

OFFSHORE SERVICE SPECIFICATION
DNV-OSS-102

**RULES FOR CLASSIFICATION
OF FLOATING PRODUCTION,
STORAGE AND LOADING UNITS**

APRIL 2007

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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- B) Materials Technology
- C) Structures
- D) Systems
- E) Special Facilities
- F) Pipelines and Risers
- G) Asset Operation
- H) Marine Operations
- J) Wind Turbines

Amendments and Corrections

This document is valid until superseded by a new revision. Minor amendments and corrections will be published in a separate document normally updated twice per year (April and October).

For a complete listing of the changes, see the "Amendments and Corrections" document located at: <http://webshop.dnv.com/global/>, under category "Offshore Codes".

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

Comments may be sent by e-mail to rules@dnv.com

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Computer Typesetting (FM+SGML) by Det Norske Veritas.
Printed in Norway.

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CHANGES IN THE RULES

The present edition of the rules includes amendments and additions decided by the Executive Board in December 2006 and supersedes the October 2003 edition.

The changes come into force 1 July 2007.

Main changes

- **General**

These rules have been updated in line with new IACS requirements (i.a. UR Z15, PR 1A, PR 19 Rev.3, Rec.39 and 44, QSCS and “Ship and Repair - Quality std.”) and feedback from the users on the previous issue. The main changes are described below.

- 1) New title / name for DNV-OSS-102 is introduced.
- 2) New service notation for Oil Loading Units and Installations, see Ch.2 Sec.5.
- 3) A new voluntary, additional class notation, **FMS** (Fatigue Methodology for Ship-shaped Offshore Units), introduced

for additional fatigue safety for offshore ships performed in accordance with the DNV-RP-C206, see Ch.2 Sec.6 Q.

- 4) Improved rules with respect to Towing, Emergency and Temporary Mooring Equipment, see Ch.3 Sec.4, new subsection K.
- 5) Improved survey requirements for anchor lines, see Ch.3 Sec.6 B704 and B800.
- 6) Text improved and aligned with the January 2007 version of the Rules for Classification of Ships.
- 7) Notations defined in the Rules for Classification of Ships which are relevant for FPSOs, have been included.
- 8) References to NPS DocReq (DNV Nauticus Production System for documentation requirements) and Guideline No.17 have replaced the references to DNV-RP-A202 and CIBS (Classification Breakdown Structure) codes, see Ch.2.

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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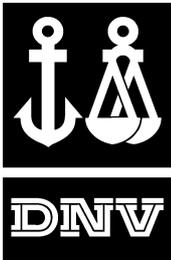
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RULES FOR CLASSIFICATION OF FLOATING
PRODUCTION, STORAGE AND LOADING UNITS

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
- hydrocarbon loading.

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 unit 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 covering 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 *Critical structural areas:* Areas that have been identified from calculations to require monitoring or from the service history of the subject unit or from similar or sister units to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the unit.

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

212 *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.

213 *FUI:* Fatigue Utilisation Factor.

214 *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.

215 *IACS:* The International Association of Classification Societies. Unified rules, interpretations, guidelines and recommendations may be found on www.iacs.org.uk.

216 *IMO:* The International Maritime Organization.

217 *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.

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

219 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.

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

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

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

223 RBI: Risk Based Inspection.

224 RCM: Reliability Centred Maintenance.

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

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

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

228 The Society: Signifies DNV.

229 Spaces: Separate compartments including holds and tanks.

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

231 Statutory survey: Survey carried out by or on behalf of a flag administration.

232 Substantial corrosion: Extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75% of allowable margins, but within acceptable limits.

233 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.

234 Suspect areas: Areas showing substantial corrosion and/or are considered by the surveyor to be prone to rapid wastage.

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

236 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.

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

238 Transverse section: Section which includes all longitudinal members such as plating, longitudinals and girders at the deck, side, bottom, inner bottom and hopper side plating, longitudinal bulkhead and bottom plating in top wing tanks, as applicable.

For transversely framed units, a transverse section includes adjacent frames and their end connections in way of transverse sections.

Guidance note:

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

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239 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.

240 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
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
	Rules for Classification of Ships
	Rules for Certification of Lifting Appliances
	Rules for Certification of Diving Systems
Guideline No.17	Plan Approval Documentation Types - Definitions

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 Station keeping Systems for Floating Structures
IACS	Shipbuilding and Repair Quality Standard ref. www.iacs.org.uk

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.

<i>Reference</i>	<i>Title</i>
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.

<i>Reference</i>	<i>Title</i>
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.

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

Guidance note:

The date on which rule or standard changes come into force is shown on the inside of the cover of new rules/standards and revised Rules/standards if they are reprinted.

For rule/standard changes which are not reprinted, but the coming into force date and the changes are published in the document "Amendments and Corrections".

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202 The applicable rules for assignment of class to a new unit are those in force at the date (as given to the Society by the client) when the contract between the owner and the yard is signed.

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 in connection with a design review and survey, give exemptions from rule requirements.

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

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

It is assumed that the unit, machinery installations and equip-

ment are maintained at a standard complying with the requirements of the rules.

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

Handling of the unit or installation

It is assumed that the unit, machinery installations and equipment are 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.

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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. produced 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.

702 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 and positioning keeping (for **1A1** main class) if applicable
- steering (for **1A1** main class) if applicable
- fire and gas protection, detection and fire extinguishing
- 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 below the damage water line.
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
- special equipment and systems notations (as applicable)
- special feature notations (as applicable).

B 200 Construction symbols

201 The symbol ✕ will be given to units and installations

built under the supervision of DNV.

202 The symbol ✕ 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
Ship-shaped Unit or Installation	Monohull ship and barge type units or installations having displacement hulls with or without propulsion machinery.
Column-stabilised Unit or Installation	Unit or installation dependent on the buoyancy of widely spaced columns for floatation and stability for all modes of operation.
Self-elevating Unit or Installation	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.
Deep Draught Installation	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.
Tension Leg Installation	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.

<i>Notation</i>	<i>Description</i>
Oil Production	Unit or installation with production of hydrocarbons as a main function
Oil Storage	Unit or installation with storage of hydrocarbons as a main function
Oil Loading	Unit or installation with oil loading 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 Additional class; special equipment and systems 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.

<i>Notation *)</i>	<i>Description</i>
BOW LOADING	Bow loading arrangement
CLEAN	Basic requirements for controlling and limiting operational emissions and discharges
CLEAN DESIGN	Additional requirements for controlling and limiting operational emissions and discharges. In addition, this notation specifies design requirements for protection against accidents and for limiting their consequences
COMF -V(crn) or -C(crn) or -V(crn)C(crn)	Units with controlled environmental standards (Comfort Class) V = noise and vibration C = indoor climate crn = comfort rating number, 1, 2 or 3, where 1 is best.
CRANE	Equipped with crane(s)
DEICE or DEICE-C	Unit equipped with de-icing or anti-icing systems
DRILL	Drilling plant
DYNPOS-AUT	Dynamic positioning system with an independent joystick back-up and a position reference back-up
DYNPOS-AUTR	Dynamic positioning system with redundancy in technical design and with an independent joystick back-up
DYNPOS-AUTRO	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
DYNPOS-AUTS	Dynamic positioning system without redundancy
E0	Unit equipped for unattended machinery space
ECO	Unit equipped for operation of machinery from centralised control station
F-A	Additional fire protection of accommodation space
F-AC	Additional fire protection of accommodation and cargo space

<i>Notation *)</i>	<i>Description</i>
F-AM	Additional fire protection of accommodation and machinery space
F-AMC	Additional fire protection of accommodation, machinery and cargo space
F-C	Additional fire protection of cargo space
F-M	Additional fire protection of machinery space
F-MC	Additional fire protection of machinery and cargo space
FMS	Fatigue methodology for ship-shaped units
HELDK	Helicopter deck structure Ref. DNV-OS-E401
HELDK-S	Helicopter deck structure including safety aspect related to the unit
HELDK-SH	Helicopter deck structure including safety aspects related to the unit and to the helicopter
HMON (...)	System for monitoring hull response, sea state and operational parameters. Letters and numbers in the parenthesis will indicate type of sensors/features and number installed of each
ICE-L	Strengthened for ice condition operation
LCS-DC	Loading computer systems for damage control, apply to integrated systems developed to assist the master as a decision aid under damage conditions
OPP-F	Oil pollution prevention - fuel systems
POSMOOR	Passive position mooring system
POSMOOR-ATA	Thruster assisted mooring system dependent on automatic remote thrust control system
POSMOOR-TA	Thruster assisted mooring system dependent on manual remote thrust control system
POSMOOR-V	Mooring system designed for positioning in the vicinity of other structures
PROD	Hydrocarbon production plant
SBM	Management of safety and environment protection in operation
SPM	Single point mooring
STL	Submerged turret loading
VCS-1, VCS-2 or VCS-3	System for control of vapour emission from cargo tanks
VIBR	Applicable to newbuildings and units in operation that meet specified vibration level criteria measured at pre-defined positions for machinery, components, equipment and structure
WINTERIZED (design temp. °C)	When operating in cold climate
WINTERIZED ARCTIC (design temp. °C)	When operating in cold climate, with additional requirements for pollution prevention in vulnerable arctic areas.

*) 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 is not covered by other class notations.

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

<i>Notation</i>	<i>Description</i>
BIS	Ship-shaped units built for in-water survey of the bottom and related items
COAT-1 COAT-2	Specification of corrosion prevention in ballast tanks
DAT(- x°C)	lowest design ambient air temperature applied as basis for the approval
HOT (...°C)	Structures built for high temperature cargo
INERT	Units with oil storage facilities less than 20 000 dwt fitted with inert gas system
NON SELF-PROPELLED	A unit for which towing assistance will be required during transit
SUB	Column-stabilised unit strengthened for operation when resting on sea bed
TMON	Tailshaft condition monitoring arrangement

703 Self-elevating units are considered to be non self-propelled unless otherwise specified.

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 coastal state legislation

901 When DNV is requested to carry out verification in

accordance with coastal 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 coastal state code and the issue of coastal state regulations used as basis for verification in brackets, for example:

PROD(N).

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

<i>Basic design notation</i>	<i>Description</i>
Production Unit or Installation(N)	Verified for compliance with DNV's interpretation of relevant Norwegian shelf state requirements
Storage Unit or Installation(N)	
PROD(N)	
UKVS	Verified for compliance with DNV's interpretation of relevant UK shelf requirements

903 For further information on procedures and scope of verification for coastal state requirements, see DNV offshore service specifications for coastal 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**

<Special equipment and systems notations> <special feature notations>

Example:

✳ **1A1 Column-stabilised Production Unit**
POS Moor 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.

