The design of the mooring system shall be in accordance with DNV-OS-E301, Ch.2. Alternatively the design may be

based on compliance with API RP 2SK.

## **G 200 Supplementary classification requirements**

**201** Certification requirements for equipment shall be as given in DNV-OS-E301, Ch.3.

## **H. Utility Systems and Equipment**

### **H 100 Technical requirements**

**101** 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 DNV-OS-D101.

#### **Guidance note:**

Recognised codes and standards which can be applied for piping and equipment are listed in DNV-OS-D101.

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### **H 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **Ol** under the following CIBS codes shall be submitted for review:

- 24 Anchoring, mooring and towing
- 30 Machinery, marine systems and safety, general
- 34 Machinery systems
- 36 Marine systems.

### **H 300 Supplementary classification requirements**

**301** Classification procedures specifically related to utility systems and equipment are given in DNV-OS-D101, Ch.3.

**302** Certification requirements for equipment are given in DNV-OS-D101, Ch.3.

## **I. Electrical Systems and Equipment**

### **I 100 Technical requirements**

**101** Electrical systems and equipment include:

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

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

**102** The electrical systems shall be designed, manufactured, tested and installed in accordance with DNV-OS-D201.

### **I 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class

notation **Ol** under the following CIBS codes shall be submitted for review:

- 33 Electrical power.

### **I 300 Supplementary classification requirements**

**301** Classification procedures specifically related to electrical systems and equipment are given in DNV-OS-D201.

**302** Certification requirements for equipment are given in DNV-OS-D201.

## **J. Instrumentation and Telecommunication Systems**

### **J 100 Technical requirements**

**101** Instrumentation and telecommunication systems and equipment include:

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

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

### **J 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **Ol** under the following CIBS codes shall be submitted for review:

- 37 Navigation, communication, integrated and special control.

### **J 300 Supplementary classification requirements**

**301** Classification procedures specifically related to instrumentation and telecommunication systems are given in DNV-OS-D202, Ch.3.

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

## **K. Fire Protection**

### **K 100 Technical requirements**

**101** Fire protection includes:

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

and shall be designed, manufactured, tested and installed in accordance with DNV-OS-D301, Sec.1 to Sec.6.

### **K 200 Documentation requirements**

**201** Documents listed in DNV-RP-A202 marked with class notation **Ol** under the following CIBS codes shall be submitted for review:

- 380 Vessel safety general
- 381 Fire and explosion prevention
- 382 Fire resistance
- 383 Fire detection and alarm
- 385 Fire fighting.

**K 300 Supplementary classification requirements**

**301** Classification procedures specifically related to fire protection are given in DNV-OS-D301, Ch.3.

**302** Certification requirements for equipment are given in DNV-OS-D301, Ch.3.

**L. Summary of Technical Reference Standards****L 100 General**

**101** Technical standards which shall be applied for assignment of main character of class for floating offshore installations are summarised in Table L1.

Table L1 Technical reference standards for OI main class (Floating Offshore Installation)		
Technical item	Reference standard	Applicable parts or comments
SAFETY PRINCIPLES AND ARRANGEMENT		
Design principles	DNV-OS-A101	Sec.1: General Sec.2: Design Principles and Assessment
Arrangement		Sec.3: Arrangement
Escape and evacuation		Sec.6: Escape and Evacuation
MATERIALS		
Metallic materials	DNV-OS-B101	
STRUCTURAL DESIGN (select type as appropriate)		
Ship-shape structure	DNV-OS-C102	
Column-stabilised type structure	DNV-OS-C103	LRFD methodology
	DNV-OS-C201	WSD methodology
Self-elevating type structure	DNV-OS-C104	LRFD methodology
	DNV-OS-C201	WSD methodology
HULL FABRICATION		
Fabrication including welding and NDT	DNV-OS-C401	Covers all types of structures
STABILITY AND WATERTIGHT INTEGRITY		
Stability, watertight integrity, freeboard and weather-tight closing appliances	DNV-OS-C301	Covers all types of structures
MOORING		
Offshore mooring system	DNV-OS-E301, Ch.2or API RP 2SK DNV-OS-E301, Ch.3	Ship-shaped, column-stabilised and deep-draught units or installations
ELECTRICAL SYSTEM EQUIPMENT		
Electrical systems including switchgear and controlgear assemblies, rotating machinery, static convertors, cables, installation, testing, and electric propulsion	DNV-OS-D201	All sections
INSTRUMENTATION AND TELECOMMUNICATION SYSTEMS		
Instrumentation systems including design principles, system design, computer based systems, component design and installation, and user interface	DNV-OS-D202	All sections
FIRE PROTECTION		
Fire protection including passive fire protection, active fire protection, fire fighting systems, fire and gas detection systems	DNV-OS-D301	Sec.1: Introduction Sec.2: Passive Fire Protection Sec.3: Active Fire Protection of Specific Areas Sec.4: Fire Fighting Systems Sec.5: Fire and Gas Detection Systems Sec.6: Miscellaneous Items

## SECTION 3

### SUPPLEMENTARY REQUIREMENTS FOR SERVICE NOTATION OIL PRODUCTION UNIT OR OIL PRODUCTION INSTALLATION

#### A. General

##### A 100 Introduction

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

**102** The requirements in this section are supplementary to those for main class **1A1** as stated in Sec.1 for notation **Oil Production Unit** and **OI** in Sec.2 for notation **Oil Production Installation**.

##### A 200 Documentation requirements

**201** Documents listed in DNV-RP-A202 marked with PSU shall be submitted for review for units which are to be assigned service notation **Oil Production Unit** or **Oil Production Installation**.

#### B. Safety Principles and Arrangement

##### B 100 General

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

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

##### B 200 Arrangement

**201** Production units or installations shall comply with DNV-OS-A101, Sec.7.

##### B 300 Area classification

**301** Production units or installations shall comply with DNV-OS-A101, Sec.4.

##### B 400 Emergency shutdown

**401** Production units or installations shall comply with DNV-OS-A101, Sec.5 and Sec.7.

##### B 500 Escape, evacuation and communication

**501** Production units or installations shall comply with DNV-OS-A101, Sec.7.

##### B 600 Supplementary documentation requirements

**601** Documents listed in DNV-RP-A202 marked with PSU under the following CIBS codes shall be submitted for review:

- 380 Safety general
- 387 Emergency operations
- 80 Oil and gas production general.

#### C. Structural Design

##### C 100 General

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

- process area structural modules
- process area foundations

- turret or submerged turret structures.

**102** The structural strength shall be as required for the main class taking into account necessary strengthening of supporting structures for equipment applied in and forces introduced by the production facilities and operation.

##### C 200 Supplementary technical requirements

**201** The items listed in 101 shall comply with the relevant sections of DNV-OS-C101 and:

- DNV-OS-C102 for ship-shaped units or installations
- DNV-OS-C103 for column-stabilised units or installations
- DNV-OS-C104 for self-elevating units or installations
- DNV-OS-C106 for deep draught units or installations.

##### C 300 Supplementary documentation requirements

**301** Documents listed in DNV-RP-A202 marked with PSU under the following CIBS codes shall be submitted for review:

- 801 Process area structural modules
- 802 Process area foundation
- 836 Turret, as applicable.

#### D. Marine and Machinery and Utility Systems

##### D 100 General

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

- piping arrangements
- ventilation in hazardous areas
- turret machinery
- use of gas and crude oil for auxiliary boilers and turbines.

##### D 200 Supplementary technical requirements

**201** Documents listed in DNV-RP-A202 marked with PSU under the following CIBS codes shall be submitted for review:

- 51 Liquid cargo transfer and stripping
- 54 Cleaning and pollution prevention
- 341 Heat, ventilation and airconditioning.

#### E. Fire Protection

##### E 100 General

**101** Service notations **Oil Production Unit** or **Oil Production Installation** specifies additional requirements for:

- passive fire protection
- fire water systems
- active fire protection of specific areas
- fire detection and alarm systems
- gas detection.

##### E 200 Supplementary technical requirements

**201** Production units or installations shall comply with DNV-OS-D301, Sec.8.

##### E 300 Supplementary documentation requirements

**301** Documents listed in DNV-RP-A202 marked with PSU



under the following codes shall be submitted for review:

- 384 Gas detection, alarm and automatic actions
- 80 Oil or gas production, general.

## F. Position Keeping

### F 100 General

**101** The position keeping system shall be in accordance with Ch.2 Sec.5 B or C.

Alternatively, the class notation may be given to units based on the assumption that the position keeping system has been subjected to verification in accordance with relevant national authority regulations or recognised codes and standards.

## G. Industrial Equipment

### G 100 General

**101** Production related systems and equipment which are installed in enclosed hull compartments shall be included in the scope of classification.

**102** The items specified in 101 shall comply with relevant requirements given in DNV-OS-E201.

## H. Preparation for Surveys and Inspections on Location

### H 100 General

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

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 suction and discharges.

Letter/number codes may conveniently be applied on the shell for identification of tanks, sea suction and discharges.

Markings should be adequately documented.

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

## SECTION 4

# SUPPLEMENTARY REQUIREMENTS FOR SERVICE NOTATION OIL STORAGE UNIT OR OIL STORAGE INSTALLATION

### A. General

#### A 100 Introduction

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

**102** The requirements in this section are supplementary to those for main class **1A1** as stated in Sec.1 for notation **Oil Storage Unit** and **OI** in Sec.2 for notation **Oil Storage Installation**.

**103** Storage units also intended for transportation of crude oil shall comply with the Rules for Classification of Ships, Pt.5 Ch.3.

#### A 200 Documentation requirements

**201** Documents listed in DNV-RP-A202 marked with PSU shall be submitted for review for units which are to be assigned service notation **Oil Storage Unit** or **Oil Storage Installation** as relevant for the intended service.

### B. Safety Principles and Arrangement

#### B 100 General

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

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

#### B 200 Arrangement

**201** Storage units or installations shall comply with DNV-OS-A101, Sec.7, applicable parts.

#### B 300 Area classification

**301** Storage units or installations shall comply with DNV-OS-A101, Sec.4, and Sec.7.

#### B 400 Emergency shutdown

**401** Storage units or installations shall comply with DNV-OS-A101, Sec.5 and Sec.7.

#### B 500 Escape, evacuation and communication

**501** Storage units or installations shall comply with DNV-OS-A101, Sec.7.

#### B 600 Supplementary documentation requirements

**601** Documents listed in DNV-RP-A202 marked PSU under the following CIBS codes shall be submitted for review:

- 380 Safety general
- 387 Emergency operations.

### C. Structural Design

#### C 100 General

**101** Service notations **Oil Storage Unit** or **Oil Storage Installation** specifies additional requirements for:

- turret or submerged turret structures, as applicable.

#### C 200 Supplementary technical requirements

**201** The items listed in 101 shall comply with the relevant sections of DNV-OS-C101 and:

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

#### C 300 Supplementary documentation requirements

**301** Documents listed in DNV-RP-A202 marked with PSU under the following CIBS codes shall be submitted for review:

- 836 Turret.

### D. Marine and Machinery or Utility Systems and Equipment

#### D 100 General

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

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

#### D 200 Supplementary technical requirements

**201** The items listed in 101 shall comply with the relevant sections of DNV-OS-D101.

#### D 300 Supplementary documentation requirements

**301** Documents listed in DNV-RP-A202 marked with PSU under the following CIBS codes shall be submitted for review:

- 51 Liquid cargo transfer and stripping
- 52 Liquid cargo storing, segregation and treatment
- 53 Venting, inerting, gas freeing and vapour emission control
- 54 Cleaning and pollution prevention.

### E. Fire Protection

#### E 100 General

**101** Service notations **Oil Storage Unit** or **Oil Storage Installation** specifies additional requirements for:

- passive fire protection
- fire water systems
- active fire protection of specific areas
- fire detection and alarm systems
- gas detection.

#### E 200 Supplementary technical requirements

**201** Production units shall comply with DNV-OS-D301, Sec.8.

#### E 300 Supplementary documentation requirements

**301** Documents listed in DNV-RP-A202 marked with PSU

under the following codes shall be submitted for review:

- 384 Gas detection and alarm
- 80 Oil or gas production, general.

the assumption that the position keeping system has been subjected to verification in accordance with relevant national authority regulations or recognised codes and standards.

## **F. Position Keeping**

### **F 100 General**

**101** The position keeping system shall be in accordance with Ch.2 Sec.5 B or C.

Alternatively, the class notation may be given to units based on

## **G. Preparation for Surveys and Inspections on Location**

### **G 100 General**

**101** It is advised that operational survey and inspection aspects are taken into consideration at the design and construction stages. See Sec.3 H for details.

## SECTION 5

### DESIGN AND CONSTRUCTION REQUIREMENTS FOR SYSTEM AND SPECIAL FACILITY NOTATIONS

#### A. Introduction

##### A 100 General

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

**102** Units and installations fitted with systems and/or special facilities complying with relevant requirements of this section may be assigned class notations as described in Table A1.

Table A1 Additional system and special facility notations	
Notation	Description
<b>DYNPOS-AUTS, DYNPOS-AUT, DYNPOS-AUTR or DYNPOS-AUTRO</b>	Unit equipped with dynamic positioning system
<b>BOW LOADING</b>	Bow loading arrangement
<b>CRANE</b>	Equipped with crane
<b>DEICE or DEICE-C</b>	Equipped with de-icing/anti-icing systems
<b>DRILL</b>	Drilling facility
<b>E0</b>	Equipped for unattended machinery space
<b>ECO</b>	Equipped for operation of machinery from centralised control station
<b>F-A, F-M, F-C, F-AC, F-AM, F-MC or F-AMC</b>	Constructed with additional fire protection
<b>HELDK, HELDK-S or HELDK-SH</b>	Helicopter deck
<b>HMON-1 or HMON-2</b>	Equipped with systems for monitoring hull behaviour
<b>ICE-L</b>	Strengthened for ice transit and operation
<b>ICS</b>	Equipped with integrated computer system
<b>OFFLOADING</b>	Hydrocarbon offloading system
<b>POSMOOR, POSMOOR-V, POSMOOR-TA or POSMOOR-ATA</b>	Unit equipped with position mooring system
<b>PROD</b>	Hydrocarbon production facility
<b>SBM</b>	Unit with implemented management system
<b>SPM</b>	Single point mooring
<b>STL</b>	Submerged turret loading

Table A2 Special feature notations	
Notation	Description
<b>SUB</b>	Strengthened for operation when resting on seabed
<b>HOT(...°C)</b>	Structures built for high temperature cargo
<b>COAT-1, COAT-2</b>	Specification of corrosion prevention in ballast tanks

##### A 200 Technical reference documents

**201** Technical requirements are given by reference to selected:

- DNV offshore standards
- DNV recommended practices
- other DNV rules and standards
- internationally recognised codes and standards.

**202** The technical reference documents, which shall be applied, are given in the following subsections and summarised in Table U1.

##### A 300 General assumptions

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

**302** 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.

##### A 400 Documentation

**401** Documentation required for review and approval is stated in DNV-RP-A201 and DNV-RP-A202.

**402** Documentation with the relevant class notation abbreviation code shall be submitted.

**403** Detail document requirements for the individual class notations are given under the relevant subsections.

#### B. Position Mooring System

##### B 100 General

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

**102** The notation is complemented with the symbols **-V**, **-TA** or **-ATA** as described in Table B1.

Table B1 POSMOOR class notations	
Notation	Description
<b>POSMOOR</b>	Passive position mooring system
<b>POSMOOR-V</b>	Mooring system designed for positioning in vicinity of other structures
<b>POSMOOR-TA</b>	Thruster assisted mooring system dependent on manual remote thrust control system
<b>POSMOOR-ATA</b>	Thruster assisted mooring system dependent on automatic remote thrust control system

**103** The notations aim to cover the reliability of the mooring system and equipment, for the purpose of ensuring safe position mooring, and covers the following aspects:

- environmental conditions and loads
- mooring system analysis
- thruster assisted mooring
- mooring equipment
- tests.

##### B 200 Technical requirements

**201** The technical requirements of DNV-OS-E301 shall be complied with for assignment of the **POSMOOR** notations.

**202** Alternatively **POSMOOR** notations may be granted based on compliance with API RP 2SK.

##### B 300 Documentation requirements

**301** Documents listed in DNV-RP-A202 marked with class notation **POSMOOR** and **POSMOOR-ATA** (as applicable) shall be submitted for review.

## B 400 Certification of materials and components

**401** Certification of equipment shall be in accordance with DNV-OS-E301, Ch.3.

## C. Dynamic Positioning Systems

### C 100 General

**101** The following notations may be assigned to units with dynamic positioning systems: **DYNPOS-AUTS**, **DYNPOS-AUT**, **DYNPOS-AUTR** or **DYNPOS-AUTRO** according to extent of requirements applied.

**102** The various notations depend on the DP-system lay-out and configuration as given in Table C1:

Table C1 Dynamic positioning class notations	
Notation	Description
<b>DYNPOS-AUTS</b>	Dynamic positioning system without redundancy
<b>DYNPOS-AUT</b>	Dynamic positioning system with an independent joystick back-up and a position reference back-up
<b>DYNPOS-AUTR</b>	Dynamic positioning system with redundancy in technical design and with an independent joystick back-up
<b>DYNPOS-AUTRO</b>	Dynamic positioning system with redundancy in technical design and with an independent joystick back-up. Plus a back-up dynamic positioning control system in an emergency dynamic positioning control centre, designed with physical separation for components that provide redundancy

**103** 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.

### C 200 Technical requirements

**201** Technical requirements for the dynamic positioning notations shall be in accordance with the Rules for Classification of Ships, Pt.6 Ch.7.

### C 300 Documentation requirements

**301** Documents listed in DNV-RP-A202 marked with class notation **DYNPOS**, **DYNPOS-AUTS**, **DYNPOS-AUT**, **DYNPOS-AUTR** or **DYNPOS-AUTRO** (as applicable) shall be submitted for review.

## D. Single Point Mooring (SPM)

### D 100 General

**101** The additional class notation **SPM** applies to units fitted with equipment enabling them to be moored to single point moorings.

**102** The requirements cover the parts of OCIMF's Recommendations for equipment employed in the mooring of ships at single point moorings, applicable for ship-shaped offshore units or installations.

### D 200 Technical requirements

**201** The requirements of the Rules for Classification of

Ships, Pt.5 Ch.3 Sec.15, shall be complied with.

### D 300 Documentation requirements

**301** Documentation as listed in the Rules for Classification of Ships, Pt.5 Ch.3 Sec.15, shall be submitted.

## E. Crude Oil Offloading System

### E 100 General

**101** The additional class notation **OFFLOADING** may be given to units or installations equipped with systems for transfer of crude oil from the unit on location to shuttle tankers complying with the requirements of 200.

### E 200 Technical requirements

**201** The requirements of DNV-OS-E201, Ch.2 Sec.4 D, shall be complied with.

## F. Bow Loading

### F 100 General

**101** The additional notation **BOW LOADING** applies to units having a bow loading arrangement satisfying the requirements of 200.

### F 200 Technical requirements

**201** The requirements of the Rules for Classification of Ships, Pt.5 Ch.3 Sec.14, shall be complied with as applicable.

### F 300 Documentation requirements

**301** Documentation as listed in the Rules for Classification of Ships, Pt.5 Ch.3 Sec.14 A300, shall be submitted.

## G. Submerged Turret Loading

### G 100 General

**101** The additional notation **STL** applies to units or installations having a submerged turret loading arrangement satisfying the requirements of 200.

### G 200 Technical requirements

**201** The requirements of the Rules for Classification of Ships, Pt.5 Ch.3 Sec.14, shall be complied with as applicable.