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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 author-

ised organisations 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.

The Society may base its verification on audits of an accepted Quality System implemented at the yard or at the manufacturer in combination with an agreed manufacturing survey arrangement.

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.

Units previously classed by a recognised society will, as a minimum, be subject to the surveys specified in IACS Procedural Requirements No.1A.

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 according to statutory regulations, DNV may accept documentation from the flag administration as proof of compliance with relevant class rules. Necessary documentation, such as copies of approved plans, reports and other particulars approved by the flag administration shall be submitted.

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.

1502 Declarations confirming compliance with the rules may upon request be issued for propulsion machinery, main boilers and specific additional class notations, provided the Society's main class has been assigned.

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
- submit correct information on the flag registry of the unit or installation
- 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
- rectify deficiencies and 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 liabilities 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 The statutory certificates shall be issued by the Society when so authorised by the Flag Administration itself. The Society will not accept statutory certificates issued by a third party.

The Society may accept the Safety Management Certificate issued by an authorised IACS member and the Cargo Ship Safety Radio Certificate issued by an organisation authorised by the Flag Administration.

It is a prerequisite for retention of class that statutory certificates (as applicable) are valid at all times.

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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B 200 Periodical and renewal surveys

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

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. while offshore or 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 All units or installations which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these units. Such units if constructed before the date the present rule standard came into force shall, as a rule, comply with the requirements for units constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and

outfitting related thereto shall meet the requirements for units constructed on or after the date the present rule standard came into force in so far as the Society deems reasonable and practicable.

(SOLAS regulation II-1/1.3)

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.

Guidance note:

Adding onboard well testing equipment and equipment of similar risk is subject to special approval by DNV. In such cases the risk inherent of the equipment and its impact on the unit are to be considered.

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B 700 Change of ownership

701 A unit or installation retains class when transferred to another owner, with the exception of class notations and survey arrangements based on certification of management of operations, which will be deleted automatically. 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 statutory surveys where DNV has been authorised.

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 by DNV (see A1700).

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.

A written MO that is no longer valid, will be deleted.

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.

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.

B 1000 Rules and standards for newbuildings applicable for units or installations in operation

1001 Previous and current rules and standards for newbuildings, are applicable to units or installations in operation as follows:

Units or installations for which the initial newbuilding survey has been carried out by DNV or another recognised classification society:

- rules/standards in force at the date of the signing of the newbuilding class request for the unit or installation in question.

Other units or installations:

- rules/standards in force at the date of entry into class of the unit or installation in question.

In special cases, amendments to the current newbuilding requirements may be made mandatory to units or installations in operation. If so, this will be especially stated.

Irrespective of these general regulations, requirements adopted from the International Maritime Standards need not exceed those in force at the time of building of the unit or installation, including later retroactive amendments.

1002 When applying the relevant rules/standards mentioned in 1001 to units or installations in operation, some reduction in the requirements may be accepted for normal wear, tear and corrosion.

1003 For hull items, such reductions or corrosion allowances may be established at the time of the renewal survey, according to Classification Note No. 72.1.

1004 When components are renewed, such components should in general be delivered with documentation as per valid rules/standards at the time of newbuilding. However, if present rules/standards are less stringent, they may replace the old rules/standards. This applies to both design approval and survey of such components.

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 a unit or installation's main and, if applicable, mandatory class notations 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. Such suspension or withdrawal may be made by the surveyor in connection with certificate endorsement.

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 unless the surveys are under completion.

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 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, STORAGE AND LOADING 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 for classification shall be in accordance with the NPS DocReq (DNV Nauticus Production System for documentation requirements) supported by Guideline No.17.

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 Documentation in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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 in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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

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.2.

G 600 Documentation requirements

601 Documentation in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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, Ch.2 Sec.1 to Sec.5.

K 200 Documentation requirements

201 Documentation in accordance with A400 shall be submitted for review.

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 production and storage units are summarised in Table L1.

Table L1 Technical reference standards for main character of class (1A1 MOU)		
<i>Technical item</i>	<i>Reference standard</i>	<i>Applicable parts or comments</i>
SAFETY PRINCIPLES AND ARRANGEMENT		
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
MATERIALS		
Metallic materials	DNV-OS-B101	
STRUCTURAL DESIGN (select type as appropriate)		
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
HULL FABRICATION		
Fabrication including welding and NDT	DNV-OS-C401	Covers all types of structures
STABILITY AND WATERTIGHT INTEGRITY		
Stability, watertight integrity, freeboard and weathertight closing appliances	DNV-OS-C301	Covers all types of structures
MOORING AND TOWING		
Temporary mooring, emergency mooring, towing	Rules for Classification of ships, Pt.3 Sec.3	Ship-shaped units
	DNV-OS-E301	Ch.3 for all other types of units
MARINE AND MACHINERY SYSTEMS AND EQUIPMENT		
Piping design, manufacturing and testing; platform piping systems; machinery piping systems; machinery and mechanical equipment	DNV-OS-D101	All sections
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	Chapter 2: Sec.1: Passive Fire Protection Sec.2: Active Fire Protection of Specific Areas Sec.3: Fire Fighting Systems Sec.4: Fire and Gas Detection Systems Sec.5: Miscellaneous Items

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 for classification shall be in accordance with the NPS DocReq (DNV Nauticus Production System for documentation requirements) supported by Guideline No.17.

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 Documentation in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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 in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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 **POS Moor** 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 Documentation in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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 Documentation in accordance with A400 shall be submitted for review.

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, Ch.2 Sec.1 to Sec.5.

K 200 Documentation requirements

201 Documentation in accordance with A400 shall be submitted for review.

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)		
<i>Technical item</i>	<i>Reference standard</i>	<i>Applicable parts or comments</i>
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 or API RP 2SK	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	Chapter 2: Sec.1: Passive Fire Protection Sec.2: Active Fire Protection of Specific Areas Sec.3: Fire Fighting Systems Sec.4: Fire and Gas Detection Systems Sec.5: Miscellaneous Items

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 Documentation in accordance with the NPS DocReq (DNV Nauticus Production System for documentation requirements) supported by Guideline No.17 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 and Sec.7.

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 Documentation in accordance with A200 shall be submitted for review.

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 Documentation in accordance with A200 shall be submitted for review.

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

D 300 Supplementary documentation requirements

301 Documentation in accordance with A200 shall be submitted for review.

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, Ch.2 Sec.7.

E 300 Supplementary documentation requirements

301 Documentation in accordance with A200 shall be submitted for review.

F. Position Keeping

F 100 General

101 The position keeping system shall be in accordance with Sec.6.

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 below the damage water line 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.

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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 Documentation in accordance with the NPS DocReq (DNV Nauticus Production System for documentation requirements) supported by Guideline No.17 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 Documentation in accordance with A200 shall be submitted for review.

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 Documentation in accordance with A200 shall be submitted for review.

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 Documentation in accordance with A200 shall be submitted for review.

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, Ch.2 Sec.7.

E 300 Supplementary documentation requirements

301 Documentation in accordance with A200 shall be submitted for review.

F. Position Keeping

F 100 General

101 The position keeping system shall be in accordance with Sec.6.

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. 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 SUPPLEMENTARY REQUIREMENTS FOR SERVICE NOTATION OIL LOADING UNIT OR INSTALLATION

A. General

A 100 Introduction

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

102 The requirements in this section are supplementary to those for main class **1A1** as stated in Sec.1 for notation **Oil**

Loading Unit and **OI** in Sec.2 for notation **Oil Loading Installation**.

A 200 Design requirements

201 To achieve the service notation **Oil Loading Unit** or **Oil Loading Installation**, the unit has to be designed, constructed and documented according to the DNV Offshore Standard OS-E403 - Offshore Loading Buoys.

SECTION 6

ADDITIONAL CLASS NOTATIONS: DESIGN AND CONSTRUCTION REQUIREMENTS FOR SPECIAL EQUIPMENT AND SYSTEMS

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 notations for special equipment and systems	
Notation	Description
BOW LOADING	Unit equipped with bow loading arrangement
CLEAN	Unit arranged to comply with basic requirements for controlling and limiting operational emissions and discharges
CLEAN DESIGN	Unit arranged to comply with additional requirements for controlling and limiting operational emissions and discharges. In addition, this notation specifies design requirements for protection against accidents and for limiting their consequences
COMF-V (crn) (or) C (crn) (or) V (crn) C (crn))	Unit with controlled environmental standards (Comfort Class) V = noise and vibration C = indoor climate crn = comfort rating number, 1, 2 or 3, where 1 is best
CRANE	Unit equipped with crane
DEICE or DEICE-C	Unit equipped with de-icing/anti-icing systems
DRILL	Unit equipped with drilling facility
DYNPOS-AUTS, DYNPOS-AUT, DYNPOS-AUTR or DYNPOS-AUTRO	Unit equipped with dynamic positioning system
E0	Unit equipped for unattended machinery space
ECO	Unit equipped for operation of machinery from centralised control station
FMS	Units designed to comply with requirements regarding fatigue methodology for ship-shaped units
F-A, F-M, F-C, F-AC, F-AM, F-MC or F-AMC	Unit constructed with additional fire protection
HELDK, HELDK-S or HELDK-SH	Unit equipped with helicopter deck Ref. DNV-OS-E401
HMON (...)	Unit equipped with systems for monitoring hull behaviour
ICE-L	Unit strengthened for ice transit and operation
LCS-DC	Unit equipped with loading computer systems for damage control, apply to integrated systems developed to assist the master as a decision aid under damage conditions

Table A1 Additional notations for special equipment and systems (Continued)	
Notation	Description
OPP-F	Unit equipped with system for oil pollution prevention - fuel systems
POSMOOR POSMOOR-V POSMOOR-TA or POSMOOR-ATA	Unit equipped with position mooring system
PROD	Unit equipped with hydrocarbon production facility
SBM	Management of safety and environment protection in operation
SPM	Single point mooring
STL	Submerged turret loading
VCS-1 VCS-2 VCS-3	Unit equipped with system for control of vapour emission from cargo tanks
VIBR	Unit equipped to meet specified vibration level criteria measured at pre-defined positions for machinery, components, equipment and structure
WINTERIZED (design temp. °C)	Unit arranged and equipped for operating in cold climate
WINTERIZED ARCTIC (design temp. °C)	Unit arranged and equipped for operating in cold climate, with additional requirements for pollution prevention in vulnerable arctic areas

Table A2 Special feature notations	
Notation	Description
BIS	Ship-shaped units built for in-water survey of the bottom and related items
COAT-1 COAT-2	Specification of corrosion prevention in ballast tanks
DAT(- x° C)	Lowest design ambient air temperature as basis for the approval
HOT(...° C)	Structures built for high temperature cargo
INERT	Units with oil storage facilities less than 20.000 dwt fitted with inert gas system
NON-SELF PROPELLED	A unit for which towing assistance will be required during transit
SUB	Strengthened for operation when resting on seabed
TMON	Tailshaft condition monitoring arrangement

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 V1.

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 shall be in accordance with the NPS DocReq (DNV Nauticus Production System for documentation requirements) supported by Guideline No.17.

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.

Notation	Description
POSMOOR	Passive position mooring system
POSMOOR-V	Mooring system designed for positioning in vicinity of other structures
POSMOOR-TA	Thruster assisted mooring system dependent on manual remote thrust control system
POSMOOR-ATA	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 Documentation in accordance with A400 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:

Notation	Description
DYNPOS-AUTS	Dynamic positioning system without redundancy
DYNPOS-AUT	Dynamic positioning system with an independent joystick back-up and a position reference back-up
DYNPOS-AUTR	Dynamic positioning system with redundancy in technical design and with an independent joystick back-up
DYNPOS-AUTRO	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 Documentation in accordance with A400 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, and in accordance with A400 shall be submitted.

E. Loading computer

E 100 General

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

The letters are denoting **L**oading **C**omputer **S**ystem **D**amage **C**ontrol.

E 200 Technical requirements

201 The requirements of the Rules for Classification of Ships Pt.6 Ch.9 Sec.4 shall be complied with as applicable.

E 300 Documentation requirements

301 Document requirements listed in the Rules for Classification of Ships, Pt.6 Ch.9 Sec.4 shall be submitted.

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 Documentation in accordance with A400 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 Documentation in accordance with A400 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**. Ref. DNV-OS-E401.

102 The various notations are related to the extent of requirements as given in Table J1.

Notation	Description
HELDK	Structural strength
HELDK-S	Strength and unit or installation safety
HELDK-SH	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 Documentation in accordance with A400 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
F-A	Accommodation space
F-M	Machinery space
F-AM	Accommodation and machinery space
F-C	Additional fire protection of cargo space
F-AC	Additional fire protection of accommodation and cargo space
F-MC	Additional fire protection of machinery and cargo space
F-AMC	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. Winterization, Cold Climate and Ice Notations

M 100 General

101 Units which are prepared for operation in cold climate or ice conditions may be assigned for the following additional class notations as given below.

M 200 Winterization

201 The additional class notations **WINTERIZED (design temp. °C)** or **WINTERIZED ARCTIC (design temp. °C)** may be assigned to units intended for service in cold climate environments.

202 Technical requirements

The requirements of the Rules for Classification of Ships Pt.5

Ch.1 Sec.6, shall be complied with as applicable.

203 Documentation requirements

Document requirements listed in the Rules for Classification of Ships, Pt.5 Ch.1 Sec.6 A200 shall be submitted.

M 300 Deicing and anti-icing systems

301 Units with systems for anti-icing and deicing may be assigned class notations **DEICE** or **DEICE-C** as applicable.

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

- main functions
- manoeuvrability
- stability
- crew safety.

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

304 Technical requirements

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 notation.

305 Documentation requirements

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

M 400 Operation in ice conditions

401 General

Offshore units strengthened for occasional navigation and operation in waters with light to heavy first year ice conditions in accordance with this sub-section may be assigned class notation **ICE-L** as described in Table M1.

Table M1 ICE class notation	
Notation	Description
ICE-L	Strengthened for ice condition operation

402 Technical requirements

- 1) 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.
- 2) Propeller nozzles and associated shafts and machinery situated more than 5 m below lowest transit waterline (TWL) are not considered affected by ice loads.
- 3) 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.

403 Documentation requirements

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

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

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 notations **E0** or **ECO**.

102 E0 is assigned when machinery alarms are relayed to the

bridge and engineers' accommodation, and a central control system is fitted.

103 ECO is assigned when machinery alarms are released in an attended centralised control station, and a remote control system 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 Documentation in accordance with A400 shall be submitted for review.

O. Not In Use

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 (...)** as given in Rules for Classification of Ships Pt.6 Ch.11.

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 (...)** class notation is based on compliance with the Rules for Classification of Ships, Pt.6 Ch.11.

P 300 Documentation requirements

301 Documentation in accordance with A400 shall be submitted for review.

Q. Fatigue Methodology for Ship-Shaped Units

Q 100 General

101 Ship shaped floating production and storage units may be assigned class notation **FMS**.

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

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

104 The **FMS** notation covers design, fabrication and operation of the unit. The specific methodology for design and fabrication are included in the DNV-RP-C206 "Fatigue Methodology for Offshore Ships". Inspection in the operational phase will be included in the in-service inspection program (IIP). The IIP can be based on a risk based approach.

Q 200 Technical requirements

201 Assignment of class notation **FMS** is based on compliance with requirements in DNV-RP-C206.

Q 300 Documentation requirements

301 Documentation in accordance with A400 shall be submitted for review.

R. Environmental Notations

R 100 Additional oil pollution prevention measures fuel oil systems

101 General

Units arranged and equipped with additional oil pollution prevention measures for the fuel oil system may be given the class notation **OPP-F**.

102 Technical requirements

The requirements given in the Rules for Classification of Ships, Pt.6 Ch.1 Sec.6, shall be complied with for assignment of the class notations.

103 Documentation

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

R 200 CLEAN or CLEAN DESIGN

201 General

Units arranged and equipped with the aim to reduce the environmental impact from emissions to air, discharges to sea, and deliveries to shore from units may be given the additional class notations: **CLEAN** or **CLEAN DESIGN**.

202 Technical requirements

The requirements given in the Rules for Classification of Ships, Pt.6 Ch.12 Sec.1, shall be complied with for assignment of the class notations.

203 Documentation

Drawings, technical information, certificates and operational procedures as specified in the Rules for Classification of Ships Pt.6 Ch.12 Sec.1 C shall be submitted for review.

Guidance note:

It should be noted that some of the required documentation is additional to, and different from, documentation normally considered "Class documentation" as delivered from the newbuilding yard. This is in particular the case for operational procedures specified in the Rules for Classification of Ships Pt.6 Ch.12 Sec.1 C, Table C2 in that may require input from the owner.

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R 300 Vapour Control Systems (VCS)

301 General

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
VCS-1	Basic installation (meeting IMO MSC/Circ.585)
VCS-2	VCS-1 + overfill alarm (meeting USCG CFR 46 part 39)
VCS-3	VCS-2 + installation for onboard vapour processing

302 Technical requirements

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

303 Documentation requirements

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 onboard
- 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.3.

T. Noise, Vibration and Comfort Rating Notations

T 100 General

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

T 200 Vibration class

201 General

Units arranged and equipped with the aim to reduce the risk of failure in machinery, components and structures onboard units, caused by excessive vibration may be given the additional class notation **VIBR**.

202 Technical requirements

The requirements of the Rules for Classification of Ships Pt.6 Ch.15 shall be complied with as applicable.

203 Documentation requirements

Document requirements listed in the Rules for Classification of Ships Pt.6 Ch.15 Sec.1 D, shall be submitted.

T 300 Comfort class

301 General

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

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

302 Technical requirements

The requirements of the Rules for Classification of Ships Pt.5 Ch.12 shall be complied with as applicable.

303 Documentation requirements

Document requirements listed in the Rules for Classification of Ships Pt.5 Ch.12 Sec.1 C, shall be submitted.

U. Special Feature Notations

U 100 General

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

U 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.

U 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.14, are to be complied with.

U 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.15.

U 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 content is normally not to exceed 0.5%.

V. Summary of Reference Documents for Additional Class Notations

V 100 General

101 Rules and standards which shall be applied for assignment of system and special facility class notations are summarised in Table V1.

ised in Table V1.

Table V1 Summary of reference documents for system and special facility notations	
<i>Notation</i>	<i>Description</i>
BOW LOADING	Rules for Classification of Ships, Pt.5 Ch.3 Sec.14
CLEAN CLEAN DESIGN	Rules for Classification of Ships, Pt.6 Ch.12 Sec.1
COMF- V(crn) (or) C(crn) (or) V(crn)C(crn)	Rules for Classification of Ships Pt.5 Ch.12
CRANE	Rules for Classification of Ships, Pt.6 Ch.1 Sec.3
DEICE DEICE-C	Rules for Classification of Ships, Pt.6 Ch.1 Sec.52
DRILL	DNV-OS-E101
DYNPOS-AUTS DYNPOS-AUT DYNPOS-AUTR DYNPOS-AUTRO	Rules for Classification of Ships, Pt.6 Ch.7
E0	Rules for Classification of Ships, Pt.6 Ch.3
ECO	Rules for Classification of Ships, Pt.6 Ch.3
F-A, F-C, F-AC, F-AM, F-MC, F-M, F-AMC	Rules for Classification of Ships, Pt.6 Ch.4
FMS	DNV-RP-C206 "Fatigue Methodology for Offshore Ships"
HELDK HELDK-S HELDK-SH	DNV-OS-E401
HMON (...)	Rules for Classification of Ships, Pt.6 Ch.11
ICE-L	Rules for Classification of Ships, Pt.5 Ch.1 Sec.3
LCS-DC	Rules for Classification of Ships Pt.6 Ch.9 Sec.4
OPP-F	Rules for Classification of Ships, Pt.6 Ch.1 Sec.6
POSMOOR POSMOOR-V POSMOOR-TA POSMOOR-ATA	DNV-OS-E301
PROD	DNV-OS-E201
SBM	Rules for Classification of Ships, Pt.7 Ch.3
SPM	Rules for Classification of Ships, Pt.5 Ch.3 Sec.15
STL	Rules for Classification of Ships, Pt.5 Ch.3 Sec.14
VCS-1 VCS-2 VCS-3	Rules for Classification of Ships, Pt.6 Ch.10
VIBR	Rules for Classification of Ships Pt.6 Ch.15
WINTERIZED WINTERIZED ARCTIC	Rules for Classification of Ships Pt.5 Ch.1 Sec.6



RULES FOR CLASSIFICATION OF FLOATING
PRODUCTION, STORAGE AND LOADING 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.4 for main class, Sec.5 for additional service notations and Sec.6 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.

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.

106 It is provided that every unit have implemented a maintenance system including machinery system and equipment subject to class (see Sec.7 Table A1). 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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A 200 Survey pre-planning and record keeping

(IACS UR Z15)

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. Periodical Surveys

B 100 General

101 All units shall be subjected to periodical surveys. The surveys shall be carried out at prescribed intervals. The surveys may be commenced and progressed within the given time windows with a view to complete these surveys by the end of the given range dates.