### G 300 Documentation requirements

**301** Documentation as listed in the Rules for Classification of Ships, Pt.5 Ch.3 Sec.14 A300, shall be submitted.

## H. Hydrocarbon Production Plant

### H 100 General

**101** Units or installations fitted with offshore hydrocarbon production facilities in compliance with DNV requirements may be assigned class notation **PROD**.

### H 200 Technical requirements

**201** The requirements for production plants are stated in DNV-OS-E201.

### H 300 Documentation requirements

**301** Documents listed in DNV-RP-A202 marked with class notation **PROD** shall be submitted for review.

## H 400 Certification of materials and components

**401** Procedures and requirements for classification including certification of equipment shall be in accordance with DNV-OS-E201, Ch.3.

## I. Drilling Plant

### I 100 General

**101** Units or installations also fitted with drilling plants in compliance with DNV requirements may be assigned class notation **DRILL**.

### I 200 Technical requirements

**201** The requirements for drilling facilities are stated in DNV-OS-E101.

### I 300 Documentation requirements

**301** Documents listed in DNV-RP-A202 marked with class notation **DRILL** shall be submitted for review.

### I 400 Certification of materials and components

**401** Procedures and requirements for classification including certification of equipment shall be in accordance with DNV-OS-E101, Ch.3.

## J. Helicopter Decks

### J 100 General

**101** 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 notations **HELDK** or **HELDK-S** or **HELDK-SH**.

**102** The various notations are related to the extent of requirements as given in Table J4.

Table J4 HELDK class notations	
Notation	Description
<b>HELDK</b>	Structural strength
<b>HELDK-S</b>	Strength and unit or installation safety
<b>HELDK-SH</b>	Strength, unit or installation safety and helicopter safety

### J 200 Technical requirements

**201** Technical requirements for **HELDK** shall comply with DNV-OS-E401, Ch.2, as applicable:

- Sec.1 to Sec.4 for notation **HELDK**
- Sec.1 to Sec.5 for notation **HELDK-S**
- Sec.1 to Sec.6 for notation **HELDK-SH**.

### J 300 Documentation requirements

**301** Documents listed in DNV-RP-A202 marked with class notation **HELDK**, **-S** and **-SH** (as applicable) shall be submitted for review.

## K. Crane Installations

### K 100 General

**101** **CRANE** notation may be given to units or installations with permanently installed cranes.

**102** In addition to certification of the crane, the following is covered:

- supporting structure for the crane, (strengthening of deck structure, pedestal etc.)
- devices for locking crane in parked position (unit at sea).

### K 200 Technical requirements

**201** The requirements given in the Rules for Classification of Ships, Pt.6 Ch.1 Sec.3, shall be complied with for assignment of class notation **CRANE**.

### K 300 Documentation requirements

**301** Document requirements listed in the Rules for Classification of Ships, Pt.6 Ch.1 Sec.3 shall be submitted for review.

### K 400 Certification of materials and components

**401** Cranes shall be delivered as DNV certified in accordance with the Rules for Certification of Lifting Appliances.

## L. Additional Fire Protection

### L 100 General

**101** Units or installations with additional fire safety measures in accommodation spaces, machinery spaces and cargo spaces may be assigned class notations **F-A**, **F-M**, **F-C**, **F-AC**, **F-AM**, **F-MC** or **F-AMC**.

**102** The various notations are related to areas subjected to additional fire protection as given in Table L1.

Table L1 Class notations for additional fire protection	
Notation	Description
<b>F-A</b>	Accommodation space
<b>F-M</b>	Machinery space
<b>F-AM</b>	Accommodation and machinery space
<b>F-C</b>	Additional fire protection of cargo space
<b>F-AC</b>	Additional fire protection of accommodation and cargo space
<b>F-MC</b>	Additional fire protection of machinery and cargo space
<b>F-AMC</b>	Additional fire protection of accommodation, machinery and cargo space

### L 200 Technical requirements

**201** The requirements as stated in the Rules for Classification of Ships, Pt.6 Ch.4, shall be complied with for assignment of the class notations.

### L 300 Documentation requirements

**301** Document requirements listed in the Rules for Classification of Ships, Pt.6 Ch.4, shall be submitted for review.

## M. De-icing and Anti-icing Systems

### M 100 General

**101** Units or installations with systems for anti-icing and de-icing as specified in this section may be assigned class notations **DEICE** or **DEICE-C** as applicable.

**102** The notation **DEICE** is aimed at maintenance of the following functions and properties of the unit and its equipment under icing conditions:

- main functions
- stability
- crew safety.

**103** **DEICE-C** also includes facilitating of cargo deck handling under icing conditions.

**M 200 Technical requirements**

**201** The requirements given in the Rules for Classification of Ships, Pt.6 Ch.1 Sec.5, shall be complied with for assignment of the class notations **DEICE** or **DEICE-C**.

**M 300 Documentation requirements**

**301** Document requirements listed in the Rules for Classification of Ships Pt.6 Ch.1 Sec.5 shall be submitted for review.

**N. Periodically Unattended Machinery Space****N 100 General**

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

**102** **E0** is assigned when machinery alarms are relayed to the bridge and engineers' accommodation, and a central control system for main propulsion machinery is fitted.

**103** **ECO** is assigned when machinery alarms are released in an attended centralised control station, and a remote control system for main propulsion machinery from at least this station is fitted.

**N 200 Technical requirements**

**201** Assignment of **E0** and **ECO** class notations is based on the compliance with the Rules for Classification of Ships, Pt.6 Ch.3.

**N 300 Documentation requirements**

**301** Documents listed in DNV-RP-A202 marked with class notations **E0** and **ECO** shall be submitted for review.

**O. Integrated Computer Systems****O 100 General**

**101** Units or installations equipped with computer based systems which are part of, or serving the main functions of the unit or installation, may be assigned the class notation **ICS**.

**O 200 Technical requirements**

**201** Assignment of **ICS** class notation is based on compliance with the Rules for Classification of Ships, Pt.6 Ch.5.

**O 300 Documentation requirements**

**301** Document requirements listed in the Rules for Classification of Ships, Pt.6 Ch.5, shall be submitted for review.

**P. Hull Monitoring System****P 100 General**

**101** Units or installations equipped with instrumentation system for monitoring hull behaviour in accordance with the requirements of this section may be assigned class notation **HMON-1** or **HMON-2** as given in Table P1.

Table P1 HMON class notations	
Notation	Description
<b>HMON-1</b>	Provided with basic hull monitoring system
<b>HMON-2</b>	Provided with comprehensive hull monitoring incorporating measurement of environmental conditions

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

**P 200 Technical requirements**

**201** Assignment of **HMON-1** and **HMON-2** class notations is based on compliance with the Rules for Classification of Ships, Pt.6 Ch.11.

**P 300 Documentation requirements**

**301** Documents listed in DNV-RP-A202 marked with class notation **HMON** shall be submitted for review.

**Q. Operation in Ice Conditions****Q 100 General**

**101** Offshore units or installations strengthened for occasional navigation and operation in waters with light to heavy first year ice conditions in accordance with this subsection may be assigned class notations **ICE-L** as described in Table Q1.

Table Q1 ICE class notations	
Notation	Description
<b>ICE-L</b>	Strengthened for ice condition operation

**Q 200 Technical requirements**

**201** The ice strengthening requirements given in the Rules for Classification of Ships, Pt.5 Ch.1 Sec.3, shall be applied as far as relevant and practicable.

**202** Propeller nozzles and associated shafts and machinery situated more than 5 m below lowest transit waterline (TWL) are not considered affected by ice loads.

**203** Ship-shaped units strengthened for navigation or operation in waters with ice conditions may be assigned class notations in accordance with Rules for Classification of Ships, Pt.5 Ch.1.

**Q 300 Documentation requirements**

**301** Document requirements listed in the Rules for Classification of Ships, Pt.5 Ch.1, shall be submitted for review.

**302** The ice strengthening requirements for Ship-shaped Units are given in Rules for Classification of Ships, Pt.5 Ch.1.

**R. Vapour Control Systems****R 100 General**

**101** Units and installations fitted with systems for control of vapour emission from cargo tanks may be given class notations as described in Table R1.

Table R1 VCS class notations	
Notation	Description
<b>VCS-1</b>	Basic installation (meeting IMO MSC/Circ.585)
<b>VCS-2</b>	<b>VCS-1</b> + overfill alarm (meeting USCG CFR 46 part 39)
<b>VCS-3</b>	<b>VCS-2</b> + installation for onboard vapour processing

**R 200 Technical requirements**

**201** Assignment of **VCS** class notations is based on compliance with the Rules for Classification of Ships, Pt. 6 Ch.10.

## R 300 Documentation requirements

**301** Document requirements listed in the Rules for Classification of Ships, Pt.6 Ch.10 Sec.1 C shall be submitted for review.

## S. Management of Safety and Environmental Protection

### S 100 General

**101** Units or installations which have implemented a management system in compliance with the provisions of this section may receive a “Shipboard SEP Classification” certificate. To receive the “Shipboard SEP Classification” certificate, the Company must hold a valid “Company SEP Classification” certificate and the unit must have been successfully audited by DNV. Units classified in accordance with the provisions of this section will be given the class notation **SBM**.

**102** SEP classification includes:

- assessment of the management system
- initial audit of the SEP management system ashore and on-board
- periodical audits ashore and onboard for retention of the SEP certificates
- renewal audits ashore and onboard every fifth year.

### S 200 Technical requirements

**201** Assignment of **SBM** class notation is based on compliance with the Rules for Classification of Ships, Pt.7 Ch.5.

## T. Special Feature Notations

### T 100 General

**101** Special feature notations provide information regarding special design assumptions, arrangements or equipment which are not covered by other class notations. Requirements related to special feature notations currently in use are described in this subsection.

### T 200 Special feature notation SUB

**201 SUB** is applicable for column-stabilised units or installations strengthened for operating when resting on the seabed.

**202** Requirements for air gap, safety against overturning stability, local reinforcement of bottom of pontoons, etc. will be specially considered for the “resting on seabed” condition.

### T 300 Special feature notation HOT(...°C)

**301** This notation applies to storage units or installations intended to carry liquid cargo at a temperature higher than 80°C at atmospheric pressure.

**302** The technical requirements in the Rules for Classification of Ships, Pt.3 Ch.1 Sec.15, are to be complied with.

### T 400 Special feature notation COAT-1 and COAT-2

**401** This notation specifies additional requirements for corrosion prevention of tanks.

**402** The technical requirements in the Rules for Classification

of Ships, Pt.3 Ch.1 Sec.16 D.

### T 500 Tailshaft monitoring - TMON

**501** When the following design requirements are fulfilled, the class notation **TMON** (tailshaft condition monitoring survey arrangement) may be obtained:

- the stern tube bearings are oil lubricated
- high temperature alarm is fitted on aft stern tube bearing (2 sensors or one easily interchangeable sensor located in the bearing metal near the surface, in way of the area of highest load, which normally will be the bottom area (5 to 7 o'clock) in the aft third of the bearing)
- where one interchangeable sensor is fitted one spare sensor is to be stored on board
- the setting of the stern tube high temperature alarm is normally not to exceed 65°C. Higher alarm set point may be accepted upon special consideration
- the sealing rings in the stern tube sealing box must be replaceable without shaft withdrawal or removal of propeller
- arrangement for bearing wear down measurement is fitted
- electrical grounding of the shafting is mandatory
- the system must allow representative oil samples to be taken for analysis of oil quality under running conditions. Location where samples are to be taken shall be clearly pointed out on system drawing and test cock to be fitted with signboard. A written procedure for how to take oil samples shall be submitted.

#### Guidance note:

See also Classification Note 10.1 Appendix G. Guideline for stern tube lubrication oil analysis.

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**502** A test kit for monitoring of possible water content in the stern tube lubricating oil is to be provided on board. The water content is normally not to exceed 2% by volume. If the water content above 2% is detected appropriate action shall be taken.

**503** Oil lubricated propeller shafts with roller bearings arranged in the stern tube may be granted TMON. Additional requirements for such arrangements are:

- a) The bearing temperature is to be monitored. Two sensors (or one sensor easily interchangeable at sea) are to be fitted. Temperature alarm level should normally not exceed 90°C.
- b) Vibration monitoring is required for roller bearings. Hand-held probes are not accepted; magnetic, glue, screw mountings or equivalent are compulsory.
- c) Vibration signal is to be measured as velocity or acceleration. Integration from acceleration to velocity is allowed.
- d) The vibration analysis equipment must be able to detect fault signatures in the entire frequency range for the monitored bearing. A reference level under clearly defined operational conditions is to be established. The reference level shall be used as basis for establishing an alarm level.
- e) For podded propulsors (where the propeller shaft is a part of the electrical motor rotor) all roller bearings for the propeller shafting are to be monitored with both oil temperature sensors and vibration monitoring.
- f) The water contents is normally not to exceed 0.5%.



## U. Summary of Reference Documents for Additional Class Notations

### U 100 General

**101** Rules and standards which shall be applied for assignment of system and special facility class notations are summarised in Table U1.

<b>Table U1 Summary of reference documents for system and special facility notations</b>	
<i>Notation</i>	<i>Description</i>
<b>DYNPOS-AUTS DYNPOS-AUT DYNPOS-AUTR DYNPOS-AUTRO</b>	Rules for Classification of Ships, Pt.6 Ch.7
<b>BOW LOADING</b>	Rules for Classification of Ships, Pt.5 Ch.3 Sec.14
<b>CRANE</b>	Rules for Classification of Ships, Pt.6 Ch.1 Sec.3
<b>DEICE DEICE-C</b>	Rules for Classification of Ships, Pt.6 Ch.1 Sec.52
<b>DRILL</b>	DNV-OS-E101
<b>DSV-I SF DSV-II SF DSV-III SF</b>	Rules for Classification of Ships, Pt.6 Ch.1 Sec.4
<b>E0</b>	Rules for Classification of Ships, Pt.6 Ch.3
<b>ECO</b>	Rules for Classification of Ships, Pt.6 Ch.3
<b>F-A, F-C, F-AC, F-AM, F-MC, F-M, F-AMC</b>	Rules for Classification of Ships, Pt.6 Ch.4
<b>HELDK HELDK-S HELDK-SH</b>	DNV-OS-E401
<b>HMON-1 HMON-2</b>	Rules for Classification of Ships, Pt.6 Ch.1 Sec.11
<b>ICE-L</b>	Rules for Classification of Ships, Pt.5 Ch.1 Sec.3
<b>ICS</b>	Rules for Classification of Ships, Pt.6 Ch.5
<b>OFFLOADING</b>	DNV-OS-E201, Sec.4 D
<b>POSMOOR POSMOOR-V POSMOOR-TA POSMOOR-ATA</b>	DNV-OS-E301
<b>PROD</b>	DNV-OS-E201
<b>SBM</b>	Rules for Classification of Ships, Pt.7 Ch.5
<b>SPM</b>	Rules for Classification of Ships, Pt.5 Ch.3 Sec.15
<b>STL</b>	Rules for Classification of Ships, Pt.5 Ch.3 Sec.14





RULES FOR CLASSIFICATION OF FLOATING  
PRODUCTION AND STORAGE UNITS

CHAPTER 3

**CLASSIFICATION IN OPERATION**

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## SECTION 1 GENERAL PROVISIONS FOR PERIODICAL SURVEYS

### A. General

#### A 100 Introduction

**101** This section states the periodical survey principles and requirements for retention of class to objects covered by the provisions of DNV-OSS-102. Requirements are applicable for main class, service notations and additional class notations unless otherwise stated.

**102** The extent of periodical surveying is presented in Sec.2 for main class, Sec.3 for additional service notations and Sec.4 for additional system and facility notations.

**103** Ship-shaped offshore structures are generally treated as ships with respect to survey of hull and equipment. Exceptions are noted in respective survey requirements in Sec.2.

**104** 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.

**105** For *column-stabilised and self-elevating units*, DNV 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.

#### A 200 Survey pre-planning and record keeping

**201** A specific survey program for renewal surveys and continuous surveys must be worked out in advance of the renewal survey by the owner in cooperation with the classification society. The survey program shall be in written format. The IIP may be part of the program.

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

#### A 300 Accessibility and facilities for surveys on location

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

See Ch.2 Sec.3 H for matters which will be taken into consideration for acceptance of surveys to be carried out on location.

### B. Principles

#### B 100 General

**101** In order to maintain class status, all classed units and installations are required to undergo periodical surveys. The objective of the surveys is to ascertain that the condition of the structure, machinery installations, equipment and appliances meet, and will continue to meet, applicable class requirements.

**102** Periodical surveys will in general belong to one of the following categories:

- annual surveys
- intermediate surveys
- renewal surveys
- other complete periodical surveys.

#### Guidance note:

Surveys related to additional class notations shall generally be carried out concurrently with the main class surveys as applicable.

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**103** The surveys shall, as a minimum, be carried out in accordance with the relevant rules and standards. The surveys aim to verify that hull, machinery, equipment and appliances:

- comply with applicable requirements
- will remain in satisfactory condition.

**104** In cases where the suitability and condition of such items cannot be satisfactorily confirmed from a standard survey, more comprehensive examination and/or testing may be required. This will be at the discretion of the surveyor.

#### B 200 Due date and survey windows

**201** The due date of a periodical survey will depend on 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.

**202** A survey “window” exists around each due date, consisting of a window before ( $W_B$ ) and window after ( $W_A$ ). The total survey window represents the overall allowable period within which a survey shall be initiated and completed.

**203** Surveying should normally be undertaken during the survey window. Under certain conditions, however, DNV may allow surveys to be initiated prior to entering the survey window (see C).

**204** Failing to complete surveys before the end of the survey window or expiry of allowed postponement will result in warning and potential suspension of class.

#### B 300 Postponement of periodical surveys

**301** DNV may accept to postpone periodical surveys beyond the survey window upon consideration in each separate case. Where postponement is granted, a condition of class (CC) will be issued stating the time limit for the postponement period. Annual and intermediate surveys shall normally not be postponed.

**302** Upon the owner's request, an extension of the validity of the classification certificate by maximum 6 months may be granted in exceptional cases.

### C. Periodical Surveys and Intervals

#### C 100 Survey intervals and concurrent surveys

**101** 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.

Survey intervals should in general be as given in Table C1. The detailed intervals are given in Table C2 and C3.

Intervals may be reduced at owner's request i.e. the survey may be carried out prior to the defined time window. In such a case the survey's anniversary date will be adjusted accordingly.