102 The surveys shall be carried out in accordance with the referred rules in order to confirm that the hull structure, machinery installations and equipment comply with applicable requirements, and will remain in satisfactory condition provided the assumptions stated in Ch.1 Sec.2 A400 are adhered to.

103 In cases where the administration of the flag state has given dispensation from any requirements in the international conventions as amended, DNV may upon its own discretion accept their decisions as basis for retention of class.

C. Periodical Surveys and Intervals

C 100 General

101 Periodical surveys belong to one of the categories as defined in 200 to 500. The extent of surveys is given in Sec.4, Sec.5 and Sec.6.

C 200 Annual survey, main and mandatory class notations

201 Annual survey is a general survey of the hull structure, machinery installations and equipment, to confirm that the unit complies with the relevant rule requirements and is in satisfactorily maintained condition.

C 300 Intermediate survey, main and mandatory class notations

301 Intermediate survey is a survey of the hull structure, machinery installations and equipment. It shall include visual examinations, measurements and test as applicable, in order to confirm that the unit complies with the relevant rule requirements and is in satisfactorily maintained condition.

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	

C 400 Renewal survey, main and mandatory class notations

401 Renewal survey is a major survey of the hull structure, machinery installations and equipment. Renewal surveys shall include visual examinations, measurements and tests in order to confirm that the unit complies with the relevant rule requirements and is in satisfactorily maintained condition.

402 Possible repairs shall normally be carried out before the renewal survey is regarded as completed. DNV may accept that minor deficiencies, recorded as condition of class, are rectified within a specified time limit, normally not exceeding 3 months after the survey completion date.

C 500 Other periodical surveys

501 In addition to the surveys for main and mandatory class notations, as defined in 200 to 400, the following periodical surveys as applicable shall be carried out in order to retain class:

- bottom survey
- tailshaft survey
- survey of thrusters for positioning and for propulsion
- survey of boilers
- survey of thermal oil heaters
- survey of steam heated steam generator
- survey of [voluntary] additional class notations.

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

503 The surveys may be performed as annual surveys, intermediate surveys and or complete periodical surveys, as detailed in 600.

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

505 Alternative survey arrangements may be accepted as an option to the applicable periodical surveys for main class, see Sec.3.

C 600 Survey intervals and concurrent surveys

601 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 to Table 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.

602 For certain units the survey intervals may be reduced by the administration, see D200.

603 Main class intermediate survey, if applicable, including mandatory class notations, shall have a due date midway in the certificate period with a time window of +/-9 months. However, the survey shall be completed concurrently with the second or third annual survey main class. The survey may be commenced at second annual survey or between second and third annual survey.

604 Bottom surveys are surveys of the outside of the unit's hull below the waterline and related items. The bottom survey intervals are in general to satisfy the following conditions:

- two bottom surveys are required during each five-year period of the classification certificate
- the interval between any two successive bottom surveys is in no case to exceed 36 months
- one such survey shall be carried out not more than 15 months prior to the expiry date of the classification certificate, in conjunction with the renewal survey.

605 Surveys, survey intervals and time windows related to main class, mandatory class notations, additional class notations and survey arrangements are given in Table C2 and Table C3, respectively. Concurrent surveys are identified in the tables.

Guidance note:

"Concurrently completed" means that the survey should be completed prior to or at the same date as the "concurrent survey" and within the time window for that survey.

"Concurrently carried out" means that the survey should be completed within the time window for the "concurrent survey".

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606 Units with additional class notations for which there are no specific survey requirements shall have the equipment and/or constructions related to these additional class notations examined to the surveyor's satisfaction at every renewal survey for main class.

C 700 Postponement of periodical surveys

701 Except for annual and intermediate surveys for main and mandatory class notations, DNV may accept to postpone periodical surveys upon consideration in each separate case. If postponement is granted, a condition of class (CC) will be issued giving the time limit for the postponement period.

702 Normally, postponement of a periodical survey will not affect the survey's next due date.

703 In exceptional cases and upon the owner's written request a postponement of the renewal survey for main and mandatory class notation with subsequent extension of the validity of the classification certificate by maximum 3 months may be granted.

Such a request shall be received by DNV well in advance of the expiry date of the classification certificate. A sighting survey with the extent equal to an annual survey shall normally be carried out in order to grant such postponement.

Guidance note:

A sighting survey is a survey to confirm that the relevant construction or the equipment is in a satisfactory condition and, as

far as can be judged, will remain so until the postponed survey has been carried out.

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- the maintenance and preservative measures taken during lay-up
- the extent of surveys carried out during this time.

C 800 Survey of units out of commission

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

- the time the unit has been out of commission

As a minimum, a sea trial for function testing of the machinery installation shall be carried out.

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

803 If the lay-up period is more than 12 months, other periodical surveys may be postponed, depending on the maintenance and preservative measures taken during lay-up.

Table C2 Periodical surveys main class. (For survey extent, see Sec.4)

Main character of class	Survey extent and type (as applicable)		Survey interval, years	Survey time window, (See Fig.1)		Remarks
				W _B (months)	W _A (months)	
1A1, OI	Hull, machinery and equipment	Renewal	5	3	0 (See C700)	
		Annual	3	3		
		Intermediate	2-3 (see C300)	See C300	See C300	
1A1, OI	Bottom					See Sec.4 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 (TMON) has been granted.
	Thruster					See Sec.4.G
	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.5 and Sec.6)

Additional class notation	Survey extent and type		Survey interval, years	Survey time window See Fig.1		Remarks
				W _B (months)	W _A (months)	
BOWLOADING	Bow loading arrangement, Annual		1	3	3	
CLEAN, CLEAN DESIGN	Environmental class, Annual		1	3	3	To be carried out concurrently with the annual survey main class. W _A is 0 when completed concurrently with the renewal survey main class.
COMF-V(crn) or C(crn) or V(crn)C(crn)	Comfort class, Annual		1	3	3	To be carried out concurrently with the annual survey main class. W _A is 0 when completed concurrently with the renewal survey main class.
CRANE	Shipboard crane, Annual		1	3	3	
	Shipboard crane, complete periodical		5	3	0	
DEICE, DEICE-C	De-icing and anti-icing system, Annual		1	3	3	
DRILL	Drilling plant	Annual	1	3	3	
		Complete periodical	5	3	See C700	
DYNPOS-AUTS, DYNPOS-AUT, DYNPOS-AUTR, DYNPOS-AUTRO	Dynamic positioning, Complete periodical		2.5	6	6	See C700
E0, ECO	Periodically unattended machinery space	Annual	1	3	3	
		Complete periodical	5	3	3	

Table C3 Periodical surveys, additional class. (For survey extent, see Sec.5 and Sec.6) (Continued)						
Additional class notation	Survey extent and type		Survey interval years	Survey time window See Fig.1		Remarks
				W_B (months)	W_A (months)	
F-A, F-M, F-C, F-AC, F-AM, F-MC, F-AMC	Additional fire protection, Complete periodical		2.5	6	6	See C700
FMS	Fatigue methodology for ship-shaped units		5	3	0	
HELDK, HELD-S, HELDK-SH	Helicopter deck		5	3	0	
HMON (...)	Hull monitoring system, Annual		1	3	See C700	
ICE-L	Strengthened for ice conditions		1	3	3	
LCS-DC	Loading computer for damage control					
OIL LOADING UNIT or OIL LOADING INSTALLATION	Annual Complete periodical		1 5	3 3	3 0	The surveys will be based upon approved operation manual
OIL PRODUCTION UNIT or OIL PRODUCTION INSTALLATION	Annual Complete periodical		1 5	3 3	3 See C700	
OIL STORAGE UNIT or OIL STORAGE INSTALLATION	Annual Complete periodical		1 5	3 3	3 See C700	
OPP-F *)	Additional oil pollution prevention measures for fuel oil systems		5	3	0	*) No specific survey items. Complete periodical survey considered covered by renewal survey main class.
POSMOOR	Position mooring	Annual Intermediate Complete periodical	1 2.5 5	3 6 3	3 6 See C700	See C700
PROD	Production plant	Annual Complete periodical	1 5	3 3	3 See C700	
SBM	Safety and environmental protection (SEP)management system, Complete periodical		5	3	See C700	
SPM	Arrangement for single point mooring, Annual		1	3	3	
STL	Arrangement for submerged turret loading, Complete periodical		5	3	3	
TMON	Tailshaft monitoring, annual		1	6	6	
VCS	Vapour control systems, Complete periodical		5	3	See C700	
VIBR			1	3	3	
WINTERIZED (design temp. °C)	Operating in cold climate		1	3	3	
WINTERIZED ARCTIC (design temp. °C)	Operating in cold climate, with add. req. for pollution prevention in vulnerable arctic areas		1	3	3	

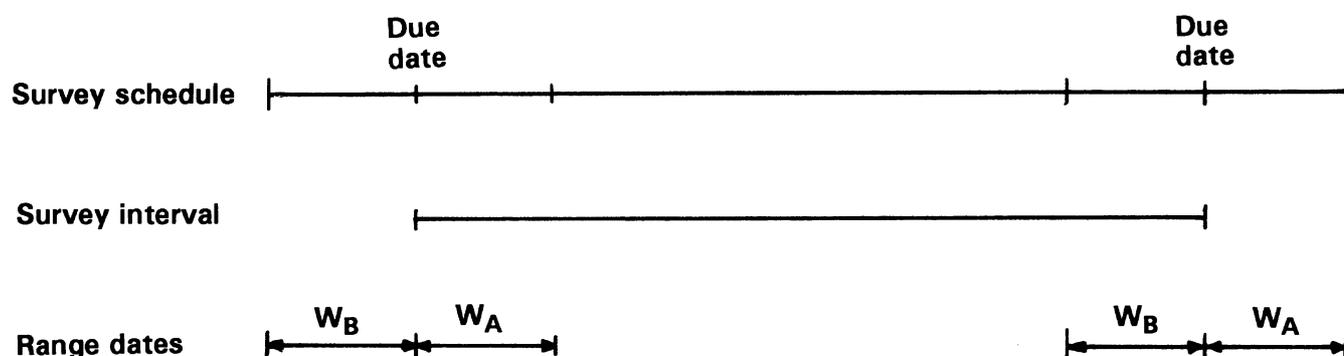


Figure 1
Survey time windows

D. Classification Certificate

D 100 Certificate endorsement

101 The classification certificate will be endorsed upon satisfactory completion of annual and intermediate surveys for main and mandatory class notations. The validity of the classification certificate may be extended upon satisfactory completion of renewal survey for main and mandatory class notations. Endorsement of the classification certificate or issue of a new certificate means that the unit is accepted for retention of class. The certificate will not be endorsed or extended in case of:

- non-satisfactory completion of the survey(s)
- any overdue periodical class survey including continuous survey if applicable
- overdue conditions of class.

Guidance note:

In case an overdue survey related to a notation, that is not mandatory, the classification certificate may be endorsed provided this class notation is suspended.

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102 In case the main class annual survey is performed prior to the defined time window, the anniversary date on the classification certificate will be advanced. Subsequent surveys shall be carried out at prescribed intervals using the new anniversary date.

Guidance note:

Expiry date of the classification certificate may remain unchanged, but additional surveys may be required so that the prescribed survey intervals are not exceeded.

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D 200 Validity of the classification certificate

201 When the classification certificate has been extended or an interim certificate has been issued, a new classification cer-

tificate will be issued after the administration has examined the surveyor's report and is satisfied that the applicable requirements have been met.

202 The validity of the classification certificate given in 201 will be 5 years if the annual and intermediate surveys as given in C are carried out at intervals and within the time windows required.

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

D 300 Issue of classification certificate and expiry date

301 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.

302 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.

303 In cases where postponement of renewal surveys have been granted as given in C700, the new certificate will be valid to a date not exceeding 5 years from the expiry date of the existing certificate before the extension was granted.

304 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.

305 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 of conversion and/or alteration.

SECTION 2

GENERAL REQUIREMENTS FOR HULL AND MACHINERY SURVEYS

A. General

A 100 Preparation for survey

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

102 Tanks and spaces shall be safe for access, i.e. gas freed, ventilated, cleaned and illuminated.

103 For overall and close-up examination, means shall be provided to enable the surveyor to examine the structure in a safe and practical way, see B100.

B. Requirements for Hull Surveys

B 100 Conditions for survey and access to structures

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

Guidance note:

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

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102 For survey, one or more of the following means for access, acceptable to the surveyor, shall be provided:

- permanent staging and passages through structures
- temporary staging and passages through structures
- lifts and moveable platforms
- boats or rafts
- other equivalent means.

103 For ship-shaped units rafts or boats alone may be allowed for survey of the under deck areas for tanks or spaces, if the depth of the webs is 1.5 m or less. If the depth of the webs is more than 1.5 m, rafts or boats alone may be allowed only:

- when the coating of the under deck structure is in good condition and there is no evidence of wastage, or
- if rafts or boats are to be used with a water level above the face plate of the deck girders, an escape route through the air space is to be provided. This may be arranged with a permanent means of access in each bay to allow safe entry and exit with access direct from deck via a vertical ladder and a small platform fitted approximately 2 m below deck.

If neither of the above conditions are met, then staging or "other equivalent means" of access shall be provided for the survey of the under deck areas.

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

Guidance note:

Reference is made to IACS recommendation No. 39 – guidelines for the use of boats or rafts for close-up surveys.

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Guidance note:

Use of remote inspection technique methods to facilitate the required internal examinations, including close-up examinations and thickness measurements, may be specially considered by DNV. The methods applied are to provide the information normally obtained from a survey carried out by the surveyor. In order to verify the results, confirmatory close-up examinations and thickness measurements at selected locations shall be carried out by the surveyor, not using the remote inspection technique method. Proposals for use of remote inspection technique methods shall be submitted to DNV for acceptance in advance of the survey.

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B 200 Thickness measurements, hull structures

201 Thickness measurements shall be carried out by a qualified company approved by DNV. thickness measurements shall normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment shall be proven to the surveyor as required.

202 The thickness measurements shall be witnessed by a surveyor. This requires the surveyor to be on board, while the measurements are taken, to the extent necessary to control the process. Thickness measurements of structures in areas where close-up examinations are required shall be carried out simultaneously with close-up examinations. (IACS PR No.19 Rev.3). A survey meeting shall be held prior to commencing the survey. The thickness measurement operator shall be part of the meeting together with representatives from the owner and DNV.

203 A thickness measurement report shall be prepared. The report shall give the location of the measurements, the thickness measured and the corresponding original thickness. Furthermore, the report shall give the date when the measurements were carried out, type of measuring equipment, names of personnel and their qualifications. The report shall be signed by the responsible 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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Guidance note:

For more information on reporting of thickness measurements, see DNV's guidelines, DNV's recommended reporting principles for ultrasonic thickness measurements of hull structures.

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B 300 Repair of structural damage or deterioration

301 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.

302 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.

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

304 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.

C. Requirements for Machinery Surveys

C 100 Shaft alignment

101 For propulsion systems where shaft alignment calculations have been required, the alignment shall be confirmed by suitable measurements when the system has been dismantled and or when external forces (e.g. grounding, welding work) may have influenced the alignment.

The measurements shall be carried out with the unit afloat and be presented to the surveyor on request.

Guidance note:

Relevant methods for making measurements are:

- bearing loads checked by jacking
- bending stress measurements (strain gauge readings)
- other approved methods.

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102 The measured values shall be within the initially approved tolerances.

C 200 Replacement of Machinery Components

201 When machinery components are renewed, such components should in general be delivered in accordance with requirements as per valid rules at the time of newbuilding, see Ch.1 Sec.4 B1000.

Guidance note:

For guidance regarding spare parts for units in operation see Rules for Classification of Ships Pt.4 Ch.1 Sec.5 A100.

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Guidance note:

- 1) If the relevant rule requires an NV certificate for the actual part, then the design and the survey, as relevant, should be in accordance with the applicable rule requirement. Applicable for diesel engines: the actual part should be produced by a manufacturer authorised by the engine designer or the designer's licensee.
- 2) If the relevant rule requires a work certificate for the actual part:
 - when design approval is required, the certificate should confirm compliance with the relevant parts (e.g. NDT, material, dimensions, etc.) of the approved drawings and specifications.
 - when no design approval is required (i.e. drawings and specifications submitted for information only), the required certificate should confirm compliance with the applicable rule requirements (e.g. pressure testing, NDT, etc.).

Applicable for diesel engines: if the part is produced by a manufacturer not authorised by the engine designer or the designer's licensee, DNV may carry out inspections according to the Rules for Classification of Ships Pt.4 Ch.3 Sec.1 Table C1 and issue a report confirming this. However, this inspection report will not cover design approval and testing as a part of the engine. It is the operator's responsibility to evaluate and take the necessary precautions to see that the parts are fit for their intended use.

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C 300 Machinery verification

301 At the time of drydocking, a dock trial shall be carried out to confirm satisfactory operation of main and auxiliary machinery.

If significant repairs are carried out to main or auxiliary machinery, or steering gear, consideration should be given to perform a sea trial to the attending surveyor's satisfaction.

Guidance note:

1) **Significant repair:**

A *significant repair* is one where the engine is completely dismantled and re-assembled, in cases such as renewal of crankshaft, bedplate, engine entablature renewal. significant repairs will, furthermore, be cases of repairs after serious damage to the engine after fire or flooding of the engine room resulting from e.g. collision or grounding of the unit. The following are not defined as significant repairs.

Routine maintenance of the engine; such as:

- unit overhaul (piston, cylinder head, liner)
- turbocharger overhaul
- bearing inspections
- renewal of cracked liners
- renewal of cylinder heads
- use of new spares parts
- use of reconditioned parts
- open up and overhaul of units and bearings
- welding repair in the thrust bearing ribs.

2) **Scope of testing:**

Main engine:

- a) Sea trial: upon complete reassembly after bedplate or crankshaft renewal, testing as for a new engine is required. The service engineer of the manufacturer's prepared test program should be used by the attending surveyor.
- b) Dock trial: generally, the testing should be limited to the following tests, which typically can be carried out alongside:
 - start / stop / reversing
 - local / remote operation
 - random safety alarms and cut-outs, including emergency stop.

Auxiliary engines:

Generally, the testing can be done alongside (shipyard or at other wharf), and does not necessarily require a sea trial. Testing as follows is recommended:

- start / stop
- local / remote operation
- random safety alarms and cut-outs, including over speed and emergency stop
- parallel running and load test.

Steering gears:

Trial performed alongside is normally sufficient.

In certain case (e.g. modifications, insurance and vetting cases) testing at unit's full speed may be required, for which a sea trial will be necessary. Largely handled case by case, calling for surveyor's experienced assessment. Owners typically will not raise objection related to this issue, and actually are likely to request DNV to attend the sea trial and issue statement thereafter.

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D. Special Provisions for Ageing Units

D 100 General

101 Floating Production, Storage and Loading 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
- for self-elevating units; contribution from transit operation.

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 D200 and D300 are complied with.

106 The society will issue a MO stating the FUI and agreed compensating measures (see D200 and D300) 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.

D 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. The corrosion protection is to be specially surveyed.

210 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 have an approved leak detection system according to guidelines issued by the society when the FUI exceeds 1.0. This is to be confirmed at the annual survey.

211 Areas identified for leak detection shall be examined for leaks at least twice monthly when the FUI exceeds 1.0. This is to be confirmed at the annual survey.

D 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, jacking gear 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 B200, 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.4 D208 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.

D 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.4 B201.

402 No special provisions are enforced for other service notations.

SECTION 3 ALTERNATIVE SURVEY ARRANGEMENTS AND SURVEYS PERFORMED BY APPROVED COMPANIES

A. Alternative Survey Arrangements

A 100 General overview of survey arrangements

101 Alternative survey arrangements may be accepted as an option to applicable periodical surveys for main class.

102 The following survey arrangements may be granted upon written request from the owner:

- *Hull continuous*, a survey arrangement that includes all the unit's hull compartments and structure. See A300.
- *Machinery continuous*, a survey arrangement based on surveys of the machinery items as detailed in Sec.7 C.
- *Machinery PMS*, a survey arrangement based on a planned maintenance system. The requirements are detailed in Sec.7 D.
- *Machinery CM*, a survey arrangement that can include selected parts of the machinery, and is not covering the complete machinery installation onboard. the requirements are detailed in Sec.7 E.

A 200 Continuous surveys, general

201 Continuous surveys comprise continuous hull and or machinery surveys.

202 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.

203 Further requirements for machinery continuous surveys are detailed in Sec.7 C.

A 300 Hull continuous survey

301 Hull continuous survey may be accepted for offshore units.

A 400 Survey arrangement based on Reliability Centred Maintenance (RCM) system

401 A plan maintenance system based on RCM may be accepted by the society. An approved plan maintenance system is a pre-requisite for this survey arrangement. Compliance with the relevant requirements as given in Sec.7 D is therefore necessary, with the exception of the requirements related to maintenance intervals.

An internationally recognised standard is to be used as a base for the RCM system, e.g. SAE JA1011 and ISO 60300-3-11.