<b>Table C1 Survey intervals</b>				
Survey type	Interval (years)	Time window (months) see Fig.1		Remarks
		$W_B$	$W_A$	
Annual survey	1	3	3	
Intermediate survey	5	9	9	First time 2.5 years after delivery.
Complete periodical survey, 2.5 year	2.5	6	6	
Complete periodical survey, 5 year	5	3	3	
Renewal survey, 5 year	5	3	0	

Table C2 Periodical surveys main class. (For survey extent, see Sec. 2)						
Main character of class	Survey extent and type (as applicable)		Survey interval, years	Survey time window, (See Fig.1)		Remarks
				W <sub>B</sub> (months)	W <sub>A</sub> (months)	
1A1, OI	Hull, machinery and equipment	Renewal	5	3	0 (See B300)	
		Annual	3	3		
		Intermediate	2-3 (see C300)	See C300	See C300	
1A1, OI	Bottom					See Sec.2 J
1A1	Tailshaft with continuous corrosion resistant metallic liner or shaft of corrosion resistant material or shaft with specially approved protection arrangement		5	6	6	
	Tailshaft with approved oil sealing glands		5	6	6	May be extended to 10 years provided that an intermediate survey is carried out after 5 years with satisfactory result. May be extended to 15 years provided a tailshaft condition monitoring survey arrangement ( <b>TMON</b> ) has been granted.
	Thruster					See Sec.2
	Auxiliary boiler		2.5	6	6	
	Steam and steam generator		2.5	6	6	
	Thermal oil heaters		2.5	6	6	

**Table C3 Periodical surveys, additional class. (For survey extent, see Sec.3 and Sec.4)**

Additional class notation	Survey extent and type		Survey interval years	Survey time window See Fig.1		Remarks
				$W_B$ (months)	$W_A$ (months)	
<b>Oil Production Unit</b> or <b>Oil Production Installation</b>		Annual Complete periodical	1 5	3 3	3 See B300	
<b>Oil Storage Unit</b> or <b>Oil Storage Installation</b>		Annual Complete periodical	1 5	3 3	3 See B300	
<b>POSMOOR</b>	Position mooring	Annual Intermediate Complete periodical	1 2.5 5	3 6 3	3 6 See B300	See 300
<b>DYNPOS-AUTS,</b> <b>DYNPOS-AUT,</b> <b>DYNPOS-AUTR,</b> <b>DYNPOS-AUTRO</b>	Dynamic positioning, Complete periodical		2.5	6	6	See 300
<b>SPM</b>	Arrangement for single point mooring, Annual		1	3	3	
<b>OFFLOADING</b>	Offshore crude offloading arrangement, Annual		1	3	3	
<b>BOWLOADING</b>	Bow loading arrangement, Annual		1	3	3	
<b>STL</b>	Arrangement for submerged turret loading, Complete periodical		5	3	3	
<b>PROD</b>	Production plant	Annual Complete periodical	1 5	3 3	3 See B300	
<b>DRILL</b>	Drilling plant	Annual Complete periodical	1 5	3 3	3 See B300	
<b>DEICE, DEICE-C</b>	De-icing and anti-icing system, Annual		1	3	3	
<b>E0, ECO</b>	Periodically unattended machinery space	Annual Complete periodical	1 5	3 3	3 3	
<b>F-A, F-M, F-C, F-AC, F-AM, F-MC, F-AMC</b>	Additional fire protection, Complete periodical		2.5	6	6	See 300
<b>ICS</b>	Integrated computer system, Complete periodical		2.5	6	6	See 300
<b>HMON-1, HMON-2</b>	Hull monitoring system, Annual		1	3	See B300	
<b>VCS</b>	Vapour control systems, Complete periodical		5	3	See B300	
<b>SBM</b>	Safety and environmental protection (SEP) management system, Complete periodical		5	3	See B300	
<b>TMON</b>	Tailshaft monitoring, annual		1	6	6	

**Figure 1**  
**Survey time windows****C 200 Annual surveys**

**201** Annual surveys are normally visual examinations to ascertain the general condition of the unit or installation or relevant item.

A more thorough annual survey may be specified for particular structures, machinery installations or equipment due to consequences of failure or age.

**202** Unless otherwise stated, annual surveys shall be carried out within a time period 3 months either side of the due date.

**203** Where surveys are completed prior to the specified period, i.e. more than 3 months before due date, the anniversary date on the classification certificate shall be advanced corre-

spondingly, i.e. to a date not more than 3 months later than the survey completion date.

Subsequent surveys shall be carried out at prescribed intervals using the new anniversary date.

Expiry date of the classification certificate may remain unchanged, provided that the prescribed survey intervals are not exceeded. This may require one or more additional surveys.

**204** The annual survey shall be carried out concurrently with any renewal survey which is also due.

**205** The satisfactory completion of annual surveys for main character of class will be endorsed on the classification certificate.

### C 300 Intermediate surveys

**301** Intermediate surveys include visual examinations of hull structures, machinery, and electrical installations and equipment in order to ascertain that the unit continues to comply with class requirements. Intermediate survey testing is specified for particular items as necessary due to consequence of failure or age.

**302** Unless otherwise stated, intermediate surveys shall be performed at the second or third annual survey after the credited date of the renewal survey. Those aspects of the intermediate survey which are additional to the requirements of the annual survey may be undertaken either at or between the second or third annual survey.

**303** Satisfactory completion of intermediate surveys of main character of class will be endorsed on the classification certificate.

### C 400 Renewal surveys

**401** Renewal surveys are major surveys of hull structures, machinery installations and equipment. Renewal surveys include visual examinations, measurements and tests in order to confirm that the unit or installation complies with the relevant DNV class requirements and is in satisfactorily maintained condition to continue the intended service.

**402** Renewal surveys for hull, machinery installations and equipment shall be carried out at 5-yearly intervals for units with main class **1A1** and installations with main class **OI**.

**403** DNV may accept that renewal surveys for hull, machinery installations and equipment are commenced before due date, provided that the surveys are completed:

- not later than 12 months after the commencement
- in any case not later than expiry date of the classification certificate including possible postponement granted.

Renewal surveys as given above shall normally not be commenced before the fourth anniversary date.

**404** When considered necessary by the Society the interval between renewal surveys may be reduced.

**405** Renewal survey requirements of units of unusual design, in lay-up or in unusual circumstances will be determined on an individual basis.

**406** Any required repairs identified from survey examinations and tests (404) shall normally be carried out:

- before the renewal survey is regarded as complete
- not later than the expiry date of the classification certificate including possible postponement granted.

In certain cases, DNV may accept that minor deficiencies are rectified within a specified time limit not exceeding 6 months after expiry date of the classification certificate including possible postponement as stipulated in B300.

### C 500 Other periodical surveys

**501** The additional class notation's requirements shall be adhered to by the owner as conditions for the retention of these class notations, as applicable.

**502** The surveys may be performed as annual surveys, intermediate surveys and or complete periodical surveys, as detailed in C200-400.

**503** A complete periodical survey is a major survey related to an additional class notation, system or component.

**504** Alternative survey arrangements may be accepted as an option to the applicable periodical surveys for main class, see D.

**505** Surveys completed prior to the specified period, i.e. more than 3 months before due date, may be accepted. In such

cases the anniversary date on the classification certificate shall be advanced to correspond to a date not more than 3 months later than the survey completion date.

Subsequent surveys shall be carried out at prescribed intervals using the new anniversary date.

Expiry date of the classification certificate may remain unchanged, in which case one or more surveys may be required so that the prescribed survey intervals are not exceeded.

## D. Alternative Survey Arrangements

### D 100 Continuous hull surveys

**101** DNV may, upon request from the owner, accept continuous surveys of hull as an alternative to relevant renewal survey work.

The items are normally to be surveyed at intervals not exceeding 5 years. Surveys carried out 6 months or less before their due date will be given a correspondingly longer interval during the next cycle.

**102** The requirements given in 100 replace requirements given for traditional periodical survey intervals carried out by the Society with a Continuous Inspection Programme (CIP). The CIP shall specifically describe the survey requirement for the owner and the Society based on the unit's arrangement, installed equipment and systems as well as implemented planned inspection and maintenance system. The CIP shall, as a minimum, include all the items that are included in the IIP. The requirement for attendance of the Society for crediting a survey is equivalent to traditional periodical surveys.

**103** Intervals for planned inspections and maintenance should be decided based on the owner's documented experience and/or designers, builders and manufacturers recommendations. Intervals for examination of hull structures and equipment covered by CIP, according to 102, are not to exceed the intervals given for periodical surveys in C300 and C400, applicable for intermediate and renewal surveys respectively.

**104** The CIP shall be prepared by the owner, and shall as a minimum, include a description of the following:

- identification of all items included and which periodical surveys they are part of
- inspection and maintenance intervals
- inspection and maintenance methods and procedures to be followed
- inspection and maintenance reporting procedures
- procedure for corrective actions following reported deficiencies.

**105** The CIP is to include records applicable to inspections, maintenance, damages, defects and corrective actions carried out. These are to be kept as objective evidence of the condition of hull structures and equipment and the effective functioning of the CIP. The records are to be readily accessible to the attending surveyor.

**106** The implementation of CIP requires that descriptive data related to the structural condition and level of maintenance for items included are established.

#### Guidance note:

Relevant data may be obtained based on results from periodical surveys and/or condition survey and further supported with information available from classification records.

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### D 200 Surveys by the chief engineer or maintenance supervisor

**201** DNV may, upon request from the owner, accept that



continuous machinery surveys, subject to the provisions of 202 to 205, are carried out by the person in charge of the machinery department (chief engineer or maintenance supervisor).

It should be noted, however, that all surveys taking place at ports where DNV is represented shall be carried out by DNV.

**202** The conditions for granting this type of chief engineer or maintenance supervisor survey arrangement will normally be:

- the owner (or managing owner) must confirm the required qualifications of the chief engineer or maintenance supervisor
- he or she has sailed a minimum of 3 years as chief engineer or maintenance supervisor with the relevant national certificate
- he or she is presently sailing as a chief engineer or maintenance supervisor with the relevant national certificate and has been employed with the owners (or managing owners) for at least 3 years
- for MOUs where it is not required to have a chief engineer, another person in charge of the maintenance (maintenance supervisor) may be accepted on a case by case basis.

The approval is unit specific.

**Guidance note:**

Chief engineers or maintenance supervisors previously approved by DNV need not fulfil the third requirement.

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**203** When a chief engineer has been accepted for surveys on behalf of DNV, DNV will issue a chief engineer or maintenance supervisor authorisation letter. This authorisation letter shall be kept available for presentation to DNV surveyors on request.

**204** Half of all items covered by a continuous machinery survey scheme (of which there are more than one) may be surveyed by the chief engineer or maintenance supervisor (i.e. he may survey half of all identical items in one five-year survey cycle).

**205** Auxiliary diesel engines and turbines may wholly be surveyed by the chief engineer or maintenance supervisor, provided that a test run including testing of safety functions is performed in the presence of a DNV surveyor. In addition, every alternate survey of auxiliary diesel engines and turbines shall be carried out by a DNV surveyor.

**206** All surveys carried out under supervision of the chief engineer or maintenance supervisor shall be recorded in the engine log book and relevant extracts given the first attending DNV surveyor. The surveyor may, if he finds it necessary, require re-survey of the parts in question.

**207** Generator parallel operation, generator load test, and testing of protection devices for generators and switchboards shall be witnessed by a DNV surveyor (see Ch.3 Sec.3).

### **D 300 Survey arrangement based on approved planned maintenance system**

**301** Machinery and automation systems maintained under an approved planned maintenance system may be surveyed subject to a special survey arrangement stating the extent and method of the survey as outlined in the following items.

**302** The owner shall establish and operate a planned maintenance system which at least includes the maintenance procedures for:

- those items and systems which are subject to the continuous machinery survey scheme
- automation equipment

where relevant to the unit or installation, and as covered by the rules.

**303** Approval of the planned maintenance system will be based on a concentrated description of the maintenance system, but with sufficient detail to serve as basis for the approval. The approval documentation shall be in the English language, and shall be submitted by the owner.

**304** The planned maintenance system shall include documentation of:

- all items/systems which are included in the maintenance programme (inventory content)
- time intervals at which maintenance jobs shall take place (maintenance schedule)
- maintenance procedures to be followed (maintenance instructions)
- means and methods of reporting of maintenance jobs and their results (maintenance documentation and history)
- means and methods of reporting performance results and measurements taken at certain intervals for trend investigations from delivery stage (reference documentation).

All documents used in the planned maintenance system, in the form of books, set of cards etc., shall be given specific individual identification for later references.

The system shall contain necessary cross-references giving both the user and the DNV surveyor easy access to information regarding the different items and systems.

The documentation shall at all times be available for review by DNV surveyors.

**305** An on board survey shall be performed in order to verify that:

- implementation conforms to the approved planned maintenance system description
- the planned maintenance system is adapted to the type and complexity of the machinery on board
- the planned maintenance system produces documentation which demonstrates that the system operates effectively and in compliance with survey and testing requirements for retention of class
- the maintenance history and reference documentation is in the English language
- the unit is manned with a chief engineer or maintenance supervisor in possession of a valid DNV letter of authorisation, in accordance with the requirements given in D200.

**306** On satisfactory completion of an implementation survey, an approval document will be issued for a survey arrangement for the unit, stating the extent and method of survey.

**307** Where there is evidence of non-compliance with either the conditions for approval of the planned maintenance system or survey requirements for the retention of class based on this approval, and this deficiency is not rectified within a set time, the survey arrangement will be cancelled. The conditions for ordinary continuous survey of machinery will then be introduced.

**308** The survey arrangement is automatically cancelled in the event of a change in management of the unit or installation.

### **D 400 Survey arrangement based on condition monitoring system**

**401** Machinery equipped with instrumentation enabling the condition of the machinery components to be ascertained and monitored may be subject to special approval regarding the extent and method of the survey.

**402** For tailshaft condition monitoring, see Sec.4 Q.

### **D 500 Surveys of units or installations out of commission**

**501** Units or installations shall continue to be subject to annual surveys during lay-up.

**502** If the lay-up period is more than 12 months, other periodical surveys (excluding the annual survey), may be postponed depending on the maintenance and preservative measures taken during lay-up.

**503** Units or installations which have been out of commission (i.e. laid up) for a period normally of 12 months or more shall be surveyed and tested before re-entry into service. This will at least include a sea trial for function testing of the machinery installation. Remaining surveys and tests will be considered in each case depending upon the time out of commission, maintenance and preservative measures taken during lay-up, and extent of surveys carried out during this time.

## E. Special Provisions for Hull Surveys

### E 100 General

**101** The owner shall provide the necessary facilities for a safe execution of the survey.

**102** Tanks and spaces shall be safe for access, i.e. gas freed, ventilated, etc.

**103** Tanks and spaces shall be sufficiently illuminated, clean and free from water, scale, dirt, oil residues, etc. to reveal significant corrosion, deformation, fractures, damage or other structural deterioration. Cleanliness is particularly important for areas which are subject to thickness measurement.

### E 200 Access to structures

**201** For overall examination, means shall be provided to enable the surveyor to examine the structure in a safe and practical way.

**202** For close-up examination, one or more of the following means of access, acceptable to the surveyor, shall be provided:

- permanent staging and passages through structures
- temporary staging and passages through structures
- lifts and moveable platforms
- boats or rafts
- other equivalent means.

### E 300 Equipment for survey

**301** Thickness measurements shall normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment shall be proven to the satisfaction of the surveyor as required.

**302** One or more of the following non-destructive testing procedures may be required if considered necessary by the surveyor:

- radiographic testing
- ultrasonic testing
- magnetic particle testing
- eddy current testing
- dye penetrant testing
- other equivalent means.

## F. Requirements for Machinery Surveys

### F 100 Maintenance system

Every unit shall have implemented a maintenance system including at least every machinery system subject to class. The maintenance system shall ensure that:

- inspections and maintenance are carried out at defined intervals
- records of these activities are maintained.

### Guidance note:

The maintenance system may be manual or computerised.

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## G. Procedures for Class Related Services

### G 100 Thickness measurements of hull structures

**101** Thickness measurements shall be carried out by a qualified company which is certified for such activities by DNV.

**102** Thickness measurements shall normally be performed under the supervision of the surveyor. Alternatively, the surveyor may accept non-DNV supervised thickness measurement provided that provisions are made for the surveyor to re-check the measurements as deemed necessary to ensure acceptable accuracy.

**103** When thickness measurements are required in connection with intermediate, renewal or complete periodical survey, the thickness measurements shall normally be carried out within 12 months prior to the completion of the survey.

**104** Thickness measurements required, if not carried out by the Society itself, shall be witnessed by a surveyor on board to the extent necessary to control the process.

**105** 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 measurement equipment, names of personnel and their qualifications. The report shall be signed by the operator. The surveyor shall verify and countersign the report.

### Guidance note:

The single measurements recorded should represent the average of multiple measurements.

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## H. Repairs of Structural Damage

### H 100 Definition

**101** 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.

### H 200 Repairs

**201** Where repairs to hull, legs, columns or other structures, machinery or equipment, which affect or may affect classification, are planned in advance to be carried out, a complete repair procedure including the extend to proposed repair and the need for surveyors attendance is to be submitted to and agreed upon by the Society reasonably in advance. Failure to notify the Society, in advance of the repairs, may result in suspension of the unit's classification until such time as the repair is redone or evidence submitted to satisfy the surveyor that the repair was properly carried out. This applies also to repairs during voyage or on site.

**202** The above is not intended to include maintenance and overhaul to hull, other structures, machinery and equipment in accordance with recommended manufacturers procedures and established marine practice and which does not require Society approval; however, any repair as a result of such maintenance and overhauls which affects or may affect classification is to be noted in the ships log and submitted to the surveyor.

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**203** 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.

**204** 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.

## I. Special Provisions for Ageing Units

### I 100 General

**101** Mobile Offshore Units with nominal age equal to or higher than documented fatigue life shall be subject to evaluation for special provisions.

**102** A fatigue utilisation index (FUI) shall be calculated to characterise units of column-stabilised and self-elevating type. The FUI is defined as the ratio between the effective operational time and the documented fatigue life.

**103** Calculation of effective operational time shall be based on recorded operations history. For the purpose of calculating the FUI, the following may be assumed:

- contribution from operation in harsh environment, e.g. North Sea, North Atlantic and Canada, equals actual operating time in such environment
- contribution from operation in other environments equals one third of actual operating time in such environments
- periods of lay-up and yard stay may be disregarded.

**104** Owner shall submit FUI or historical data allowing for calculation of FUI as part of the planning process prior to renewal survey when the nominal age exceeds the documented fatigue life.

**105** Operation of the unit may continue when the FUI exceeds 1.0 provided requirements stipulated in I200 and I300 are complied with.

**106** The Society will issue an MO stating the FUI and agreed compensating measures (see I 200, 300) following each renewal survey after the nominal age has reached the documented fatigue life.

**107** These special provisions focus on the fatigue and corrosion properties of the hull. Degradation mechanisms due to ageing effects related to other aspects such as marine systems must also be given due consideration by owner through maintenance, and by DNV surveyors through regular surveys.

### I 200 Column-stabilised units

**201** If no fatigue cracks have been found in a unit prior to the FUI reaching 1.0, no special provisions will be required until such cracks are detected.

**202** If fatigue cracks have been found in a unit prior to the FUI reaching 1.0, owner shall assess structural details in special areas at latest prior to the renewal survey for the 5-year period in which the FUI will reach 1.0, with the purpose of improving the fatigue properties of the structure.

**203** Basis for such assessment is documented fatigue lives for the typical structural details in combination with the documented as-is condition. A ranking of details starting with the lowest fatigue lives may conveniently be established.

**204** Structural details may be improved by replacement or

grinding. Associated plans and procedures shall be approved by the Society. The scope of the improvement program will depend on the initial assessment and owner's plans for further use of the unit.

**205** Units which have encountered fatigue cracks prior to the FUI reaching 1.0, and which have undergone an assessment and improvement program as outlined in 202 through 204 to the Society's satisfaction, will not be subject to extended survey requirements.

**206** Units which have encountered fatigue cracks prior to the FUI reaching 1.0, and where satisfactory compensating measures in the form of structural improvements have not been implemented, shall be subject to additional NDE at intermediate surveys corresponding to the extent required for renewal surveys when the FUI exceeds 1.0.

**207** The process outlined in 202 through 206 shall be repeated prior to each successive renewal survey after the FUI has reached 1.0.

**208** Systematic thickness measurements shall be performed at renewal surveys when the FUI exceeds 1.0. Owner shall submit program for such measurements for approval prior to the renewal survey.

**209** Owner shall document that corrosion protection of the unit's hull is adequate and in line with conditions assumed in original design when the FUI exceeds 1.0.

**210** When the FUI exceeds 1.0, the unit shall have an approved leak detection system according to guidelines issued by the Society.

**211** Areas identified for leak detection shall be examined for leaks at least twice monthly when the FUI exceeds 1.0.

### I 300 Self-elevating units

**301** If no fatigue cracks have been found in a unit prior to the FUI reaching 1.0, no special provisions will be required until such cracks are detected.

**302** FUIs may be calculated separately and in detail for various parts of the unit such as leg nodes, spud cans and deck structure. The calculations may reflect the various degrees of bottom restraints and loading pattern resulting from the deck being fixed at various levels during the operations history of the unit.

**303** In addition to the standard scope of survey outlined in A200, 5% of the areas with FUI larger than 1.0 shall be subject to NDE at renewal surveys.

**304** The additional areas for NDE shall be selected with focus on probability of cracking and consequence of possible failures.

**305** When operational time (time in operation regardless of environment excluding periods of lay-up and yard-stay) exceed documented fatigue life, the scope for survey of jacking gears as outlined in Sec 2 D209 shall increase to comprise about 20% of jacking gear units but not less than two units per leg.

**306** When operational time (see 305) exceeds documented fatigue life, systematic thickness measurements shall be performed at renewal surveys. Owner shall submit program for such measurements for approval prior to the renewal survey.

### I 400 Ship-shaped units

**401** Extended survey requirements for ageing units of ship-shaped type with service notation Oil Storage are condition-based as per Sec 2 D103.

**402** No special provisions are enforced for other service notations.

## **J. Risk Based Inspection (RBI)**

### **J 100 General about RBI**

**101** Offshore units and installations including process equipment, pipelines, risers, structures and mooring systems are designed to ensure a safe and economical operation during the intended service life. Deterioration processes, such as corrosion, wear and tear and fatigue crack growth, take place from the very moment they are taken into use. Thus, in order to ensure that the condition of the units and installations remains in compliance with the safety requirements throughout their operational life, inspections, condition monitoring and maintenance are required.

**102** RBI provides a consistent framework for decision making under uncertainties. The main principle behind the approach is that different inspection strategies are compared in terms of the risk they imply. Risk in this sense is defined as the product between likelihood and consequence of failure.

**103** The RBI approach is a condition based approach by which the inspection effort is adapted to the condition of the item and prioritised in accordance with the importance of the individual items and the different deterioration mechanisms.

The methodology gives feedback on:

- where to inspect
- what to inspect
- how to inspect
- when to inspect.

Furthermore, it provides guidance on actions to be taken de-

pending on the actual inspection results.

### **J 200 Methodology for offshore structures**

**201** Risk based inspection methods are used to develop a basis for in-service inspection programmes for offshore structures like jackets, FPSO's and semi submersibles (hull and topside structures).

**202** The most critical details, like hot spot areas showing the shortest calculated fatigue live, are selected for analyses. For fatigue degradation, a fracture mechanics model is calibrated to the fatigue damage obtained from S-N approach. Then the degree of accumulated fatigue damage at a hot spot can be assessed after an inspection where the crack size is a governing parameter for efficiency of the inspection.

**203** Based on information available at the design stage an optimal target failure probability is established to achieve an acceptance criterion for annual probability of a fatigue crack at time for planned in-service inspections. Costs associated with in-service inspection, possible repair and shutdown are included to determine an optimal acceptance criterion.

**204** The time to first inspection and time interval between inspections for critical details is determined based on consequence of a degradation, methods used for fabrication, reliability of in-service inspection and degradation rate like fatigue life.

### **J 300 Use of RBI for classed units**

**301** Development of inspection plans based RBI may be applied. Such plans shall be approved by DNV.

## SECTION 2

### PERIODICAL SURVEY EXTENT FOR MAIN CLASS

#### A. General

##### A 100 Introduction

**101** This section presents the standard extent of surveys for retention of main class **1A1** for mobile offshore units and **OI** for floating offshore installations.

**102** The requirements for service notations are given in Sec.3, and additional system and special facility class notations are given in Sec.4.

**103** Subsections for tailshaft (F) and thrusters for propulsion (G) are not applicable for **OI** class.

**104** DNV's Total Safety Class does not apply for mobile offshore units or floating offshore installations.

##### A 200 Extent of hull survey

**201** The In-service Inspection Program (IIP) for units of column-stabilised and self-elevating types (see Sec 1 A105) is developed on the basis of a general, experience-based scope in combination with design and fabrication particulars for the ac-

tual unit as well as experience from in-service surveys of units of similar type.

**202** The basic scope for development of IIP for units of column-stabilised type is given in Table A1.

**203** The basic scope for development of IIP for units of self-elevating type is as given in Table A2.

**204** Relevant survey requirements for units of ship-shaped types additional to those stated in DNV Ship Rules are summarised in Table A3.

##### Guidance note:

At the 1st Annual or intermediate survey after construction, column-stabilised and self-elevating units may be subject to examination of major structural components including non-destructive testing, as deemed necessary by the Society. If the Society deems such survey to be necessary, the extent should be agreed to by the Society and the owner or client prior to commencement of the Survey.

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

**Table A1 Basic scope for development of IIP for column-stabilised units**

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
<b>Special Areas <sup>1)</sup> (SP) – connections:</b>												
Horizontal bracing connections	A				A		C	A <sup>3)</sup> B <sup>4) 3)</sup>	A	A	A	A
Vertical diagonal bracing connections	B				A		C	X <sup>3)</sup>	A	A	A	A
Columns to pontoon and deck connections	X		X		C		X		A	X	A	C
Upper hull girder/bulkhead connections	X		X		X		X		A	X	A	X
<b>Special Areas (SP) - attachments of:</b>												
Crane/gangway pedestals and top flange	A		A		A	X	A	X	A	A	A	A
Anchor windlasses	X		A		X		A		A		A	X
Anchor chain fairleads	C				B		C		A		A	C
Helideck support	X		X		X		C	X	A	X	A	C
Other attachment/support connections	X		X		X		X	X	A	X	A	X
<b>Primary Structure <sup>2)</sup> (PR):</b>												
Horizontal bracings	A				A		B		A		A	
Vertical diagonal bracings	C		X		C		C		A		A	
Column shell	X		X		C		C		A		A	
Upper hull girders/bulkheads	X		X		X		X		A		A	
Drill floor with substructure	X		X						A	X	A	X
Crane/gangway pedestal	X		A		A		A		A		A	
Lifeboat platforms support			A				A				A	X
Helideck support structure	X		X		X		A		A	X	A	X
Other support structures	X		X		X		X		A		A	
<p><b>A</b> = 100% <sup>5)</sup>  <b>B</b> = 50% <sup>5)</sup>  <b>C</b> = 25% <sup>5)</sup>  <b>X</b> = Spot check 2-5% <sup>5)</sup></p> <p><b>V</b> = Visual Inspection including Close Visual Inspection of Special Areas.  <b>NDT</b> = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ECI) of selected stress concentrations and fatigue sensitive details.</p> <p>1) <b>Special Area (SP)</b> are those sections of Primary Structure which are in way of critical load transfer point, stress concentrations, etc. See also DNV-OS-C103 Sec.2, B and DNV-OS-C201 Sec.11, B.</p> <p>2) <b>Primary Structure (PR)</b> are elements which are essential to the overall structural integrity of the unit. See also DNV-OS-C103 Sec.2, B and DNV-OS-C201 Sec.11, B.</p> <p>3) External NDT may be waived at IS if the unit has an approved leakage detection system according to guidelines issued by the Society.</p> <p>4) Bracing to Bracing (K-joint).</p> <p>5) - of the total number of these parts.</p>												

**Table A2 Basic scope for development of IIP for self-elevating units**

Self-elevating 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
<b>Special Areas <sup>1)</sup> (SP) – connections:</b>												
Leg to Spudcan							A	X	A	A	A	A
Leg Nodes			X				A				A	X <sup>3)</sup>
Connections of primary members in Jack House			A				A	X			A	A
Main Barge girder/bulkhead connections	X		X		X		X		A		A	
<b>Special Areas (SP) - attachments of:</b>												
Crane/gangway pedestals and top flange	A		A		A	X	A	X	A	A	A	A
Support of Drill Floor			A				A				A	A
Helideck support	X		X		X		C	X	A	X	A	C
Other attachment/support connections	X		X		X		X	X	A	X	A	X
<b>Primary Structure <sup>2)</sup> (PR):</b>												
Spudcans							A		A		A	
Legs			X				A				A	X
Jack Houses			A				A				A	X
Main Barge girders/bulkheads	X				X				A		A	
Drill floor with substructure	X		X						A	X	A	X
Crane/gangway pedestal	X		A		A		A		A		A	
Lifeboat platforms support			A				A				A	X
Helideck support structure	X		X		X		A		A	X	A	X
Other support structures	X		X		X		X		A		A	
<b>A</b> = 100% <sup>4)</sup> <b>B</b> = 50% <sup>4)</sup> <b>C</b> = 25% <sup>4)</sup> <b>X</b> = Spot check 2-5% <sup>4)</sup>  <b>V</b> = Visual Inspection including Close Visual Inspection of Special Areas. <b>NDT</b> = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ET) of selected stress concentrations and fatigue sensitive details.												
1) <b>Special Area (SP)</b> are those sections of Primary Structure which are in way of critical load transfer point, stress concentrations, etc. See also DNV-OS-C103 Sec.2, B and DNV-OS-C201 Sec.11, B. 2) <b>Primary Structure (PR)</b> are elements which are essential to the overall structural integrity of the unit. See also DNV-OS-C103 Sec.2, B and DNV-OS-C201 Sec.11, B. 3) At levels which have been in way of lower guided in operation, upper guides in transit and in way of spudcans. 4) - of the total number of these parts.												

**Table A3 Relevant structural survey requirements for ship-shaped offshore units**

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
<b>Special Areas <sup>1)</sup> (SP) – connections:</b>												
Moonpool openings	C				A		A		A	A	A	A
Turret	A				A		A		A	A	A	A
<b>Special Areas (SP) - attachments of:</b>												
Crane pedestals and top flange	A		A		A	X	A	X	A	A	A	A
Anchor windlasses	X		A		X		A		A		A	X
Anchor chain fairleads	C				B		C		A		A	C
Helideck support	X		X		X		C	X	A	X	A	C
Other attachment/support connections	X		X		X		X	X	A	X	A	X
<b>Primary Structure <sup>2)</sup> (PR):</b>												
Drill floor with substructure	X		X						A	X	A	X
Crane pedestal	X		A		A		A		A		A	
Lifeboat platforms support			A				A				A	X
Helideck support structure	X		X		X		A		A	X	A	X
Other support structures	X		X		X		X		A		A	
<b>A</b> = 100% <sup>3)</sup> <b>B</b> = 50% <sup>3)</sup> <b>C</b> = 25% <sup>3)</sup> <b>X</b> = Spot check 2-5% <sup>3)</sup>  <b>V</b> = Visual Inspection including Close Visual Inspection of Special Areas. <b>NDT</b> = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ECI) of selected stress concentrations and fatigue sensitive details.												
1) <b>Special Area (SP)</b> are those sections of Primary Structure which are in way of critical load transfer point, stress concentrations, etc. See also DNV-OS-C103 Sec.2, B and DNV-OS-C201 Sec.11, B.  2) <b>Primary Structure (PR)</b> are elements which are essential to the overall structural integrity of the unit. See also DNV-OS-C103 Sec.2, B and DNV-OS-C201 Sec.11, B.  3) - of the total number of these parts.												

## B. Annual Survey

### B 100 Survey extent

**101** The survey will normally cover systems and parts for:

- structure and equipment
- machinery and safety systems.

### B 200 Structure and equipment for ship-shaped units

**201** Survey requirements for ship-shaped structures and related equipment are given in the Rules for Classification of Ships, Pt.7 Ch.2. Sec.2 'Survey Extent - Main Class'.

**202** The survey requirement in Pt.7 Ch.2. Sec.3 G. 'Oil Carrier' shall be applied to ship-shaped units with the service notation 'Oil Storage', with the following exemption:

- attendance of two surveyors as introduced in the LAN initiative.
- requirement for Enhanced Survey Programme (ESP).

The scope of structural inspection and thickness testing specified shall be followed for the age of the unit.

**203** The exempted requirement for ESP shall be enforced when the surveys in 202 reveal one of the following conditions:

- substantial corrosion as defined in Pt.7 Ch.2 Sec.1 Table A1
- non-existing, or coating considered POOR as defined in Pt.7 Ch.2 Sec.1 Table A1

- multiple fatigue induced cracks in major load bearing elements within 0.4 L.

**204** The following items shall, however, be surveyed in accordance with mobile offshore unit requirements:

- stability (recording for lightweight)
- moorings (shall be surveyed according to Sec.4 B 'Position Mooring Equipment')
- bottom surveys
- inspection of sea valves
- thruster and tailshaft surveys.

### B 300 Structure and equipment for column-stabilised and self-elevating units

**301** 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.

**302** 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.

**303** 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.

**304** The means for leakage detection of dry bracings shall be function tested.

**305** Internal surfaces in ballast tanks may be subject to survey, including thickness measurements. The permissible reduction in thickness is as given for the renewal survey.

**306** Accessible and visible parts of the unit's permanent towing arrangement and temporary and emergency mooring system shall be inspected. If the temporary mooring system is part of the mooring system for position keeping on location, then accessible and visible parts of the position mooring system shall also be inspected.

**307** 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, side scuttles etc., as well as an external inspection of scupper valves and sanitary valves.

**308** Remote controls and alarm systems for doors, hatches and watertight dampers shall be surveyed and function tested.

**309** Guard rails shall be examined.

**310** For units or installations subjected to annual load line inspections by DNV, the requirements in 307 and 309 are considered covered by this inspection.

**311** The «Appendix to the classification certificate» and the documents referred to therein, shall be verified as kept available onboard the unit.

#### **B 400 Machinery and safety systems for ship-shaped units or installations**

**401** Survey requirements for machinery and safety systems on ship-shaped units or installations are given in the Rules for Classification of Ships, Pt.7 Ch 2.

**402** Tank level measurements and helifuel systems shall, however, be surveyed in accordance with offshore unit requirements, see B503 and B508, respectively.

#### **B 500 Machinery and safety systems for column-stabilised and self-elevating units or installations**

**501** The survey shall include examination of spaces for machinery, boilers and incinerators, and equipment located therein, with particular attention to fire and explosion hazards. As the DNV surveyor deems necessary, running tests and/or opening of machinery, and tests of safety devices and equipment may be required.

**502** Boilers shall be externally surveyed. The general condition of the boiler including mountings, piping and insulation shall be ascertained and the surveyor may require opening, removal of insulation etc. if found necessary. Safety valves, instrumentation and automation systems shall be tested in operating condition when found necessary by the surveyor.

**503** The bilge and ballasting system and related subsystems, such as remote valve operation and tank level indications for column-stabilised units or installations, shall be visually surveyed and tested.

**504** The brake torques of jacking machinery on self-elevating units shall be checked. Where provided, the fixation rack system shall also be checked.

**505** For steering gears and/or propulsion thrusters applied for steering purposes, steering functions and alarms shall be tested.

**506** For units or installations granted a survey arrangement based on an approved planned maintenance system (PMS), an annual survey of the PMS is required to prolong the validity of the arrangement. The purpose of this survey is to review and evaluate the previous period's maintenance activities and experience.

The annual survey shall consist of the following main elements:

- a) The maintenance history will be examined in order to verify that the PMS has been operated according to the intentions and that the system is kept up to date.
- b) Evaluation of the maintenance history for main overhaul jobs on the components covered by the continuous machinery survey (CMS) scheme carried out since last annual survey.
- c) Details of corrective actions on components in the CMS scheme shall be made available.
- d) If condition monitoring equipment is in use, function tests of this equipment and verification of the calibration will be carried out as far as practicable and reasonable.

If found necessary by the surveyor, opening or testing of machinery may be required.

**507** In hazardous areas the following equipment and systems shall be surveyed or tested:

- ventilation systems shall be function tested
- the tests shall include emergency stop systems and alarms for lost ventilation
- alarms and shutdown functions for pressurised equipment shall be function tested
- gas detection equipment shall be function tested
- electrical equipment shall be visually inspected.

### **C. Intermediate Survey**

#### **C 100 General**

**101** The survey shall normally be carried out in sheltered waters. Survey on location may be acceptable provided that the underwater inspection is performed in accordance with an approved procedure, and using approved personnel and equipment.

**102** 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 A200.

#### **C 200 Structure and equipment for ship-shaped units**

**201** Survey requirements for ship-shaped structures and related equipment are given in the Rules for Classification of Ships, Pt.7 Ch.2. Sec.2 'Survey Extent - Main Class'.

**202** The survey requirement in Pt.7 Ch.2. Sec.3 G. 'Oil Carrier' shall be applied to ship-shaped units with the service notation 'Oil Storage', with the following exemptions:

- requirement to increased scope of intermediate survey for tankers exceeding 15 years of age do not apply (Ref. Ship Rules Pt.7 Ch.2 Sec.3 G406)
- attendance of two surveyors as introduced in the LAN initiative
- requirement for Enhanced Survey Programme (ESP).

**203** The exempted requirement for ESP shall be enforced when the surveys in 202 reveal one of the following conditions:

- substantial corrosion as defined in Pt.7 Ch.2 Sec.1 Table A1
- non-existing, or coating considered POOR as defined in Pt.7 Ch.2 Sec.1 Table A1
- multiple fatigue induced cracks in major load bearing elements within 0.4 L.

**204** The following items shall, however, be surveyed in accordance with the requirements in Pt.7 Ch.2 Sec.2 'Survey Extent - Main Class'.

cordance with mobile offshore unit requirements:

- stability (recording for lightweight)
- moorings (shall be surveyed according to Sec.4 B, Position Mooring Equipment)
- external corrosion
- bottom surveys
- inspection of sea valves
- thruster and tailshaft surveys.

### C 300 Structure and equipment for column-stabilised and self-elevating units or installations

**301** 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 the in-service inspection programme.

**302** The cathodic protection system shall be surveyed by visual inspection of sacrificial anodes and extent of corrosion. Corrosion in welds of vital parts which may be subject to fatigue shall be particularly considered.

**303** For column-stabilised units or installations, the survey shall, at minimum, cover accessible areas at light ballast draught.

**304** For self-elevating units or installations, survey of the full height of the legs is normally required. Potential measurements will also be required if found necessary.

**305** If the temporary mooring system is part of the mooring system for position keeping on location, then the position mooring system shall also be inspected. The mooring system shall be function tested during typical anchor handling operations.

### C 400 Machinery and safety systems for ship-shaped units or installations

**401** Survey requirements for machinery and safety systems on ship-shaped units or installations as are given in the Rules for Classification of Ships, Pt.7 Ch.2.

### C 500 Machinery and safety systems for column-stabilised and self-elevating units or installations

**501** The survey shall generally be carried out as for the annual survey.

**502** The fire protection arrangement shall be surveyed. For units or installations being inspected by national authorities with respect to fire protection arrangement, the survey for classification may normally be considered as covered by this inspection.

## D. Renewal Survey, Structure and Equipment

### D 100 Ship-shaped structures

**101** Survey requirements for ship-shaped structures and related equipment are given in the Rules for Classification of Ships, Pt.7 Ch.2. Sec.2 'Survey Extent - Main Class'.

**102** The survey requirement in Pt.7 Ch.2. Sec.3 G. 'Oil Carrier' shall be applied to ship-shaped units with the service notation 'Oil Storage', with the following exemption:

- requirement for dry-docking as part of the renewal survey
- attendance of two surveyors as introduced in the LAN initiative
- requirement for Enhanced Survey Programme (ESP).