402 The following information is to be submitted to the society for approval:

- a) The RCM analysis in paper or electronic form, should include the following:
 - methodology used for selecting systems
 - decision criteria for ranking criticality
 - standard used as a baseline (e.g. SAE / ISO)
 - details of the participants in the analysis, with qualifications.
- b) The systems and equipment covered by the analysis. Drawings and documentation may be required as necessary.
- c) Equipment manufacturers guidelines for minimum maintenance levels.
- d) Details regarding implementation of the RCM analysis into the PM system.

- e) Methodology for continuous improvement / refinement of RCM system.

Guidance note:

Typically the following seven steps are to be taken into account for machinery systems covered by the RCM philosophy:

- what are the system functions and associated performance standards?
- how can the system fail to fulfil these functions?
- what can cause a functional failure?
- what happens when a failure occurs?
- what effect or consequences will a failure have?
- what can be done to detect and prevent the failure?
- what should be done if a maintenance or proactive task cannot be found?

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403 If condition monitoring of equipment is to be carried out as part of the RCM system, this is to be carried out in accordance with an approved programme. See DNV classification note 10.2 for further details. Condition monitoring of equipment will normally be approved on an individual equipment basis.

404 An implementation survey onboard the vessel is required in order to verify that the RCM analysis is properly implemented into the pm system onboard. It is recommended that the system has been implemented and operated for at least 6 months before the implementation survey is carried out.

In order to verify the system and the crew's general knowledge, the implementation survey is to be carried out during normal operation. On a successful implementation survey, a certificate for machinery RCM will be issued stating conditions for the survey arrangement and the machinery included in the arrangement.

405 To maintain the validity of the survey arrangement machinery RCM, an annual survey of the implemented system is required. This survey replaces the annual and renewal surveys of machinery for components included in the RCM system. The purpose of this survey is to review and evaluate the previous period's maintenance activities and experience.

The annual survey shall normally consist of examination of:

- condition monitoring records
- maintenance records
- assessment of RCM handling onboard
- verification that the spares required to be held onboard is in place.

If found necessary by the surveyor, opening or testing of machinery may be required.

406 To prolong the validity of the survey arrangement a renewal survey of the implemented RCM system during normal operation is required. The purpose of this survey is to verify that:

- procedures for carrying out RCM are followed
- the vessel's crew are familiar with system and handling of results
- re-evaluation of maintenance schedules as required.

407 Any modifications to equipment or machinery systems which could impact the RCM system must be documented and forwarded to the society for approval.

B. Surveys by Approved Companies or Service Suppliers

B 100 General

101 Parts of the periodical surveys may be carried out by companies approved by DNV. The following survey parts may be performed by such companies:

- thickness measurements
- bottom survey afloat
- general NDT
- mooring line survey.

B 200 Thickness measurements

201 The requirements given in Sec.2 B200 apply.

B 300 Bottom survey afloat

301 An approved company to be used. The results of the survey are to be verified by a DNV surveyor. Detailed requirements are given in the Rules for Classification of Ships Pt.7 Ch.1 Sec.5 A500.

C. Risk Based Inspection (RBI)

C 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 depending on the actual inspection results.

C 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, FPSOs and semi submersibles (hull and top-side 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.

C 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 4 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.5, and additional system and special facility class notations are given in Sec.6.

103 Subsections for tailshaft (F) and thrusters for propulsion (G) are not applicable for **OI** class.

A 200 Hull survey - general

201 Conditions of protective coating

Where provided, the condition of protective coating of cargo holds, cargo tanks and ballast tanks shall be examined.

The condition will be rated GOOD, FAIR or POOR as defined in Table A1.

Table A1 Conditions of protective coating	
Corrosion protection system	Is normally to consist of full hard coating supplemented by anodes or full hard coating. Guidance note: Other coating systems may be considered acceptable as alternatives provided that they are approved by DNV and applied and maintained in compliance with the manufacturer's specification. ---e-n-d---of---G-u-i-d-a-n-c-
Coating condition "GOOD"	Condition with only minor spot rusting.
Coating condition "FAIR"	Condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.
Coating condition "POOR"	Condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

202 For structures where original protective coatings are in GOOD condition, the extent of close-up examination and thickness measurements may be specially considered. This also applies to tanks of stainless steel. If not otherwise specified, the same applies for re-coated structures (by epoxy coating or equivalent, alternatively a type approved coating, e.g. semi-hard), provided that the condition of the protective coating is in GOOD condition and that documentation is available stating that:

- the scantlings were assessed and found satisfactory by a surveyor prior to re-coating
- the coating was applied according to the manufacturer's recommendations.

Special consideration as used in this context is taken to mean, as a minimum, that sufficient close-up examination and thickness measurements are carried out to confirm the actual average condition of the structure under the protective coating.

A 300 Extent of hull survey

301 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 actual unit as well as experience from in-service surveys of units of similar type.

302 The basic scope for development of IIP for units of column-stabilised type is given in Table A2.

303 The basic scope for development of IIP for units of self-elevating type is as given in Table A3.

304 Relevant survey requirements for units of ship-shaped types additional to those stated in the Rules for Classification of Ships are summarised in Table A4.

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.

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Table A2 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
Special Areas ¹⁾ (SP) – connections:												
Horizontal bracing connections	X				X		C	X ³⁾ B ⁴⁾ 3)	A	X	A	X
Vertical diagonal bracing connections	B				A		C	X ³⁾	A	X	A	X
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
Special Areas (SP) - attachments of:												
Crane/gangway pedestals and top flange	A		A		A	X	A	X	A	X	A	X
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

Table A2 Basic scope for development of IIP for column-stabilised units (Continued)												
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
Primary Structure ²⁾ (PR):												
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>A = 100% ⁵⁾ B = 50% ⁵⁾ C = 25% ⁵⁾ X = Spot check 2-5% ⁵⁾</p> <p>V = Visual Inspection including Close Visual Inspection of Special Areas. NDT = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ECI) of selected stress concentrations and fatigue sensitive details.</p> <p>1) Special Areas (SP) 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) Primary Structures (PR) 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) External NDT may be waived at IS if the unit has an approved leakage detection system according to guidelines issued by the Society. 4) Bracing to Bracing (K-joint). 5) - of the total number of these parts.</p>												

Table A3 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
Special Areas ¹⁾ (SP) – connections:												
Leg to Spudcan							A	X	A	A	A	A
Leg Nodes			X				A				A	X ³⁾
Connections of primary members in Jack House			A				A	X			A	A
Main Barge girder/bulkhead connections	X		X		X		X		A		A	
Special Areas (SP) - attachments of:												
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
Primary Structure ²⁾ (PR):												
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	

Table A3 Basic scope for development of IIP for self-elevating units (Continued)

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
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	

A = 100% ⁴⁾
B = 50% ⁴⁾
C = 25% ⁴⁾
X = Spot check 2-5% ⁴⁾

V = Visual Inspection including Close Visual Inspection of Special Areas.
NDT = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ET) of selected stress concentrations and fatigue sensitive details.

- Special Areas (SP)** 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.
- Primary Structures (PR)** 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.
- At levels which have been in way of lower guided in operation, upper guides in transit and in way of spudcans.
- of the total number of these parts.

Table A4 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
Special Areas ¹⁾ (SP) – connections:												
Moonpool openings	C				A		A		A	A	A	A
Turret	A				A		A		A	A	A	A
Special Areas (SP) - attachments of:												
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
Primary Structure ²⁾ (PR):												
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	

A = 100% ³⁾
B = 50% ³⁾
C = 25% ³⁾
X = Spot check 2-5% ³⁾

V = Visual Inspection including Close Visual Inspection of Special Areas.
NDT = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ECI) of selected stress concentrations and fatigue sensitive details.

- Special Areas (SP)** 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.
- Primary Structures (PR)** 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.
- of the total number of these parts.

B. Annual Survey

— machinery and safety systems.

B 100 Survey extent

101 The survey will normally cover systems and parts for:

— structure and equipment

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.1 Sec.2.

202 The survey requirement in the Rules for Classification of Ships Pt.7 Ch.1 Sec.2 B400 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 defined as extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75% of allowable margins, but within acceptable limits
- non-existing, or coating considered POOR as defined in A200
- 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')
- tank level measurements
- helicopter fuel
- bottom surveys
- sea valve inspection
- 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, see also D208.

Condition of protective coating according to A201 to be reported.

For areas with general breakdown of the protective coating, close-up examination and thickness measurements shall be carried out to an extent sufficient to determine both general and local corrosion levels.

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.1 Sec.2 C.

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.

Steering gears for azimuth thrusters, providing the main and/or auxiliary steering function, shall be surveyed as given in Sec.7 Table A1.

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 A300.

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.1. Sec.3.

202 The survey requirement in the Rules for Classification of Ships Pt.7 Ch.1 Sec.3 B400 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. Rules for Classification of Ships Pt.7 Ch.1 Sec.3 B403.)
- 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 defined as extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75% of allowable margins, but within acceptable limits
- non-existing, or coating considered POOR as defined in A200
- 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)
- external corrosion
- tank level measurements
- helicopter fuel
- bottom surveys
- sea valve inspection
- 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.1 Sec.3 C.

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.1 Sec.4.

102 The survey requirement in the Rules for Classification of Ships Pt.7 Ch.1 Sec.4 B400 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 defined as extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75% of allowable margins, but within acceptable limits
- non-existing, or coating considered POOR as defined in A200
- 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.6 B, Position Mooring Equipment)
- external corrosion
- bottom surveys
- inspection of sea valves
- thruster and tailshaft surveys.

105 Alternative survey arrangements given in D300 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.

Tank	Age of unit in years			
	0-5	5-10	10-15	above 15
Sea water ³⁾	all	all	all	all
Fresh water ⁴⁾	one	one	all	all
Fuel, diesel oil	one	one	two	half
Lubricating oil	none	none	one	half

Notes:

1) Tanks of integral type
Guidance note:
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.
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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 at the first and second renewal surveys after delivery. At the third renewal and subsequent renewals, in addition to the above, mandatory thickness gaugings are to be taken as a minimum in the following areas:

Column Stabilised Units:

- column base tanks which are used for trimming the vessel
- main horizontal braces at the connection to column / pon-

- toon or diagonal braces (K-nodes)
- selected areas of exposed upper hull where 'box' or 'I' beams receive major concentrated loads
- pump room bilge wells.

Self Elevating Units:

- major connections of leg to mat
- lattice leg chord at connections to spudcan
- spudcan bulkheads at connections to leg chord
- leg chords in way of splash zone
- load transfer area in way of jack house (external and in way of pre load tanks).

For both kinds of units the reduction in thickness shall normally not exceed 5% of the original thickness. Larger reductions may be allowed upon special consideration.

Detailed locations for thickness gaugings will be included in the vessels In-service Inspection Programme.

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.