**103** The exempted requirement for ESP shall be enforced when the surveys in 102 reveal one of the following conditions:

- substantial corrosion as defined in Pt.7 Ch.2 Sec.1 Table A1
- non-existing, or coating considered POOR as defined in Pt.7 Ch.2 Sec.1 Table A1
- multiple fatigue induced cracks in major load bearing elements within 0.4L.

**104** The following items shall, however, be surveyed in accordance with mobile offshore unit requirements:

- stability (recording for lightweight)
- moorings (shall be surveyed according to Sec.4 B, Position Mooring Equipment)
- external corrosion
- bottom surveys
- inspection of sea valves
- thruster and tailshaft surveys.

**105** Alternative survey arrangements given in 300 may be applied also to ship-shaped units or installations.

### D 200 Column-stabilised and self-elevating structures

**201** The renewal survey includes the requirements given in B and C. The extent of the survey is given in the in-service inspection programme, and will additionally include the requirements given in 202 to 216.

**202** Survey of pipes, valves, couplings, anodes, equipment for level indication, etc. inside tanks and spaces.

**203** Tanks shall, as a minimum, be internally surveyed in accordance with Table D1, as far as applicable.

Table D1 Tank survey and pressure testing <sup>1), 2)</sup>				
Tank	Age of unit in years			
	0-5	5-10	10-15	above 15
Sea water <sup>3)</sup>	all	all	all	all
Fresh water <sup>4)</sup>	one	one	all	all
Fuel, diesel oil	one	one	two	half
Lubricating oil	none	none	one	half
Notes:				
1) Tanks of integral type				
<b>Guidance note:</b> If a selection of tanks are accepted to be surveyed, then different tanks shall, as far as practicable, be surveyed at each survey, on a rotational basis.  Independent tanks within machinery spaces (non-integral, self-supporting tanks which do not form part of the unit's hull) are normally surveyed as part of the renewal survey for machinery, see E.  ---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---				
2) If a selection of tanks are accepted to be surveyed, then different tanks shall, as far as practicable, be surveyed at each survey, on a rotational basis.				
3) Tanks used as bilge water holding tanks, shall be examined as required for sea water tanks.				

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

**205** Remote control system for valves in bilge, ballast and cooling water systems shall be surveyed and tested.

**206** Remote controls and alarm systems for doors, hatches and watertight dampers shall be surveyed and function tested. Spot checks shall be carried out to verify the position indication in the control in situ.

**207** Tank bulkheads and tank decks integral with the unit or installation structure shall, as a minimum, be hydraulically tested from at least one side to the maximum pressure they can be subjected to in service. The number of tanks to be tested shall be in accordance with Table D1, as far as applicable.

**208** Thickness measurements shall be carried out as deemed

necessary by the surveyor. The reduction in thickness is not normally to exceed 5% of the original thickness. Larger reductions may be allowed upon special consideration.

**209** The jacking systems, including shock pads, shall be examined. A selected number of jacking gear units (about 10%, but not less than one unit per leg) shall be opened up for inspection.

**210** For self-elevating units or installations, all parts of the legs shall be examined.

**211** The towing and mooring equipment shall be surveyed as follows:

- all chain lockers and anchor stowage arrangements shall be surveyed
- the permanent towing arrangement of the unit shall be surveyed
- the temporary and/or emergency mooring systems shall be surveyed
- if the temporary and/or emergency mooring systems are part of the mooring system for position keeping on location, the complete mooring system for position keeping shall be subject to a comprehensive survey. This will include thorough visual examination and extensive non-destructive testing of mooring chain or wire rope. This inspection shall include dismantling and non-destructive testing of all joining shackles that have been in service for more than 5 years
- function testing of the mooring systems shall be performed.

**212** Sea chests and other sea inlets and discharges (above and below the waterline) with valves, including sanitary valves and scupper valves, shall be opened for survey.

Alternative survey methods may be accepted upon special consideration and approved procedures.

**213** The unit or installation is to undergo a weight or displacement survey and the weight record will be checked in order to verify the current lightweight and centre of gravity. Where the weight survey indicates a difference from the calculated lightweight in excess of 1% of the operating displacement, an inclining test should be conducted. For self-elevating units or installations deviations up to 5% of the operating displacement may be accepted upon special considerations. It is a provision that the weight difference is positioned at the most unfavourable position when calculating the vertical centre of gravity (VCG).

The above mentioned requirements may be considered complied with where the national authorities enforce similar requirements. In such cases a copy of the report on the weight survey, or on the new inclining test, endorsed by the national authorities, shall be submitted.

**214** The presence of required signboards shall be verified.

**215** The cathodic protection system of the submerged zone shall be surveyed. The efficiency of the system for the forthcoming 5-year period shall be confirmed.

**216** The unit or installation shall be dry docked at the third renewal survey and at each renewal survey thereafter, unless acceptable equivalent alternatives are agreed.

See also 300.

**217** Fixation of major appurtenances to the main structure shall be surveyed. These may typically include crane pedestals, helicopter decks, drilling derricks, lifeboat platforms and heavy deck modules or skids.

### D 300 Alternative survey

**301** 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 sys-

tem and survey arrangement.

See also Ch.2 Sec.3 H for matters that will be taken into consideration for acceptance of surveys on location.

**302** Provisions regarding fatigue safety factors and corrosion protection shall be in accordance with the following requirements:

- DNV-OS-C102 Appendix A for ship-shaped units
- DNV-OS-C103 Appendix A for column-stabilised units
- DNV-OS-C104 Appendix A for self-elevating units.

## E. Renewal Survey, Machinery and Safety Systems

### E 100 General

**101** The survey shall include the items given in Table E1 as far as applicable.

**102** Automated machinery plant shall be surveyed to the extent required for **E0** or **ECO** survey, as far as applicable.

**103** By completion of the 5-year CMS cycle, all items shall have been credited. Items maintained according to running hours or condition monitoring criteria, without a 'main overhaul' carried out in the cycle, may be credited based on satisfactory maintenance or condition monitoring records, clearly indicating that the maintenance is not calendar based.

### E 200 Electrical Installations

#### 201 Ship-shaped units or installations

Survey requirements for electrical systems on ship-shaped units are given in the Rules for Classification of Ships, Pt.7 Ch.2.

#### 202 Column-stabilised units or installations

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.

**203** The insulation resistance of the complete installation shall be measured, and the results presented to the DNV surveyor.

**204** 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.

**205** 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, e.g. for jacking system at full load
- interlocking and/or alarms for pressurised rooms and equipment.

### **E 300 Instrumentation and automation**

**301** Correct functioning of the various parts of the following systems shall, as far as applicable, be verified to the satisfaction of the attending surveyor:

- each alarm and safety system
- fire alarm system
- manual control of machinery
- remote control of propulsion machinery. It will normally be required that the following manoeuvres are affected:
  - from stop to head
  - from ahead to astern
  - stop
  - from stop to astern
  - stop by operating the emergency device.

**302** It shall be verified that the remote control can be transferred to stand-by manual control in the engine room in case of power supply failure to the remote control system.

**303** 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.

**304** Remote shutdown for fuel-oil transfer service pumps and ventilating equipment, together with oil tank outlet valves where required to be capable of being remotely closed are to be proved satisfactory. Emergency switch(s) for all electrical equipment including main and emergency generators, except alarm and communication systems and lighting in vital areas such as escape routes and landing platforms, are to be proved satisfactory (by a combination of testing and review of maintenance records).

(IACS UR Z15)

**Table E1 Machinery surveys**

Class	Item or system		Survey method <sup>1)</sup>
<b>1A1</b>	Propulsion machinery	Diesel engines Evaporators and condensers with ejectors Electrical main motors Thrust- and intermediate shaft bearings Machinery foundations	1 and 2 1 1 and 2 1
	Gears <sup>3)</sup>	Shafts with pinions, gear wheels, couplings and bearings	1
<b>1A1/ OI</b>	Auxiliary machinery	Diesel engine Turbines Prime movers for auxiliary thrusters <sup>2) 3)</sup> Machinery foundations	1 and 2 1 and 2 2
	Pumps <sup>4)</sup>	Piston pumps Screw pumps, gear pumps Centrifugal pumps for sea water, bilge and ballast Other centrifugal pumps and ejectors	1 2 1 2
	Pipes, valves, independent tanks, etc. <sup>10) 11), 13)</sup>	Lubricating oil <sup>5)</sup> Fuel oil <sup>12)</sup> Bilge and ballast <sup>6)</sup> Cooling water High pressure mud system <sup>7)</sup> Steam with temperature below 450°C Steam pipes of copper <sup>8)</sup> Feed water Compressed air Hydraulic oil	2 2 2 2 2 2 2 2 2
	Electrical installations	Generators Switchboards Distribution boards Electrical equipment Cable installation Navigation light controllers Mechanical ventilation of battery lockers and rooms	2 2 2 2 2 2 2
	Sundry <sup>4)</sup>	Gas compressors Air compressors Emergency compressors Compressed air receivers <sup>9)</sup> Heat exchangers Incinerator arrangement Inert arrangement for units without notation <b>INERT</b> (see also Rules for Classification of ships Pt.7 Ch.2 Sec.3 H) Instrumentation and automation for units or installations without notation <b>E0</b> or <b>ECO</b>	1 and 2 2 2 1 and 2 1 2 2

- 1) The survey methods given are defined as follows:  
*Survey method No. 1:* Visual inspection by opening up fully or partly as deemed necessary by the surveyor. Pressure testing to be carried out when relevant and found necessary by the surveyor.  
*Survey method No. 2:* External survey and performance test to be carried out. Alarm- and safety functions shall be tested if found necessary by the surveyor. Opening up and/or pressure testing may be required if found necessary by the surveyor. Last overhaul shall be verified.
- 2) For definition and survey extent, see G.
- 3) Selected bearings shall be examined. Gears and roller bearings may as far as practicable be inspected without dismantling complicated assemblies.
- 4) Prime movers and starters shall be surveyed together with pumps and units. Non-metallic flexible expansion pieces in the main salt water circulating system are to be examined internally and externally.
- 5) Strainers shall be opened. Selected pipes and engine system tanks, if any, shall be surveyed for sludge.
- 6) Valves, cocks and strainers shall be opened.
- 7) Crack and/or thickness examination may be required. Selected pipes shall be pressure tested to 1.5 times working pressure.
- 8) Shall be pressure tested to 2 times working pressure.
- 9) Shall be pressure tested to 1.2 times working pressure if internal survey is not possible.
- 10) Sea valves shall be opened (including scuppers and sanitary discharges).
- 11) For piping systems outside machinery spaces, see Sec.4.
- 12) Settling tanks and daily service tanks for both heavy fuel and diesel oil to be surveyed for sludge. If inspection and cleaning of above tanks have been carried out by the crew during the last 12 months and relevant log extracts provided and confirmed, this may be accepted as survey at the surveyor's discretion.
- 13) Valves where function in the piping system is not evident are to be checked for adequate and readable marking for identification.

## F. Renewal Survey, Tailshaft Survey

### F 100 Standard requirements

**101** For renewal survey, the tailshaft shall be withdrawn and the following parts examined, where relevant:

- propeller nut and threaded end of tailshaft
- cone, key and keyway, including examination of the fore part of the taper and keyway by magnetic particle inspection method
- tailshaft bearing areas

- stern tube bushes or bearings. Clearance measurements shall be included
- shaftsealing arrangement, including lubricating oil system.

#### F 200 Alternative survey

**201** The following alternative requirements do not apply to tailshafts covered by additional class notations **DYNPOS-AUTS**, **DYNPOS-AUT**, **DYNPOS-AUTR** and **DYNPOS-AUTRO**.

**202** Subject to 201, an alternative tailshaft survey may be accepted for oil lubricated tailshafts with approved sealing arrangement, provided that the number of service hours encountered is relatively low, e.g. less than 5000 hours since the last tailshaft survey.

**203** At the first renewal survey, the lubricating oil for each of the stern tubes shall be analysed and the results forwarded to DNV. Acceptable analysis results, together with satisfactory survey of accessible parts of the shafts including clearance measurements, will normally be considered sufficient.

**204** In addition to 202 and 203, the second and third renewal surveys shall also include removal of key fitted propellers and survey of the tailshaft cone including key and keyway.

**205** At the second renewal survey, 50% of all similar tailshafts shall be surveyed, with the remaining 50% of the tailshafts to be surveyed at the third renewal survey. Magnetic particle inspection shall be used.

**206** From the fourth renewal survey and onwards, a complete tailshaft survey shall be carried out.

#### F 300 Tailshaft condition monitoring survey arrangement

**301** See Sec.1 D402.

### G. Thrusters

#### G 100 Definitions

**101** Thrusters for propulsion are defined as thrusters which are intended for propulsion or propulsion and steering of the unit during sea voyage.

**102** Thrusters installed to achieve redundant main propulsion systems are to be regarded as thrusters for propulsion, e.g. for the class notation **EPR**.

**103** Thrusters for dynamic positioning are thrusters incorporated in systems for dynamic positioning of offshore units, where the unit has been granted the additional class notation **DYNPOS-AUTS**, **-AUT**, **-AUTR** or **-AUTRO**, see Sec.4 C.

**104** Thrusters for position mooring are thrusters incorporated in systems for thruster assisted position mooring of offshore units, where the unit has been granted the additional class notation **POSMOOR-TA** or **POSMOOR-ATA**, see Sec.4 B.

**105** Thrusters for heading control are to be regarded as thrusters for position mooring.

**106** Thrusters for other purposes than specified in 101 to 104 (e.g. non-self-propelled units) are defined as auxiliary thrusters.

#### G 200 Condition monitoring approach - extent of survey and testing

**201** The owners shall propose a plan for the monitoring of the thrusters, where the following are to be considered:

- condition monitoring (what can be detected and what cannot)
- vibration analysis (what can be detected and what cannot)
- oil sample results (of each oil system involved in the thruster)
- sparking across the oil film
- cathodic protection
- consequence of failure of the thruster system and time needed to remedy the failure
- failure of the ancillary systems which may degrade the functionality of the thruster (e.g. azimuth system, raising or lowering system for the thruster).

FMEA of the thruster system may be a useful tool in this regard.

**202** It is recognised that most of these external surveys will take place with an ROV. So the focus of the inspection will be for obvious signs of oil leakage and gross damage.

The electro-motor shall be surveyed for damage to the housing and to the rotor itself.

#### G 300 Extent of survey and testing without condition monitoring system

**301** Thrusters for propulsion shall be surveyed as per Table G1 as applicable.

**302** Thrusters for dynamic positioning and position mooring shall be surveyed as per Table G1 as far as applicable.

**303** Thrusters not defined as propulsion thrusters or incorporated in systems for the dynamic positioning (class notation **DYNPOS-AUTS**, **DYNPOS-AUT**, **DYNPOS-AUTR** or **DYNPOS-AUTRO**) or position mooring (**POSMOOR-TA** or **POSMOOR-ATA**) shall be surveyed as auxiliary thrusters as per Table G2, as far as applicable.

Table G1 Extent of surveys and tests of propulsion thrusters and dynamic positioning thrusters		
Survey and tests	Survey interval	
	2.5 years	5 years
<b>1. Intermediate survey</b> Includes survey of internals through inspection openings, also in underwater housing.	X	
<b>2. Complete internal survey</b> <sup>1)</sup> Includes visual inspection of relevant parts, and NDT when necessary		X
<b>3. Function testing</b>		
3.1 Sealing arrangement	X	X
3.2 Lubricating and hydraulic oil system	X	X
3.3 Test of thruster unit including alarm system	X	X
1) The survey interval may be extended by 2.5 years provided running hours since last complete survey is less than 15 000 hours and an intermediate survey is carried out.		

#### Guidance note:

Azimuth thrusters providing the main steering function are to be surveyed and tested annually as part of the annual survey.

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

Table G2 Extent of surveys and tests of position mooring thrusters and auxiliary thrusters		
Survey and tests	Survey interval	
	2.5 years	5 years
<b>1. Survey extent</b>		
1.1 Oil analysis of gear house oil and oil for the CP mechanism		X <sup>1)</sup>
1.2 Survey of gear and bearings through inspection openings or by other means (if possible)		X
1.3 External survey of gear housing, propeller blades, bolts locking and other fastening arrangements	X	X
1.4 Survey of external piping systems	X	X
<b>2. Function testing</b>		
2.1 Sealing arrangements	X	X
2.2 Lubrication and hydraulic oil system	X	X
2.3 CP mechanism	X	X
2.4 Test of thruster unit including alarm system	X	X
<b>3. Internal survey</b>		
Bearings, gear and shafts and other relevant parts		X <sup>2)</sup>
1) It is advised to take oil analysis prior to docking for (bottom) survey in order to ensure that there is no need for opening of the thruster (e.g. water in the oil). 2) Only if any indications of abnormalities are observed. Satisfactory maintenance according to manufacturer recommendations to be documented and considered as a base for extent of possible opening.		

## H. Renewal Surveys, Boiler and Steam Heated Steam Generator

### H 100 Renewal survey

**101** The survey shall normally include:

- internal and external examination of the boilers, superheaters, economisers and air preheaters or steam heated steam generator, including drums, stays, pipes, insulation, etc.
- internal examination of all mountings
- setting of safety valves including remote operation of same, except for exhaust gas boilers where the safety valves may be set by the chief engineer or maintenance supervisor and the results reported to DNV
- examination and testing of instrumentation and automation equipment
- examination and testing of attached fuel oil burning equipment.

**102** If found necessary, the surveyor may require hydraulic test, thickness measurements and/or crack detection test of any part of the installation.

## I. Thermal Oil Heater Survey

### I 100 Renewal survey

**101** The survey shall normally include:

- tightness test of the installation with special attention to flange connections and valve and pump packings
- external examination of coils in the oil fired furnace
- testing of thermal oil-flow and pressure drop across the heater including comparison with reference data from the heater as new. Significant increase in flow resistance across the furnace coils will require internal cleaning of the coils
- examination and testing of plant instrumentation including regulation and safety systems
- examination and setting of liquid relief valves
- examination of fuel oil equipment including burners with nozzles
- examination of fire extinguishing system with release arrangements for the thermal oil installation including furnace

- analysis of thermal oil samples from the system in order to establish safe operating temperature and state of deterioration
- function test of plant with special attention to stability of automatic regulating systems.

## J. Survey of the Outside of Unit's Bottom and Related Items

### J 100 Schedule

**101** The outside of the unit's bottom and related items are to be examined two times in any five (5) year period, with an interval not exceeding three (3) years between examinations. For units operating in salt water for less than six (6) months each year, the survey interval may be increased by the Society.

**102** Consideration may be given at the discretion of the Society, to any special circumstances justifying an extension of the interval.

**103** Proposals for alternative means of examining the unit's bottom and related items while afloat may be considered, provided they are in general agreement with Appendix C.

### J 200 Parts to be examined

#### 201 Ship-shaped Units (ship or barge type units)

External surfaces of the hull, keel, stem, stern frame, rudder, nozzles, and sea strainers are to be selectively cleaned to the satisfaction of the attending surveyor and examined together with appendages, the propeller, exposed parts of stern bearing assembly, rudder pintle and gudgeon securing arrangements, sea chest and strainers, and their fastenings (as applicable).

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

#### 202 Self-elevating Units

External surfaces of the upper hull or platform, spudcans, mat, underwater areas of legs, together with their connections as applicable, are to be selectively cleaned to the satisfaction of the attending surveyor and examined.

At each dry-docking survey or equivalent, after renewal survey No. 2, the surveyor is to be satisfied with the condition of the internal structure of the mat or spudcans. Leg connections to mat and spudcans are to be examined at each dry-dock survey

or equivalent. Non-destructive testing may be required of areas considered to be critical by the Society or found to be suspect by the surveyor.

### **203** *Column-stabilised Units*

External surfaces of the upper hull or platform, footings, pontoons or lower hulls, underwater areas of columns, bracing and their connections, sea chests, and propulsion units as applicable, shall be selectively cleaned and examined to the satisfaction of the attending surveyor. Non-destructive testing may be required of areas considered to be critical by the Society or found to be suspect by the surveyor.

## **J 300** **Survey planning and record keeping**

**301** Plans and procedures for dry-docking surveys (or underwater inspection in lieu of dry-docking survey per Appendix C) 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 to be necessary in light of experience.



## SECTION 3

### PERIODICAL SURVEY EXTENT FOR ADDITIONAL SERVICE NOTATIONS

#### A. General

##### A 100 Introduction

**101** This section presents the standard extent of surveys for retention of additional service notations applicable to offshore drilling and support units. The requirements shall be applied in addition to those for main class notation presented in Sec.2.

#### B. Oil Production and/or Oil Storage Units and Installations

##### B 100 Application

**101** The requirements in B apply to units or installations with class notation:

**Oil Production Unit** or **Oil Production Installation**  
**Oil Storage Unit** or **Oil Storage Installation.**

##### B 200 Survey arrangement

**201** Annual and complete periodical surveys may be carried out on location based on an approved planned maintenance system without interrupting the function of the unit or installation.

##### B 300 Annual survey

**301** Structures, supporting equipment and heavy modules applied in the production operation shall be surveyed.

**302** The following items shall be subjected to a general examination:

- crude oil tank openings and pressure/vacuum valves
- crude oil piping systems
- crude oil pump rooms
- escape routes
- fire extinction systems in crude oil tank and pump room area.

**303** The following components and systems shall be surveyed and tested for correct functioning as found necessary by the surveyor:

- gas detection systems for flammable and toxic gases
- fire detection system
- system for crude oil tank level measurements
- general alarm system and communication between control stations.

**304** In hazardous areas the following equipment and systems shall be surveyed and tested:

- ventilation system including overpressure alarms
- alarms and shutdown for pressurised equipment and rooms
- electrical equipment and cables
- self-closing gastight doors, air locks, openings and accesses
- protection devices for combustion equipment and engines.

**305** The emergency shutdown system for:

- wellhead valves and production facilities
- all non-essential electrical equipment
- all essential electrical equipment

shall be surveyed and function tested. Special attention shall be

given to both manual and automatic activation, power supply and alarms.

**306** Where cross connections between piping system for production and safe piping system exist, the means for avoiding possible contamination of the safe system with the hazardous medium shall be surveyed.

##### B 400 Complete periodical survey

**401** The requirements given in 300 apply with the addition given in 400.

**402** For objects having boilers burning crude oil or slop, survey and testing of control equipment including monitoring systems and shutdown functions related to the following systems shall be carried out:

- ventilation and gas-tightness, fuel supply line and boiler with boiler front lagging
- fuel pumps and heating arrangement
- drain pipe ducts and automatic closing drain traps
- inert and purging systems
- manual and automatic quick closing valves and shutdown systems
- boiler hood ventilation system
- boiler compartment ventilation
- boiler front extinguishing system
- pilot burner arrangement
- gastight bulkhead penetrations
- gas detection system
- fuel heater.

**403** For objects having turbines, engines or boilers burning gas, survey and testing of the safety and control equipment and alarm and shutdown functions related to the following systems shall be carried out:

- gas heating arrangement
- ventilation arrangement
- protection and flame screens
- gas freeing and purging systems
- manual and automatic shutdown system
- gas detection system
- pilot flame burner or «fuel floor» arrangement
- governor stability switching from gas fuel to oil, or vice versa.

**404** Function test of instrumentation and safety devices for equipment and systems in 303 shall be carried out.

**405** The fire extinguishing system in or at:

- crude oil tank area
- crude oil pump room
- engine and boiler room
- helicopter deck

shall be surveyed and tested for correct functioning.

**406** It shall be verified that required signboards are in order.

**407** The drainage system of hazardous area shall be surveyed.

**408** The insulation resistance of the electrical installation in the hazardous area shall be checked.

**409** The fireman's outfit shall be surveyed.

**410** Industrial equipment included in class according to Ch.2 Sec.2 G shall be surveyed. Attention is to be paid to fire and other hazards. Thickness checking of pipework shall be carried out and records reviewed by the surveyor, as applicable. Hy-

drostatic testing may be requested by the surveyor.

## SECTION 4

### PERIODICAL SURVEY EXTENT FOR ADDITIONAL SYSTEM AND SPECIAL FACILITY NOTATIONS

#### A. General

##### A 100 Introduction

**101** This section presents the standard extent of surveys for retention of additional system and special facility class notations applicable to production and storage units or installations. The requirements for main and service class notations are presented in Sec.2 and Sec.3.

#### B. Position Mooring Equipment

##### B 100 Application

**101** The requirements in B apply to units or installations with class notations:

- **POSMOOR**
- **POSMOOR-V**
- **POSMOOR-TA**
- **POSMOOR-ATA.**

##### B 200 Types of surveys

**201** Annual surveys may be carried out with the unit at operational draft and the mooring system in use. No special inspection aids are required and no disruption to the unit's operation is intended.

**202** Intermediate survey may be carried out on location. No special aids are required and minimal disruption to anchor handling operation is intended.

**203** Renewal survey will require appropriate cleaning with good access and adequate lighting.

**204** Alternatively, the owner may opt for a continuous survey by providing an extra mooring line, which is regularly inspected in special facilities onshore and exchanged with lines installed on the unit. This arrangement is normally noted by an MO which gives the last/next survey date of each mooring line. At each renewal survey for the hull, the attending surveyor shall carry out the equivalent of the intermediate survey on each mooring line and renewal survey extent on the other parts of the mooring system, i.e. windlass, fairleads, anchors, etc. which are not covered by the continuous survey cycle.

**205** The extent and type of survey is dependent on the design such as corrosion protection/allowance and fatigue, see B500, B600 and B700.

**206** Owners are to ensure that the mooring system can be adequately surveyed. An inspection and survey plan shall be submitted to the Society for approval at the commencement of the in-service phase.

##### B 300 Annual survey

**301** Accessible and visible parts of the unit's or installation's mooring system for position keeping on location shall be inspected.

**302** The unit or installation log shall be reviewed in order to verify that the unit or installation has been operating within the environmental conditions specified for **POSMOOR** in the "Appendix to the classification certificate". The anchor chain records are also to be reviewed.

**303** Thruster operation shall be function tested for units or installations with system notation letters: **TA** or **ATA**.

##### B 400 Intermediate survey

**401** The requirements given in 300 apply with the additions given in 402 to 403.

**402** The mooring system for position keeping on location shall be inspected. This inspection will include dismantling and non-destructive testing of all joining shackles which have been in service for more than 5 years.

D-shackles of Long Term Mooring (LTM) type do not need to be dismantled.

The mooring system, including static and dynamic brakes, during typical anchor handling operations shall be function tested.

**403** Units and installations with system notation letters **-ATA** shall be surveyed as given in C, as far as is applicable.

##### B 500 Complete periodical survey

**501** The requirements stipulated in 200 and 300 apply with the additions given in 402 and 403.

**502** The complete mooring system for position keeping on location shall be subject to comprehensive survey, including opening up and NDT of selected parts of windlasses and winches and fairleads. Critical parts of all mooring chains or wires and accessories shall be thoroughly visually examined and subject to extensive NDT.

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

##### B 600 Complete periodical survey - systems designed before 1996

**601** For mooring systems designed without corrosion protection/allowance and not designed with respect to fatigue the following requirements apply:

- inspection of the unit's log and anchor line records
- thruster operation is to be function tested. (Units with TA or ATA notation)
- dismantling and non-destructive testing of all joining shackles which have been in service for more than 5 years, except for LTM shackles
- function testing of windlasses/winches and fairleads, including testing of brake torque
- units with system notation TA and ATA are also to be inspected according to Sec.4 C *Dynamic Positioning System*
- complete inspection of mooring system including:
  - opening up and non-destructive testing of selected parts of windlasses/winches and fairleads
  - visual examination and extensive non-destructive testing of critical parts of all anchor chains, wire ropes and accessories
  - dimension control of chain and connection elements
  - inspection of cathodic protection system of sockets.

**602** 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.

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

**604** For acceptance/rejection criteria for wire rope, ISO Standard 4309-1981 (E) shall be used as guidance.

**605** Inspection of the mooring lines shall normally be carried out onshore. The lines shall be properly cleaned before inspection.

### **B 700 Complete periodical survey – fatigue design life factor 3**

**701** A survey scheme as outlined herein will only apply for mooring systems with recommended connection elements. The scheme applies to all production and/or storage units designed according to:

- DNV MOU Rules Pt.6 Ch.2 *Position Mooring (POS-MOOR)*, dated January 1996 (Design life factor 3)
- API RP2SK dated 1997-03-01 (Design life factor 3)
- DNV-OS-E301 *Position Mooring*, dated June 2001 (Design life factor 3).

**702** Typical connection elements such as kenter shackles, ordinary D-shackles, C-links and pear links are not permitted in long term mooring systems. Swivels should be avoided unless specifically qualified with respect to functionality, structural strength and fatigue for long term use.

**703** Recommended connection elements in long term mooring systems are purpose made elements such as triplates and D-shackles of Long Term Mooring (LTM) type.

**704** The following information shall be submitted to the Society:

- sample chain/wire certificate
- sample joining shackle certificate (one of each type of shackle used)
- design fatigue life
- fatigue life used since new / last inspection
- latest inspection reports
- history of chain/wire, e.g. inspections, chain/wire breaks, joining shackles
- planned remaining field life
- future inspection plans.

**705** Assumptions and conditions for acceptance of approach:

- it is assumed that the remaining fatigue life exceeds the expected field life by a factor of 3
- loss of one line shall not lead to a critical situation for the installation
- if any defects are found on the chain/wire during visual inspection, all chains/wires are to be pulled for visual inspections
- chain/wire inspection is carried out under supervision by DNV surveyors
- all studs found loose are to be pressed tight
- the most heavily loaded (extreme tension) line is to be inspected. If a different line is most heavily utilised in fatigue, then this line is also to be inspected
- no twist shall exist between upper & lower fairlead. Any twists shall be removed
- units with system notation TA and ATA are also to be inspected according to Sec.4 C *Dynamic Positioning System*.

**706** At least 1 out of every 8 chain lines (12.5%) shall be included in visual /MPI inspection at a suitable offshore or onshore facility as follows:

- 100% visual
- 100% MPI of joining links

- 10% of the links are to have overall MPI (may be reduced for benign waters)
- diameter measurements of the chain link every 100th link. The anchor chains shall be replaced if the diameter of the chain with the breaking strength used in the design is reduced by 2%
- 2-neck measurement values to be noted every 100th link (measurement of the two diameters taken at the neck of the link at the mating surface).

**707** All the remaining chain/wires shall be ROV inspected with respect to the following:

- overall visual inspection (including cleaning if necessary)
- go/no go gauge on 2 link wear every 100th link
- wear and scouring in touch down area
- anchors and anchor jewellery
- chain/wire attachments to the hull shall be surveyed visually as far as possible, if not accessible by ROV
- chain links in the fairlead pockets and close to fairleads shall be given special attention
- six strand wire ropes shall be inspected according to B602.

**708** Any joining links shall be opened for MPI inspection. Note that these are not recommended in mooring chains and are to be replaced by recommended connections, if the principle of only pulling 12.5% of the lines shall apply.

**709** The fairleads shall be inspected visually and by ROV as far as possible. All fairleads are to be inspected.

**710** Visual inspection of windlass and fairlead pockets shall be carried out. Particular attention shall be paid to:

- 1) Rate of wear on pockets, including relative rate of wear between links and pockets.
- 2) Mis-match between links and pockets, including improper support of the links in the pockets.

**711** 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.

**712** 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.

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

**714** DNV Routines:

- rig co-ordinator (RC) shall review plans for survey of mooring system in co-operation with owner and submit plans to DNV responsible unit for units in operation for approval
- following approval, RC shall advise attending surveyor of chain/wire to be pulled and scope of inspection
- surveyor shall advise RC of survey findings, e.g. number and extent of loose studs, cracks, gross damage
- surveyor shall create reports detailing all findings (positive and negative)
- RC shall credit all chain/wires on satisfactory survey and issue Memo in the Nauticus system.

### **B 800 Complete periodical survey – fatigue life factor 5-8 or greater**

**801** The requirements in B800 are valid for mooring system design according to:

- DNV MOU Rules Pt.6 Ch.2 *Position Mooring (POS-MOOR)* dated January 1996 (design life factor 10)

- API RP2SK dated 1997-03-01 (design life factor 10)
- DNV-OS-E301 *Position Mooring*, dated June 2001 (design life factors 5 - 8).

**802** For information to be submitted, see B704.

**803** For assumptions and conditions for acceptance of approach, see B705.

**804** At least 1 out of every 8 chain lines (12.5%) shall be inspected offshore by use of ROV as follows:

- 100% overall visual inspection (including cleaning if necessary)
- diameter measurements of the chain link every 100th link. The anchor chains shall be replaced when the diameter of the chain with the breaking strength used in the design is reduced by 2%
- 2-neck measurement values to be noted every 100th link (measurement of the two diameters taken at the neck of the link at the mating surface)
- go/no go gauge on 2 link wear every 100th link
- wear and scouring in touch down area
- anchors and anchor jewellery if available
- chain/wire attachments to the hull shall be surveyed visually as far as possible.

**805** Special attention shall be paid to connection elements such as:

- LTM shackles and their bolts and locking devices
- wear and tear of connection elements
- corrosion with attention to severe pitting
- steel wire rope sockets and their cathodic protection system
- chain stoppers
- wear and tear of chain links in chain stoppers and fairleads
- damage to the protection (sheathing) of steel wire rope.

**806** If the ROV inspection reveals defects that are considered as critical, i.e. cracks, severe pitting and wear and tear, a more detailed inspection including MPI will be required.

**807** Normally connection elements such as kenter shackles, pear links, C-links and D-shackle with locking pin through bow and bolt, and swivels are not accepted in long term mooring systems. If such equipment is installed they shall either be dismantled and subjected to non-destructive testing of all machined surfaces, or be replaced with new elements at least every 5 years.

**808** The fairleads shall be inspected visually and by ROV as far as possible. All the fairleads shall be inspected with special attention to wear and tear of fairlead wheels and malfunctioning.

**809** Windlasses and winches shall be surveyed according to B710, B711, B712 and B713.

**810** DNV routines are described in B714.

## C. Dynamic Positioning System

### C 100 Application

**101** The requirements in C apply to units or installations with class notations:

**DYNPOS-AUTS, DYNPOS-AUT, DYNPOS-AUTR, DYNPOS-AUTRO.**

### C 200 Complete periodical survey

**201** All sensors, peripheral equipment and reference systems shall be tested to verify correct operation and adequate accuracy as compared to previous calibration or specifications.

**202** Failures of sensors shall be simulated to check the alarm

system and the switching logic.

Acoustic reference systems shall be tested with thrusters in operation.

Switch-over between reference systems acting as input to controller shall be performed to assure that warnings, alarms and information to operator are satisfactory. Off-location alarm shall be demonstrated.

**203** Each thruster shall be tested with a range of pitches or speed, and the indicating instruments for speed, pitch and azimuth shall be observed and verified to be of adequate accuracy.

The different modes of thruster control shall be tested for:

- manual control of pitch, speed and azimuth
- remote thrust control
- controller (automatic) control
- transfer of control.

The remote thrust control system shall be tested with the reference system in operation.

The system shall be capable of keeping the unit in position (not exceeding position boundaries, off-location alarm).

**204** Survey of the thruster unit shall be carried out as for thrusters for propulsion.

#### Guidance note:

Survey of the thrusters requires docking of the unit and should be harmonised with the bottom survey.

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**205** Prime movers for thrusters shall be opened if found necessary by the surveyor.

**206** The electrical installation serving the dynamic positioning system shall be examined.

**207** The automatic reconnection system for generators and consumers connected to the bus-bar system(s) shall be tested (simulated test may be accepted).

Power failure to the different sub-systems shall be simulated to verify the intended functioning.

**208** The complete dynamic positioning system is normally to be tested in all operational modes, with simulation of different failure conditions to enable test of switching of modes, back-up systems, and the alarm system.

Manual override shall be demonstrated during both normal operation and failure conditions.

## D. Offshore Crude Offloading

### D 100 Application

**101** The requirements in D apply to units or installations with class notation:

#### OFFLOADING.

### D 200 Complete periodical survey

**201** Every survey of the offloading arrangement shall be held concurrently with the annual survey for service notation **Storage.**

**202** Spaces and zones used in connection with offshore offloading shall be surveyed with respect to general cleanliness and maintenance.

**203** Valves and piping shall be externally surveyed. Opening up and/or pressure testing may be required if found necessary by the surveyor.

**204** Instrumentation, automation and communication equipment in offloading control station shall be surveyed, tested and

verified to be in order.

**205** Ventilation of gas-free spaces shall be verified to be in order.

**206** Electrical equipment in gas-dangerous spaces shall be surveyed.

**207** Emergency disconnection systems, automatic and manual, shall be surveyed and tested as far as possible.

**208** The offloading area shall be surveyed with respect to fire and explosion hazards and is to include survey of:

- fire extinguishing equipment
- protective measures preventing structural elements initiating sparks
- ventilation of control station and offloading hose connector area
- emergency escape routes from control station
- interlock functions for the mooring and loading systems.

**209** It shall be verified that the required operation manual is in order.

## **E. Offshore Bow Loading**

### **E 100 Application**

**101** The requirements in E apply to units or installations with class notation:

#### **BOW LOADING.**

### **E 200 Complete periodical survey**

**201** Every survey of the bow loading arrangement shall be held concurrently with the annual survey for service notation **Storage**.

**202** Spaces and zones used in connection with bow loading shall be surveyed with respect to general cleanliness and maintenance.

**203** Valves and piping, including inert gas purge pipes shall be externally surveyed. Opening up and/or pressure testing may be required if found necessary by the surveyor. Condition of spray-shield and collecting tray in way of connector shall be in order.

**204** Instrumentation, automation and communication equipment in bow control station shall be surveyed, tested and verified to be in order.

**205** Ventilation of gas-free spaces shall be verified to be in order.

**206** Electrical equipment in gas-dangerous spaces shall be surveyed.

**207** Emergency disconnection systems, automatic and manual, shall be surveyed and tested as far as possible.

**208** The bow loading area shall be surveyed with respect to fire and explosion hazards and is to include survey of:

- fire extinguishing equipment
- protective measures preventing structural elements initiating sparks
- ventilation of bow control station and bow loading connector room
- emergency escape routes from bow control station
- interlock functions for the mooring and loading systems.

**209** It shall be verified that the required operation manual is in order.

## **F. Production Plant**

### **F 100 Application**

**101** The requirements in F apply to units or installations with class notation:

#### **PROD.**

### **F 200 Survey arrangement**

**201** Annual and complete periodical survey may take account of an approved planned maintenance system. As far as possible disruption of the function of the unit or installation should be minimised.

### **F 300 Annual survey**

**301** An overall survey of production related equipment, structures and systems with particular attention to structural integrity, fire or explosion hazards, safety systems and personnel protection shall be carried out. If deemed necessary by the surveyor running test, NDT, and/or opening up of equipment may be required.