See sub-section K for detailed survey requirements.

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 D300.

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 system 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 Machinery systems and equipment are covered by a survey arrangement if not part of a separate survey. The available machinery survey arrangements are based on the inventory list (see Sec.7 Table A1) established for the unit.

The conditions for:

- obtaining and maintaining the survey arrangement, and
- the corresponding survey methods to verify that the machinery system is in an acceptable condition is different for each of the available machinery survey arrangement. If a survey arrangement is not specified, Machinery renewal is set as default.

The following survey arrangements are available:

- machinery renewal, see Sec.7 B
- machinery continuous, see Sec.7 C
- machinery PMS (Planned Maintenance System), see Sec.7 D.
- machinery CM (Condition Monitoring), see Sec.7 E.

102 Propulsion systems containing components or elements may change characteristics during the lifetime and hence influence the torsional behaviour of the system.

Such components may be:

- vibration dampers
- elastic couplings
- speed governor or quick passing through device.

The mentioned components shall be maintained and inspected as approved by DNV or as recommended by the manufacturer.

As an alternative to opening up for inspection, measurements may be carried out to confirm the correct dynamic conditions.

The torsional vibration measurements shall be carried out and reported to DNV. The results shall be compared with the approved limits (torsional vibration calculations).

If an elastic coupling is replaced by another type, new torsional vibration calculations shall be submitted for approval.

103 *Auxiliary thrusters* shall be examined and tested as follows:

- oil analysis of gear house oil and oil for the CP mechanism
- examination of gear and bearings through inspection openings or by other means
- examination of external piping systems
- examination of bearings, gear and shafts and other relevant parts if any indications of abnormalities are observed. Satisfactory maintenance according to manufacturer's recommendations to be documented and considered as a base for extent of possible opening.

Opening to be carried out normally at least every 10 years. Any opening up of a thruster shall be witnessed by a surveyor of the Society.

- function testing of sealing arrangements
- function testing of lubrication and hydraulic oil system
- function testing of CP mechanism
- function testing of thruster unit including alarm system.

Guidance note:

It is advised to take oil analysis at regular intervals and always prior to docking in order to ensure that there is no need for opening of the thruster (e.g. water in the oil).

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E 200 Electrical installations

201 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.

202 The insulation resistance of the complete installation shall be measured, and the results presented to the DNV surveyor.

203 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.

204 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

- ductor testing
- primary current injection.

E 300 Instrumentation and automation

301 Correct functioning of the various parts of the following systems shall, as far as applicable, be verified:

- alarm and safety system
- fire alarm system
- manual control of machinery
- remote control of propulsion machinery
- remote control of positioning keeping machinery.

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)

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 5 000 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 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.6 U. Tailshaft Monitoring.

G. Renewal Survey for Thrusters for Positioning and Thrusters for Propulsion

G 100 Definitions

101 Thrusters for dynamic positioning are thrusters incorporated in systems for dynamic positioning of offshore units, where the unit has been granted the additional class notations **DYNPOS-AUTS**, **-AUT**, **-AUTR** or **-AUTRO**.

102 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 notations **POS Moor-TA** or **POS Moor-ATA**.

103 Thrusters for propulsion are defined as thrusters which are intended for propulsion or propulsion and steering of the unit during sea voyage.

Guidance note:

Thrusters installed to achieve redundant main propulsion systems should be regarded as thrusters for propulsion.

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G 200 Survey extent

201 Thrusters for propulsion and positioning shall be surveyed as given in 202-209, as applicable.

202 Drive motors and shafting system external to the thrusters and pumps and external piping systems shall be surveyed as given in Sec.7 Table A1.

203 Inboard gear transmissions accessible for survey from inboard side shall be surveyed as given in Sec.7 Table A1.

204 Alarm, safety and control systems shall be tested as required for renewal survey of propulsion machinery.

205 Requirements for external survey are included in scope for bottom survey. Internal survey of outboard parts, see 206-207, is recommended to be carried out concurrent with bottom survey.

206 Reduced scope may be applied to the first periodical survey and the periodical survey following a full scope survey, see 207. Reduced scope may also be applied for the periodical survey after a reduced scope survey provided the running hours is less than 15 000 hours since last full scope survey.

Requirements for survey with reduced scope of outboard parts are:

- Oil analysis covering lubrication oil for gears, bearings, sealing boxes, steering gear and CP propeller. It is advised to take oil analysis at regular intervals and always prior to survey in order to ensure that there is no need for opening of the thruster (e.g. water in the oil).
- Survey of propeller power transmission gears and bearings through inspection openings or in similar extent (e.g. use of fibre optical means or lifting of pinion).
- Visual survey of electric motor and associated equipment inclusive shaft bearings and measurement of insulation resistance.
- Sealing arrangement of propeller blades, propeller shaft and steering column.

207 Full scope is to be applied to the periodical survey following a reduced scope survey unless the running hours is less than 15 000 hours since last full scope survey, see 206.

Requirements for survey with full scope are:

- the requirements to reduced scope as given in 206
- visual inspection of relevant parts
- NDT of relevant parts
- running test.

208 Any opening up of thrusters shall be witnessed by a surveyor and should meet the requirements in 207.

209 Internal survey of outboard parts as well as drive motor and gear transmissions may be replaced by an approved condition monitoring arrangement, see Classification Note 10.2 Appendix H.

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 Soci-

ety, 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.

K. Survey of Towing, Emergency & Temporary and Position Mooring Equipment

K 100 Types of survey

101 *Annual survey* is a visual examination to ascertain the general condition of the relevant items. The survey is normally carried out on location with the unit at operational draft and the mooring system in use. No special inspection aids are required and no disruption to the unit's operation is intended.

102 *Intermediate survey* is normally carried out on location when the unit is carrying out anchor-handling operations at a rig-move. No special aids are required and minimal disruption to anchor handling operation is intended.

103 *Renewal survey* will require appropriate cleaning with good access and adequate lighting, i.e. the special inspection aids and facilities usually associated with a sheltered water visit.

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.

K 200 Annual survey

201 Towing, Emergency & Temporary Equipment are to be subject to visual inspection.

K 300 Intermediate survey

301 Towing, Emergency & Temporary Equipment are to be subject to visual inspection.

K 400 Renewal survey

401 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
- function testing of the mooring systems shall be performed.

K 500 Anchor chains; acceptance criteria and repair

501 Diameter loss due to abrasion and corrosion

Links or joining shackles with minimum cross-sectional area less than 81% of the original nominal area is to be rejected. The equivalent reduction in diameter is 10%. Two perpendicular measurements are to be taken and the average compared to the allowable 10% reduction.

502 Missing studs

Missing studs on stud link chain is not acceptable. Links are to be removed or studs are to be refitted using an approved procedure.

503 Corroded studs

As guidance, if the measured stud cross-sectional area is less than 40% of the nominal link (bar) cross-sectional area, links should be removed or studs should be refitted using an approved procedure.

504 Studs secured by fillet welds

Grade 3 chains are sometimes fitted with studs secured by fillet welds. In service the welds may crack. The following applies:

- 1) any axial or lateral movement is unacceptable. Links are to be removed or studs are to be re-welded using an approved procedure
- 2) links with intact fillet welds but with gaps exceeding 3 mm between the stud and the link should be removed or repaired using an approved procedure. This because the stud welds will eventually crack due to vibrations when chain is running over fairlead at speed during anchor handling
- 3) existing links which are found to have the stud fillet welded at both ends are subject to special consideration.

505 Studs secured by press fitting and mechanical locking

With this design of stud there is little prospect of the stud falling out even if it is loose. However, loose studs have caused fatigue at the edge of imprints. The following applies:

- 1) axial stud movement up to 1 mm is acceptable
- 2) axial stud movement greater than 2 mm is unacceptable. Links are to be removed or studs are to be pressed using an approved procedure
- 3) acceptance of axial stud movement from 1 to 2 mm must be evaluated based on the environmental conditions of the unit's location and expected period of time before the chain is again available for inspection
- 4) lateral movement up to 4 mm is acceptable provided there is no realistic prospect of the stud falling out
- 5) welding of studs is not acceptable.

506 Cracks, gouges, and other surface defects

Defects may be removed by grinding to a depth of 7% of original nominal diameter provided the resulting cross-sectional area is at least 81% (90% for Position Mooring Equipment) of the original nominal area.

The resulting grooves are to have a length along the link of approximately six times the depth and a bottom radius of approximately three times the depth. Grooves are to be blended into the surrounding surface to avoid any sharp contours.

Complete elimination of defects is to be verified by MT or PT.

507 Gross-distortion

Links showing distortion/ miss-shape are to be rejected.

508 Joining shackle defects and repair

Experience has shown a number of anchors and chains lost due to joining shackle failure. Joining shackle is to be rejected if cracks and other defects are found on the machined surfaces. In addition, all joining shackles on that chain which are of the same design and which have an equal or greater service life are also to be considered carefully with a view to rejection. Cracks and other defects on the remaining surface may be removed by grinding.

509 Distortion

Shackles showing distortion/ miss-shape are to be rejected.

510 Tapered pins

Tapered pins holding the parts of joining shackles together must make good contact at both ends and the recess of counter-bore at the large end of the pin holder should be solidly plugged with a peened lead slug to prevent the pin from working out.

511 Replacement of links and joining shackles

Links or shackles beyond repair are to be replaced with joining shackles in compliance with current Rules and guided by the following good marine practice:

- 1) joining shackles should pass through fairleads and windlasses in the horizontal plane
- 2) since joining shackles have much lower fatigue lives than ordinary chain links as few as possible should be used
- 3) if a large number of links meet the discard criteria and these links are distributed in the whole length, the chain should be replaced with new chain.

Any other type of replacement links are subject to special approval.

SECTION 5 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.4.

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 notations:

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.3 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. Hydrostatic testing may be requested by the surveyor.

C. Oil Loading Units and Installations

C 100 Application

101 The requirements in B apply to units or installations with class notations:

Oil Loading Unit or Oil Loading Installation

C 200 Survey arrangement

201 Annual and complete periodical surveys may be carried out on location based on an approved operation manual.

SECTION 6 PERIODICAL SURVEY EXTENT FOR ADDITIONAL CLASS; SPECIAL EQUIPMENT AND SYSTEM 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.

The complete mooring system for position keeping on location is subject to comprehensive survey, including opening up and NDT of selected parts of windlasses and winches and fairleads.

Critical parts of all mooring chains or wires and accessories will be thoroughly visually examined and subjected to extensive NDT when required. The extent and type of survey is dependent on the design such as corrosion protection / allowance and fatigue, see B500, B600 and B700.

For units with permanently locked off chain arrangement, particular attention will be paid to the hanging off arrangement.