**302** For equipment installed subsea at time of annual survey a review of the maintenance manual or test log is an acceptable survey method provided a satisfactory recording system and acceptable maintenance procedure exist.

**303** Riser system and production or well control components shall be visually surveyed as far as accessible. If deemed necessary by the surveyor pressure testing shall be carried out.

**304** Pressure vessels and heat exchangers shall be externally surveyed. Safety valves, instrumentation and systems on tanks or separators shall be surveyed and tested in operating condition as found necessary by the surveyor.

**305** High pressure or capacity pumps and compressors shall be externally surveyed and function tested as deemed necessary by the surveyor.

**306** Piping systems including flexible pipes shall be surveyed as deemed necessary by the surveyor.

**307** Pressure relief and depressurising valves shall be surveyed and tested as deemed necessary by the surveyor.

**308** Riser handling devices, lifting devices for production and related operations, wire ropes, end attachments, and sheaves shall be surveyed. Function testing of safety devices shall be carried out as found necessary by the surveyor.

**309** Survey of accessible parts of the following structures shall be carried out to confirm structural integrity and condition of securing arrangement:

- ground flare
- burner boom
- derrick
- skids.

**310** The process and utility safety systems shall be surveyed during operation and tested for correct functioning as found necessary by the surveyor with particular emphasis on:

- shutdown valves
- shutdown instrumentation
- shutdown sequence and logic
- interconnection with emergency shutdown system
- regulation or control system
- alarm system.

A review of the maintenance manual or test log is an acceptable survey method provided a satisfactory recording system and an acceptable maintenance procedure exist.

**311** Drainage system for produced liquids for hazardous areas shall be surveyed.

**312** Water protection system in process area shall be sur-

vayed and function tested as deemed necessary by the surveyor.

#### F 400 Complete periodical survey

**401** The requirements given in 300 apply with the additions given in 400.

**402** Riser joints, flexible pipes and other riser system components to be closely visually surveyed for mechanical damage and corrosion. Surface NDT methods shall be used to investigate critical areas for cracks. Thickness measurements and dimensioned checks may be required if found necessary by the surveyor. Satisfactory functioning and pressure integrity shall be confirmed.

**403** The production or well control equipment shall be subject to internal inspection to the extent necessary to reveal current condition. Satisfactory functioning and pressure integrity shall be confirmed.

**404** Pressure vessels and heat exchangers shall be subjected to internal surveys. If this is not practical then use of thickness measurements may be considered. Examination of related equipment such as valves, piping and fittings shall be carried out. Pressure testing to rated working pressure shall be carried out.

**405** Correct setting of valves shall be confirmed.

**406** High pressure or capacity pumps and compressors shall be surveyed by opening up fully or partly as deemed necessary by the surveyor. Pressure testing to be carried out when relevant and found necessary by the surveyor.

**407** Overhead lifting equipment and lifting devices shall be dismantled to the extent necessary to evaluate current condition. Main loading parts shall be checked by NDT. Thickness measurements as deemed necessary to be carried out. Wire ropes shall be surveyed.

**408** Structural condition of the flaring arrangement shall be surveyed. NDT of main structural components may be required as deemed necessary by the surveyor.

**409** The fixed water protection systems in process area shall be surveyed and tested for correct functioning.

**410** Function test of safety devices and instrumentation listed in 310 shall be carried out.

### G. Drilling Plant

#### G 100 Application

**101** The requirements in G apply for units or installations with class notation: **DRILL**.

**102** Well test systems on units with **DRILL** notation shall be surveyed according to the requirements given in F.

#### G 200 Annual survey

**201** Drilling related equipment, structures and systems shall be surveyed, with particular attention to the structural integrity, fire or explosion hazards and personnel protection. Running tests, NDT and/or opening of equipment shall be performed as considered necessary by the surveyor.

**202** Overhead drilling equipment and lifting appliances for drilling and associated operations shall be surveyed, with particular emphasis on structural integrity. Examination and functional testing shall be carried out as found necessary by the surveyor, for example safety devices and emergency stop function. The marking (SWL) shall be verified as acceptable.

**203** Wire ropes (including end attachments) and sheaves of the tensioning drilling and associated systems shall be surveyed. If deemed necessary by the surveyor, checking by NDT shall be carried out.

**204** Pressure vessels shall be externally surveyed. The general condition of the pressure vessel including mountings, piping and possible insulation will be ascertained. The surveyor may require opening or internal survey or thickness measurements and/or crack detection test, if found necessary.

Safety valves, instrumentation and automation systems shall be surveyed and tested in operating condition as required by the surveyor. Liquid level controls on tanks or separators shall also be tested.

**205** Piping systems including flexible pipes shall be surveyed. Thickness measurements shall be carried out as deemed necessary by the surveyor. Safety valves shall be surveyed and tested as deemed necessary by the surveyor.

**206** The mud and cement system shall be surveyed. Pumps shall be externally surveyed and function tested.

**207** Marine riser joints (as far as accessible) and diverter system shall be visually surveyed and inspected for corrosion, cracks and wear. Thickness measurements may be required by the surveyor.

**208** The blowout preventers shall be surveyed and pressure tested according to a recognised code or, if not accessible, a review of records or test log shall be performed.

**209** The well testing system shall be surveyed.

#### G 300 Complete periodical survey

**301** The requirements given in 200 apply, with the additions given in 302 to 308.

**302** Derrick and flare boom installations shall be examined, with emphasis on the structural condition of bracings and with respect to deformation and slack or loose bolts (if of bolted design). Thickness measurements and/or NDT of main structural components and checking of bolts after dismantling may be required as deemed necessary by the surveyor.

**303** Main loading parts of overhead drilling equipment shall be checked by MPI (magnetic particle inspection). Structural parts shall undergo thickness measurements deemed necessary by the surveyor.

The API RP 8B may be used as guidance.

Thickness measurements and NDT for main structural parts of the lifting appliances shall be carried as deemed necessary by the surveyor. Lifting appliances (except overhead drilling equipment and BOP handling equipment) shall be load tested, as stated in the Rules for Certification of Lifting Appliances.

**304** Pressure vessels shall be surveyed internally. If internal survey is not practical, thickness measurements shall be taken.

Pressure vessel related equipment, such as valves, pipes, etc., shall be examined. The correct setting and any remote operation of safety valves shall be examined. Pressure testing to maximum allowable working pressure shall be performed.

**305** Mud and cement pump fluid ends shall be surveyed and checked for cracks in critical areas.

**306** The marine riser system, including diverter system and choke and kill lines, is to be surveyed. Liquid penetrants or MPI methods shall be used to investigate critical areas for cracks. Thickness measurements may be required if found necessary by the surveyor. Choke and kill lines shall be pressure tested to the maximum allowable working pressure.

**307** The blow-out preventer system shall be subject to complete performance test, including pressure testing to maximum allowable working pressure. Records of overhaul shall be reviewed.

For class notation **DRILL(N)** there shall be complete overhaul and test of the BOP at intervals of 5 years.

**308** Piping systems including flexible pipes shall be pressure tested to the working pressure.

## H. Helicopter Deck

### H 100 Application

**101** The requirements in H apply to units or installations with class notation:

**HELDK**

**HELDK-S**

**HELDK-SH.**

### H 200 Complete periodical survey

**201** All surveys of the helicopter deck arrangement shall be concurrent with the complete periodical survey of the hull.

**202** An overall survey shall be carried out with particular emphasis on the structural integrity of the deck with supporting structure, and is normally to include examination of the following components and arrangements:

- drainage arrangements
- surface protection on wooden decks
- safety net
- lashing arrangements for the helicopter
- arrangements for the prevention of sliding
- helicopter deck including support
- fire safety installation (**S, SH**)
- communication equipment (**S, SH**)
- obstacles and marking (**SH**).

## I. Crane

### I 100 Application

**101** The requirements in I apply to units or installations with class notation:

**CRANE.**

### I 200 Annual survey

**201** The following survey requirements shall be carried out concurrently with the annual survey for main class.

**202** An overall survey shall be carried out with particular emphasis on structural integrity, including examination of:

- wire ropes and end attachments
- blocks and sheaves
- hooks with accessories
- shackles
- bearings of boom heel and eyebolt connections
- securing arrangement for crane during passages
- support structure.

**203** The slewing system (slewing bearing or hook rollers) including tightness of bolts shall be examined as required by the surveyor.

**204** Examination and functional testing of the following shall be performed as found necessary by the surveyor:

- correct adjustment of brakes
- resistance measurement of electrical systems
- leakages in hydraulic system
- safety devices
- emergency stop function
- fire extinguisher.

**205** The load charts, marking and components certificates shall be verified as available and in order.

### I 300 Complete periodical survey

**301** Structural parts shall undergo thickness measurements as deemed necessary by the surveyor.

**302** The following components shall be dismantled (opened up) and/or checked by MPI (magnetic particle inspection):

- boom heel bearings
- fixed sheaves
- blocks
- axle pin and housing
- eyebolt connections
- hooks, ring and balls.

The slewing ring shall be opened up, and internal fillets, race-way and bolts shall be subjected to MPI.

Alternatively:

- slewing bearings may be subject to relevant accepted NDT in order to check for defects in fillets and raceways
- crane with approved securing device (retainer) fitted, opening up is not required
- at least 50% of the holding down bolts shall be drawn and subjected to MPI.

**303** Flatness and condition of bearing mounting flanges shall be checked.

**304** Load testing shall be performed as outlined in Form No. CG 2 in the Rules for Certification of Lifting Appliances.

## J. De-icing and Anti-icing Systems

### J 100 Application

**101** The requirements in J apply to units or installations with class notations:

**DEICE**

**DEICE-C.**

### J 200 Annual survey

**201** Visual inspection of anti-icing and de-icing switchboards and confirm heating load on each circuit according to marking on the switchboards.

**202** Examination of equipment for de-icing and anti-icing including:

- heaters
- covers
- equipment for manual de-icing
- radar equipment
- heating coils
- steam tracing lines.

## K. Periodically Unattended Machinery Space and Machinery Centralised Operated

### K 100 Application

**101** The requirements in K apply to units or installations with class notations:

**E0**

**ECO.**

### K 200 Annual survey

**201** The surveyor shall verify that systematic maintenance and functional testing of instrumentation has been performed and documented.

The general condition of the following shall be to the satisfaction of the surveyor:



- installation of instrumentation equipment with regard to electrical and mechanical condition, labels, signboards etc.
- control panels
- local indicating instruments.

**202** Correct functioning of the following systems shall be verified:

- alarm systems
- safety systems
- remote control systems
- automatic control systems
- emergency lighting systems in engine room
- communication systems
- fire alarm and fire protection systems.

### **K 300 Complete periodical survey**

**301** The requirements given in 200 apply, subject to the additions given in 302 to 305.

**302** Correct functioning of the various parts of the following systems shall be verified to the satisfaction of the surveyor:

- each alarm system
- each safety system
- each fire detector
- automatic control loops
- manual control of machinery.

**303** The following manoeuvres shall be undertaken for survey of remote control of propulsion machinery:

- from stop to ahead
- from ahead to astern
- stop
- from stop to astern
- stop by operating the emergency device.

**304** The surveyor shall verify effective transfer from remote control to stand-by manual control in the engine room in case of power supply failure to the remote control system.

**305** Where provided, cancelling of automatic load reduction and/or automatic stop of engine functions shall be demonstrated to the satisfaction of the surveyor.

## **L. Additional Fire Protection**

### **L 100 Application**

**101** The requirements in L apply to units or installations with class notations:

**F-A**

**F-M**

**F-C**

**F-AM**

**F-AC**

**F-MC**

**F-AMC**

### **L 200 Complete periodical survey, all F-class notations**

**201** Fire pumps including emergency fire pump and prime movers shall be surveyed and tested.

**202** Fireman's outfit and compressors for charging the air bottles, shall be surveyed.

### **L 300 Complete periodical survey, F-A**

**301** The requirements in 200 apply, with the following additions:

- fire retarding partitions in the accommodation shall be surveyed
- hose stations, together with their equipment, in the accommodation, shall be surveyed
- automatic fire-detecting and alarm systems including release arrangement for self-closing doors in passageways, stairways and machinery casings shall be surveyed and tested.

### **L 400 Complete periodical survey, F-M**

**401** The requirements in 200 apply with the following additions:

- main and local extinguishing systems in engine and boiler rooms including detection and alarm arrangements shall be surveyed and tested. The quantity of extinguishing medium shall be checked
- portable dry powder fire extinguishers, and spare charges shall be checked
- hose stations in the engine and boiler rooms together with their equipment shall be surveyed.

### **L 500 Complete periodical survey, F-C**

**501** The requirements in 200 apply with the following additions:

- smoke detector systems for cargo holds, cargo pump rooms, compressor rooms and other service rooms shall be surveyed and tested
- CO<sub>2</sub>-systems shall be surveyed and the CO<sub>2</sub>-quantity verified. Thickness measurements and or pressure testing of CO<sub>2</sub>-bottles may be required if found necessary by the surveyor
- foam systems shall be surveyed and the foam quantity verified. Foam forming concentrate shall be analysed every five years
- dry chemical powder systems shall be surveyed and the powder quantity verified
- fire extinguishing systems for deck area shall be tested
- portable fire extinguishers for the deck area and cargo holds shall be surveyed. Spare charges shall be checked
- hose stations on deck together with their equipment shall be surveyed.

### **L 600 Complete periodical survey, F-AM**

**601** The requirements in 300 to 400 apply.

### **L 700 Complete periodical survey, F-AC**

**701** The requirements in 300 and 500 apply.

### **L 800 Complete periodical survey, F-MC**

**801** The requirements in 400 and 500 apply.

### **L 900 Complete periodical survey, F-AMC**

**901** The requirements in 300 to 500 apply.

## **M. Integrated Computer Systems**

### **M 100 Application**

**101** The requirements in M apply to units or installations with class notation:

**ICS.**

### **M 200 Complete periodical survey**

**201** All surveys of integrated computer systems shall be concurrent with the survey of instrumentation and automation systems for class notation **E0**.

**202** The installation shall be visually examined, and the sys-

tems shall be tested as follows:

- at workstations, relevant pages shall be called onto the screen. The pages shall be checked for relevance and compared to the instruction material
- active control and manipulation of a selection of parameters shall be demonstrated from two or more workstations
- protection of systems against interference from unauthorised personnel shall be demonstrated.

## N. Hull Monitoring System

### N 100 Application

**101** The requirements in N apply to units or installations with class notations:

**HMON-1** or  
**HMON-2**.

### N 200 General

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

**202** The operation manual shall be available to the attending surveyor during periodical surveys. In addition to the manual the following documents shall be available:

- arrangement and layout
- test program for software
- in-service test program
- maintenance procedures.

### N 300 Annual survey

**301** The operation of the hull monitoring system shall be verified by a DNV surveyor:

- to ensure that the value of the stress as defined is compatible with the output of the loading instrument for the current condition
- by examination of the recorded data for compliance with the requirements.

**302** The monitoring system shall be calibrated annually. The calibration shall be verified by a DNV surveyor.

**303** It shall be verified that the following items are available and in order:

- calibration certificates and recommendations for all relevant components of the monitoring system
- operations manual.

## O. Vapour Control Systems

### O 100 Application

**101** The requirements in O apply to units or installations with class notations:

**VCS-1**  
**VCS-1B**  
**VCS-2**  
**VCS-2B**  
**VCS-3**.

### O 200 Complete periodical survey

**201** Requirements for survey of the additional class notations **VCS-1** and **VCS-2** are considered covered by the rules for units or installations with class notation **Storage Unit** or

## Storage Installation.

**202** For **VCS-1B** and **VCS-2B** the following instruments and equipment shall be surveyed and tested:

- the means to inert the vapour transfer hose
- oxygen analyser with alarms
- detonation arrester.

Requirements for survey of the remaining parts of the installation are considered covered by the rules for units or installations with class notation **Storage Unit** or **Storage Installation**.

**203** For **VCS-3** the details of periodical survey requirements will be specified in the unit's or installation's "Appendix to the classification certificate".

## P. Safety and Environmental Protection Management System

### P 100 Application

**101** The requirements in P apply to units or installations with class notation:

**SBM**.

### P 200 Survey requirements

**201** Surveys shall be in compliance with the Rules for Classification of Ships, Pt.7 Ch.5.

## Q. Tailshaft Monitoring

### Q 100 Application

**101** The requirements in Q apply to units with class notation: **Tailshaft monitoring (TMON)**.

### Q 200 General

**201** For oil lubricated tailshafts that are monitored to ascertain the condition of the tailshaft system during operation, and that fulfils the design requirements in Ch.2 Sec.6 T500 the Society will not require any specific time interval between complete tailshaft surveys.

In such cases a tailshaft condition monitoring survey arrangement (class notation **TMON**) will be granted.

**202** The class notation is applicable to conventional, podded and thruster propulsion systems. Other arrangements will be subject to special consideration.

**203** Units with more than 3 years since the last tailshaft withdrawal are normally to carry out a complete tailshaft survey in connection with the initial **TMON** implementation survey.

#### Guidance note:

The requirement for a complete survey at **TMON** implementation may be waived provided the following:

- Complete records are presented to the Society containing relevant measurements concerning **TMON** for a period covering the last 3 years, showing satisfactory results.
- Such records shall at least include monthly measurements of stern tube bearing temperatures with corresponding sea water temperatures, oil consumption, water content in oil, and in case of roller bearing, recordings of vibration or shock pulse measurements or trend analysis.
- Where fluid film bearings are applied, bearing clearances from last dry docking and wear down measurements taken since last shaft withdrawal shall be presented.

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### **Q 300 Annual survey**

**301** The following conditions for **TMON** operation must be verified during annual survey:

- a) On board oil analysis for checking of water content in the stern tube oil shall be performed monthly and recorded in the **TMON** record file by the chief engineer.
- b) At least two oil samples per year shall be submitted to a recognized laboratory for analysis testing of water content, iron, chromium, copper, tin, silicon, sodium and magnesium.
- c) The documentation of the laboratory analysis shall be kept on board, and shall contain a conclusion regarding the condition of the oil and its suitability for further use.

- d) The report from the oil analysis presented to the surveyor at annual surveys shall be less than three months old.

### **Q 400 Dismantling of propellers**

**401** 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.

## APPENDIX A SPECIAL CONSIDERATIONS FOR CONVERSIONS

### A. Basic Principles

#### A 100 Introduction

**101** This appendix has been prepared to make available DNV's approach for an efficient transfer of existing tankers to offshore production and storage units or installations.

#### A 200 Assumptions

**201** DNV assumes that the tanker being proposed for conversion:

- holds a valid class certificate from a recognised classification society
- has been assessed and considered suitable for the intended new duty and service life at a specified location.

#### A 300 Main principles

**301** All new systems shall comply with the latest DNV rules or standards or recognised international standards. Modified systems will normally be accepted based on rules or standards applicable at the time of construction. Alternative solutions will be considered based on sound engineering principles.

**302** Standard and 'field proven' equipment may be accepted without being subjected to re-certification, when equipment certificate (e.g. from a recognised classification society) or other supporting documentation provides evidence of suitability for intended use.

##### Guidance note:

Evidence of suitability for intended use of *field proven* equipment may be documented through records of satisfactory operation with identical equipment at similar climatic conditions, environmental and operating parameters for a representative number of installations (indication > 10) and period of time (indication > 2 years).

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**303** Deviations from requirements applicable to unrestricted world-wide operation will be accommodated, by evaluating fitness for purpose at the specific location. The criteria and limitations for the unit or installation, systems or components will be stated in the "Appendix to the classification certificate".

**304** Approval schemes with terms of reference other than DNV rules or standards will be allowed for specific systems, when such references are found to give an acceptable safety level equivalent to the rules or standards.

**305** Renewal surveys on location, avoiding dry-docking, will be accommodated to the extent feasible.

##### Guidance note:

Owners are encouraged to consider at the conversion stage the in-service inspection aspects of the unit on location.

The following are areas where small changes made at the conversion stage can contribute to better and more cost-effective follow-up in service:

##### Overboard valves

- Consider fitting boroscope fittings downstream of the valves.
- Consider how opening/replacing valves can be safely carried out offshore. Attention to be paid to the effect of closing a seachest, or losing the use of a valve.

##### Thrusters

- Inspection on location, removal if damage is found.

##### Survey of bottom

- Consider markings to allow identification of location of ROV/diver (see Ch.2 Sec.3 H).
- Consider fitting of hinged sea chest grids.
- Survey of tailshaft systems and rudder systems, e.g. water lubricated rudder bearings should be arranged to allow clearances taken on location.

##### Mooring systems

- How to survey the part of the system that is close to the hull or the unit.
- How to survey the area past the thrash zone.
- Survey of the SLP/STL connections to the hull and the internals in the hull openings.

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### B. Class Notations

#### B 100 Conversions

**101** Class notations applicable to conversions will be as given for production and storage units in Ch.1 Sec.3.

### C. Technical Guidance for Classification

#### C 100 General

**101** All new or modified structures, systems and components shall comply with the current class rules in force at the time of signing the classification contract.

**102** All other structures, systems and components will in principle be accepted based on rules applicable at the time of construction (when the tanker was first classed), if suitable for the intended purpose.

#### C 200 Hull and topside structures

**201** The following approach should be taken to evaluate the suitability of the hull for the intended operation:

- Determine the condition of the tanker with respect to corrosion and possible reduced scantlings.
- Identify the static loads acting on the unit as a consequence of its new function:
  - total topside loads and load distribution (for longitudinal strength).
- Identify the environmental loads by applying **1A1 Tanker for Oil** rules for loads and motions. Alternatively, if less strict values than above shall be applied, determine hydrodynamic wave loads and motions and accelerations for the relevant location and during transit.
- Assess hull girder longitudinal strength (buckling and yield) exposed to new static and dynamic loads based on the actual scantlings of the ship, if less strict values than **1A1 Tanker for Oil** shall be applied.

##### Guidance note:

In both cases, the NAUTICUS Hull software is an efficient tool for such assessments.

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- Assess local strength of :

- supporting structure for heavy topside loads
- structures in way of mooring

- turret structure and interface with the hull as applicable.
- f) Determine remaining fatigue life for critical structural details, accounting for the former load history.
- g) Propose inspection programme based on required fatigue life and corrosion margins, including safety factors and findings during earlier inspections.
- h) The site-specific environmental data will be included in the “Appendix to the classification certificate”, with reference to source.

### C 300 Hull condition

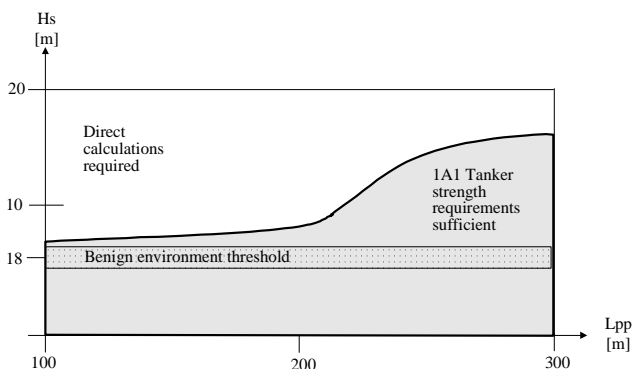
**301** It is envisaged that thickness measurements are available from the evaluation done by or on behalf of the owner in preparation for the conversion. This information together with the renewal survey carried out onboard will decide the extent of possible steel renewal to:

- bring the hull back to the basic scantlings as applicable for a tanker,
- or alternatively
- accept reduced scantlings for a specific location.

### C 400 Hull strength in benign environment

**401** A new set of still-water load conditions needs to be defined in order to account for the new function of the unit, including global and local loads mentioned above. An existing tanker would comply with the main **1A1** class requirements, which imply that the hull girder longitudinal strength is based on the 20 years North Atlantic environmental loads ( $10^{-8}$  probability level of exceedance).

**402** If the actual site-specific environmental loading is less severe than the **1A1 Tanker for Oil** requirements for longitudinal strength, the hull strength may be assessed according to specific acceptance criteria for benign environment (see DNV-OS-C102).



**Figure 1**  
**Typical longitudinal strength margins**

**403** This implies that the global strength may be based on direct calculations of wave bending moments and the actual scantlings of the hull. Accelerations used for the design of topside structure and connection to the hull may be determined from these direct calculations, as an alternative to the normally more conservative **1A1 Tanker for Oil** requirements.

### C 500 Fatigue assessment

**501** The fatigue capacity for conversions will be considered on a case-by-case basis, and is a function of the following parameters:

- results from survey and assessment of critical details

- service history of the vessel and estimated remaining fatigue life
- duration of the intended stay on a specific location and environmental conditions.

#### Guidance note:

A simplified method is described in Classification Note 30.7, which is regarded as an efficient way to establish the remaining fatigue life, and the required safety against fatigue damage. The same Classification Note also includes guidance on full stochastic fatigue analysis if this proves to be necessary. The NAUTICUS suite of software can be used to perform the calculations.

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### C 600 Topside support structure

**601** The process deck structure should be designed to applicable class rules or recognised structural codes or standards. Due consideration shall be given to the flexibility of the topside support structure to the main hull to take care of the movement from the global bending of the unit. Existing hull structure providing support for the process plant footprints shall be checked against the Rules for Classification of Ships.

### C 700 Mooring

**701** With few exceptions, the usual station-keeping concepts are spread mooring for relatively shallow to intermediate water depths, and single-point mooring for deeper waters.

**702** There are basically two approaches for certification of the mooring system design:

- in accordance with class rules; or alternatively
- in accordance with recognised international standards (e.g. API RP 2SK).

### C 800 Marine systems and equipment

**801** The marine system piping and equipment are categorised in three groups based on the scope of the conversion work:

- a) *Not subjected to any alteration, or any effect from the modification of the related systems*  
These systems and equipment will be accepted based on requirements for renewal survey.
- b) *Subjected to alteration and modifications*  
These systems will be accepted as long as the modification of the equipment and system is carried out in accordance with rules, or recognised international standards. Modification to systems and components which are identified as safety critical shall be subject to approval. The modified system shall also undergo satisfactory pressure or function testing as required by the Rules for Classification of Ships, Pt.7 Ch.2 Sec.2, as applicable for renewal survey.
- c) *New systems and equipment*  
New systems and equipment that are covered by the class scope will be subject to approval based on class rules and/or international standards and shall undergo satisfactory pressure or function testing as applicable based on the Rules for Classification of Ships, Pt.4 and Pt.7, for acceptance.

### C 900 Electrical and instrumentation

**901** Typical consequences of conversions will be increased power demand and hazardous zone alterations. This requires incorporation of new elements to the existing systems, and obtaining unambiguous area classification with matching equipment requirements. Integration of instrumentation for marine applications with new process and offloading functions need to be implemented based on a consistent approach. Class requirements are based on IEC standards (61892 - series). In case of incorporating US based equipment, the hazardous area defini-

tions will need specific attention with particular focus on Div 1 and fulfilment of Zone 0 and 1 requirements. DNV accept electrical equipment for hazardous areas provided type test certificates issued by a recognised test laboratory or institution support these. This also applies to US based UL / FM listed electrical equipment upon evaluation of premises for use and scope of testing. Requirements to electrical installation as per the SOLAS convention applicable to “Oil Tankers” may be re-evaluated, taking into account the new intended duty and service.

#### **C 1000 Safety systems and arrangement**

**1001** Safety systems will be subject to approval irrespective of the class scope chosen. The focus will mainly be on systems that have global impact on the safety of the vessel, and the effect from safety and control systems beyond the individual process skid or module.

**1002** The safety systems include the following:

- hazardous area classification
- ignition prevention (review of ‘ex’ equipment suitable for hazardous area)
- fire and gas detection system
- fixed fire fighting system
- emergency shutdown system.

**1003** Interface between safety and marine systems will be evaluated to ensure that addition of the hydrocarbon process plant has not compromised the safety and functionality of the marine systems.

**1004** The arrangement and lay-out of the processing plant should be considered in view of fire and explosion hazards, depending on size and complexity of the plant, as well as location in relation to accommodation, escape, shelter and evacuation facilities. Protection of equipment from operation of the plant should be considered, e.g. cranes and lay down areas to be in locations avoiding lifting operations over pressurised equipment.

**1005** Due regards should be given to the already built-in safety features required to fulfil the ICLL, SOLAS and MARPOL requirements.

### **D. Additional Services**

#### **D 100 General**

**101** Description of additional DNV services related to conversion projects within the areas of pre-conversion, class transfer, subsea installations, production facilities and in-service support can be found at the DNV web site [www.dnv.com](http://www.dnv.com).

## APPENDIX B

### INTRODUCTION TO OFFSHORE CLASSIFICATION

#### A. Introduction

##### A 100 Purpose

**101** This appendix is informative and should not be understood as rule requirements. The appendix explains the system of classification, how it works, conditions of validity, and its interaction with statutory control. This information is to a large extent implied by the rules, but a brief clarification of the essential points in one place is considered useful.

#### B. The Classification System

##### B 100 The classification process and its limitations

**101** Classification is a system for safeguarding life and property at sea, and the environment due to operational consequences. It implies a process of verifying offshore objects against a set of requirements. The requirements are laid down in the rules and standards established by DNV. Classification has gained worldwide recognition as an adequate level of safety and quality.

**102** Classification implies an activity, in which an offshore unit is surveyed during construction based on design approval, tested before being taken into service, and surveyed regularly during its whole operational life until it is scrapped. The aim is to verify that the required rule standard is built in, observed and maintained.

**103** Classification is not performed as a substitute for the client's own quality and safety control and related duties, or the client's obligations to third parties, nor to relieve the client of any consequences of default. Classification implies that rule requirements are verified at regular intervals. It is the owner's responsibility to maintain the unit so as to comply with the rules at all times.

**104** DNV keeps complete files on all classed ships and offshore units covering the documentation required by the rules. Reports will not be disclosed to any party, apart from the national authorities involved, without the owner's consent. DNV also undertakes all reporting to national authorities required in connection with the safety certificates.

##### B 200 Who needs classification?

**201** Classification serves as verification system for a number of parties who have special interest in the safety and quality of offshore units, such as:

- National authorities, who accept units for registry, or let units into their territorial waters, need assurance that they are safe and represent a minimum hazard to their surroundings.
- Insurance underwriters require offshore units to be classed in order to give insurance.
- Owners, who need the technical standard of the rules as basis for building contracts and to document the unit's standard when seeking insurance or financing, or when hiring out or selling the unit.
- Building yards and sub-contractors use the rules as a tool for design and construction, as required by their client.
- Finance institutions use classification as a documented indicator of the unit's value.
- Charterers require confirmation of the unit's standard before hire.

##### B 300 Recognition of DNV

**301** DNV is recognised as an international classification society by virtue of its position in the maritime industry, founded on the following criteria:

###### *Independence*

- By classing a substantial share of the world fleet and through high equity and financial independence, the economic basis for independent decisions in classification matters is ensured.

###### *High technical competence*

- Extensive research and development in class related fields sustain a process where the rules and standards are continuously extended and improved in pace with new technology and experience gained. Research and development also contributes to a high level of staff competence.
- Continuous monitoring of a large classed fleet ensures valuable feedback from casualties, damage incidents and operational experience in general. Analyses of these data are one important source of improvements to the rules.
- DNV runs a scheme for training and qualification of its technical personnel to ensure correct, uniform quality of approval and survey work throughout the organisation.

###### *Worldwide survey station network*

- DNV operates survey stations all over the world. Efficient reporting and information systems support the operations, and provide service to clients and national authorities.

##### B 400 Responsibility for safety at sea

**401** National law institutes national authorities' responsibility for the total safety control of offshore units flying the national flag. Classification cannot in any way relieve the national authorities of that responsibility.

**402** National authorities may use the classification system and DNV's worldwide survey station network as their executive branch for safety control. The convenience of this arrangement is proved by the fact that DNV has been delegated extensive authorisation to work and certify on behalf of the majority of the maritime nations of the world.

**403** The classification system applied to delegated, statutory work offers the national authorities regular monitoring of survey and certificate status of offshore units flying their flag. Verification of DNV's work process and quality systems may also be carried out. In this way, national control is retained at the discretion of the authority involved.

##### B 500 Classification of newbuildings

**501** The builder initiates the process by submitting a request for classification to DNV. In response to a list of documentation issued by DNV for the specific class notations requested, the builder and sub-suppliers submit drawings, specifications, related technical descriptions and data, including specification of materials as required by class, for approval.

The builder initiates the process by submitting a request for classification to DNV. In response to a list of documentation issued by DNV for the specific class notations requested, the builder and sub-suppliers submit drawings, specifications, related technical descriptions and data, including specification of materials as required by class, for approval.

**502** During the building period DNV carries out surveys at the building yard and its suppliers. The method and extent of

survey will be decided by DNV based on the acceptance of their quality system.

The purpose of the surveys is to verify that the construction, components and equipment satisfy the rule requirements and are in accordance with the approved plans, that required materials are used, and that functional tests are carried out as prescribed by the rules.

**503** When DNV is satisfied that the requirements specified for the offshore unit in question have been met, the appropriate class notation will be assigned and confirmed by the issuance of a classification certificate. Provided the requirements for retention of class are complied with, the certificate will normally have a validity of five years.

#### **B 600 Classification in the operational phase**

**601** Compliance with the rule requirements in the operational phase is verified by DNV through a system of periodical surveys. The most comprehensive survey is the one carried out in connection with the renewal of the five-yearly classification certificate. During the five year period the unit undergoes annual and intermediate surveys covering various parts, equipment and systems, depending on the class assigned.

**602** In order to confirm retained validity of class, DNV evaluates the extent of possible sustained damage and verifies ensuing repairs. Deferred repairs may be accepted by DNV, but always associated with a maximum time limit.

**603** The rules allow periodical surveys to contain an element of sampling. This sampling must be sufficient to enable the surveyor to obtain a proper assessment of the condition of the unit. This assessment is based amongst other things on type, age and technical history of the unit.

**604** Results of the surveys are reported to the owners and to DNV's central office for updating records. Special findings are also recorded and used as basis for updating and development of the rules.

**605** "The register of vessels classed with DNV" is available for supplying information on ship's and offshore unit's main particulars and details of their classification.

#### **B 700 Owner's duties**

**701** In order to maintain valid class the classification system specifies the following to be observed by the owner:

- The unit has to be competently handled in accordance with the rules.
- The unit has to be maintained to rule standard at all times. Any conditions of class have to be carried out as specified.
- The unit has to undergo prescribed periodical and renewal surveys, as well as surveys of damage, repairs, conversions and alterations.
- The unit has to undergo prescribed periodical and renewal surveys, as well as surveys of damage, repairs, conversions and alterations.

**702** To assist the owner in this regard DNV supplies regular status reports on certificates, surveys carried out and becoming due, and possible conditions of class.

### **C. Remuneration**

#### **C 100 Fee system**

**101** Remuneration is normally based on a fee system, in which DNV invoices each type of survey according to a basic scale of fees. The basic scale of fees is developed by taking into consideration the amount of work needed to execute, process and follow up the survey in question, as well as the items surveyed. The fees also cover investment and development costs of the rules as well as maintenance of a worldwide survey network, central service support system, etc. Price level and costs vary from country to country and are therefore reflected in the fees charged.

### **D. Classification Support**

#### **D 100 General**

**101** The staff of DNV represents a significant accumulation of knowledge and practical experience in offshore-related technical fields. This is an asset often drawn on by the industry in matters related to classification.

**102** The expertise of DNV is available to the owner at any time when needed in connection with operating problems, damage and casualties.

#### **D 200 Pre-contract support**

**201** Co-operation with DNV early in the design stage, before classification is requested and any contract is signed, is usually very beneficial to both yard and owner. Different technical solutions may be evaluated, thus contributing to a more efficient unit, and ensuring that all safety aspects as specified by the rules are taken care of. In this way, expensive changes late in a project may be avoided.

#### **D 300 In-service support**

**301** Similar services are given in connection with units in operation. Alternative ways of repairs may be indicated, acceptable distributions of crude cargo and ballast to alleviate overstressing may be computed in case of damage, stability may be investigated, etc. These are typical examples.

#### **D 400 Limitations**

**401** Two main restrictions prevail on DNV when undertaking classification support work:

- DNV does not carry out complete, conceptual design of offshore units. In cases where DNV has been involved in design support, the plans and calculations must still be independently evaluated by DNV before being accepted for classification purposes.
- Information received from clients in connection with assignment of class is not disclosed and used in classification support work.



## APPENDIX C

### UNDERWATER INSPECTION IN LIEU OF DRY-DOCKING SURVEY

and photograph (if necessary) by diver. Overall or spot cleaning may be required.

#### A. Introduction

##### A 100 General

**101** Following are the procedures and conditions under which a properly conducted underwater inspection may be credited as equivalent to a dry-docking survey.

(IACS UR Z15)

#### B. Conditions

##### B 100 Limitations

**101** Underwater inspection in lieu of dry-docking survey may not be acceptable where there is record of abnormal deterioration or damage to the underwater structure; or where damage affecting the fitness of the unit is found during the course of the survey.

##### B 200 Thickness gauging and non-destructive testing

**201** Underwater testing of internal thickness gaugings of suspect areas may be required in conjunction with the underwater inspection. Means for underwater non-destructive testing may also be required for fracture detection.

##### B 300 Plans and data

**301** Plans and procedures for the dry-docking survey (underwater inspection) are to be submitted for review in advance of the survey and made available on board. These should include drawings or forms for identifying the areas to be surveyed, the extent of underwater cleaning, non-destructive testing locations (including NDT methods), nomenclature, and for the recording of any damage or deterioration found.

##### B 400 Underwater conditions

**401** The areas to be surveyed are to be sufficiently clean and the sea water clear enough to permit meaningful examination

#### C. Physical Features

##### C 100 General

**101** The following physical features are to be incorporated into the unit's design in order to facilitate the underwater inspection. When verified they will be noted in the unit's classification for reference at subsequent surveys.

##### C 200 Stern bearing

**201** For self-propelled units, means are to be provided for ascertaining that the seal assembly on oil lubricated bearings is intact and for verifying that the clearance or wear-down of the stern bearing is not excessive. For use of the wear-down gauges, up-to-date records of the base depths are to be maintained on board. Whenever the stainless-steel seal sleeve is renewed or machined, the base readings for the wear-down gauge are to be re-established and noted in the vessel's records and in the survey report.

##### C 300 Rudder bearings

**301** For self-propelled units with rudders, means and access are to be provided for determining the condition and clearance of the rudder bearings, and for verifying that all parts of the pintle and gudgeon assemblies are intact secure. This may require bolted access plates and a measuring arrangement.

##### C 400 Sea suction

**401** Means are to be provided to enable the diver to confirm that the sea suction openings are clear. Hinged sea suction grids would facilitate this operation.

##### C 500 Sea valves

**501** For the dry-docking survey (underwater inspection) associated with the renewal survey, means must be provided to examine any sea valve.