204 *Mooring lines:*

Alternatively, the owner may opt for a continuous survey by providing an extra mooring line, which is regularly inspected in special facilities onshore and exchanged with lines installed on the unit. This arrangement is normally noted by an MO which gives the last/next survey date of each mooring line. At each renewal survey for the hull, the attending surveyor shall carry out the equivalent of the intermediate survey on each mooring line and renewal survey extent on the other parts of the mooring system, i.e. windlass, fairleads, anchors, etc. which are not covered by the continuous survey cycle.

205 Owners are to ensure that the mooring system can be adequately surveyed. An inspection and survey plan shall be submitted to the Society for approval at the commencement of the in-service phase.

The following information shall be submitted to the Society:

- sample chain/wire/fibre rope certificate
- sample joining shackle certificate (one of each type of

- shackle used)
- design fatigue life
- fatigue life used since new / last inspection
- latest inspection reports
- history of chain/wire/fibre rope, e.g. inspections, chain/wire /fibre rope breaks, joining shackles
- planned remaining field life
- future inspection plans.

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.

402 *Windlass and fairlead pockets:*

Visual inspection of windlass and fairlead pockets. Particular attention to be paid to:

- rate of wear on pockets, including relative rate of wear between links and pockets
- mismatch between links and pockets, including improper support of the links in the pockets.

403 *Mooring system function testing for units with winches installed:*

Function testing of the mooring system. Particular attention to be paid to:

- the function of brakes
- the smooth passage of links or wire and joining shackles over the windlass or winch and fairlead
- the absence of chain jumping or other irregularities.

404 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 of fairleads and winches irrespective of fatigue life factors of the mooring system

501 The requirements given in 400 apply.

502 The fairleads shall be inspected visually and by ROV as far as possible. All fairleads are to be inspected with special attention to wear and tear of fairlead wheels and malfunctioning.

503 Visual inspection of windlass and fairlead pockets shall be carried out. Particular attention shall be paid to:

- 1) Rate of wear on pockets, including relative rate of wear between links and pockets.
- 2) Mismatch between links and pockets, including improper support of the links in the pockets.

504 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.

505 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.

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

B 600 Complete periodical survey - systems designed before 1996 (no fatigue analysis and corrosion allowance)

601 For mooring systems designed without corrosion protection/allowance and not designed with respect to fatigue the following shall be carried out in addition to B500:

- 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.6 C *Dynamic Positioning System*
- complete inspection of mooring system including:
 - visual examination and extensive non-destructive testing of critical parts of all anchor chains, wire and fibre ropes and accessories
 - dimension control of chain and connection elements
 - inspection of cathodic protection system of sockets.

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 the following standards shall be used as guideline:

- for wire rope: ISO Standard 4309-2004, API RP 2I
- for fibre rope: DNV-RP-E304
- for chain: Sec.4 K500 and API RP 2I with the following addition: the anchor chains shall be replaced if the diameter of the chain with the breaking strength used in the design is reduced by 2%.

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 Third Edition, October 2005 (Design life factor 3)
- DNV-OS-E301 *Position Mooring*, dated June 2001 (Design life factor 3).

702 Recommended connection elements in long term mooring systems shall be purpose made elements such as triplates and D-shackles of Long Term Mooring (LTM) type.

703 Assumptions and conditions for acceptance of approach:

- the remaining fatigue life exceeds the expected field life by a factor of 3
- loss of one line will not lead to a critical situation for the installation
- if any defects are found on the chain/wire during visual inspection, all chains/wires are to be pulled for visual inspections
- chain/wire inspection is carried out under supervision by DNV surveyors results of ROV inspection to be verified 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
- fairlead and winches surveyed according to B500
- units with system notation **TA** and **ATA** are also to be inspected according to Sec.4 C *Dynamic Positioning System*.

704 All mooring lines shall be inspected offshore by use of ROV within 5 years.

At least 2 out of every 8 chain lines (25%) shall be included in visual /MPI inspection at a suitable offshore or onshore facility as follows:

- 100% visual
- 100% MPI of joining links
- 10% of the links are to have overall MPI (may be reduced for benign waters)
- diameter measurements of the chain link every 100th link. The anchor chains shall be replaced if the diameter of the chain with the breaking strength used in the design is reduced by 2%
- 2-neck measurement values to be noted every 100th link (measurement of the two diameters taken at the neck of the link at the mating surface).

705 All the remaining chain/wires shall be ROV inspected with respect to the following:

- overall visual inspection (including cleaning if necessary)
- go/no go gauge on 2 link wear every 100th link
- wear and scouring in touch down area
- anchors and anchor jewellery
- chain/wire attachments to the hull shall be surveyed visually as far as possible, if not accessible by ROV
- wear and tear in chain links where the mooring line is locked of in the chain stopper
- chain links in the fairlead pockets and close to fairleads shall be given special attention
- six strand wire ropes shall be inspected according to B602.

706 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.

707 Normally connection elements such as Kenter shackles, pear links, C-links and D-shackle with locking pin through bow and bolt, and swivels are not accepted in long term mooring systems. However, if such equipment is accepted installed they shall either be dismantled and subjected to non-destructive testing of all machined surfaces, or be replaced with new elements at least every 5 years.

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 Third Edition, October 2005 (design life factor 10)
- DNV-OS-E301 *Position Mooring*, dated June 2001 (design life factors 5 - 8).

802 For assumptions and conditions for acceptance of approach, see B704.

803 All mooring lines shall be inspected offshore by use of ROV during a 5 years period as follows:

- 100% overall visual inspection (including cleaning if necessary)
- diameter measurements of the chain link every 100th link of at least 1 out of 8 chains lines (12.5%).
The anchor chains shall be replaced when the diameter of the chain with the breaking strength used in the design is reduced by 2%. If unexpected wear and tear or corrosion reveals, the diameter measurements shall be extended. The plan for the extended inspection shall be approved by the surveyor.
- 2-neck measurement values to be noted every 100th link (measurement of the two diameters taken at the neck of the link at the mating surface)
- go/no go gauge on 2 link wear every 100th link
- wear and scouring in touch down area
- anchors and anchor jewellery if available
- chain/wire /fibre rope attachments to the hull shall be surveyed visually as far as possible.

804 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.

805 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.

806 Normally connection elements such as kenter shackles, pear links, C-links and D-shackle with locking pin through bow and bolt, and swivels are not accepted in long term mooring systems. However, if such equipment is accepted installed they shall either be dismantled and subjected to non-destructive testing of all machined surfaces, or be replaced with new elements at least every 5 years.

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.

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

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. Single Point Mooring

D 100 Application

101 The requirement in D applies to units with class notation:

SPM.

D 200 Annual survey

201 The annual survey shall be carried out in concurrently with the annual survey for main class.

E. Loading Computers for Damage Control

E 100 Application

101 The requirement in E applies to units with class notation:

LCS-DC.

E 200 Annual survey

201 The survey required in the following shall be carried out concurrently with the annual survey for main class.

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

F. Offshore Bow Loading

F 100 Application

101 The requirements in F apply to units or installations with class notation:

BOW LOADING.

F 200 Complete periodical survey

201 Every survey of the bow loading arrangement shall be held concurrently with the annual survey for service notation:

Oil 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.

G. Submerged Turret Loading

G 100 Application

101 The requirement in G applies to units with class notation:

STL.

G 200 Annual survey

201 The annual survey shall be carried out in concurrently with the annual survey for main class.

H. Production Plant

H 100 Application

101 The requirements in H apply to units or installations with class notation:

PROD.

H 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.

H 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 surveyed

and function tested as deemed necessary by the surveyor.

H 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.

I. Drilling Plant

I 100 Application

101 The requirements in I 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.

I 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.

I 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 out 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.

J. Helicopter Deck

J 100 Application

101 The requirements in J apply to units or installations with class notations (Ref. DNV-OS-E401):

HELDK

HELDK-S

HELDK-SH.

J 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**).

K. Crane

K 100 Application

101 The requirements in K apply to units or installations with class notation:

CRANE.

K 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.

K 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, raceway 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.

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
- CO₂-systems shall be surveyed and the CO₂-quantity verified. Thickness measurements and or pressure testing of CO₂-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. Winterization, Cold climate and Ice

M 100 Winterization

101 Application

These requirements apply to units with the following class notations:

WINTERIZED or WINTERIZED ARTIC.

102 Annual survey

Anti-icing and de-icing switchboards shall be surveyed. It shall be verified that the heating load on each circuit is according to relevant marking on the switchboards.

103 The equipment for de-icing and anti-icing shall be examined, including the following items:

- heaters
- covers
- equipment for manual de-icing
- radar equipment
- heating coils
- steam tracing lines.

104 Thermal protection suits including face masks, gloves and boots in sufficient number for all crew members to be verified on board.

105 The ice search light on wheelhouse top shall be tested.

106 For units with class notation **WINTERIZED ARCTIC** (design temp.) the annual survey requirements for class notation **CLEAN** shall be carried out, see R200.

M 200 Deicing and anti-icing systems

201 Application

These requirements apply to units with the following class notations:

DEICE or DEICE-C.

202 Annual survey

Visual inspection of anti-icing and de-icing switchboards and confirm heating load on each circuit according to marking on the switchboards.

203 Examination of equipment for de-icing and anti-icing including:

- heaters
- covers
- equipment for manual de-icing
- radar equipment
- heating coils
- steam tracing lines.

N. Periodically Unattended Machinery Space and Machinery Centralised Operated

N 100 Application

101 The requirements in N apply to units or installations with class notations:

E0

ECO.

N 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.

N 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.

O. Not In Use

P. Hull Monitoring System

P 100 Application

101 The requirements in P apply to units or installations with class notation:

HMON (...).

P 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.

P 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.

Q. Fatigue Methodology for Ship-Shaped Units

Q 100 Application

101 The requirements Q apply to ship-shaped units with class notation:

FMS.

Q 200 General

201 The purpose for the survey is to ensure that the fatigue critical details have no indications of fatigue damage.

202 The fatigue critical areas given in the drawings of fatigue critical areas or in accordance with the inspection program shall be surveyed.

Q 300 Annual survey

301 The extent of inspections for annual survey shall be in accordance with the in service inspection program.

Q 400 Intermediate survey

401 The extent of inspections for intermediate survey shall be in accordance with the in service inspection program.

Q 500 Complete periodical survey

501 The extent of inspections for complete survey shall be in accordance with the in service inspection program

R. Environmental notations

R 100 Additional oil pollution prevention measures - fuel oil systems

101 No specific survey requirements. Complete periodical survey is considered covered by renewal survey of main class.

R 200 CLEAN or CLEAN DESIGN

201 Application

The requirements apply to units with class notations:

CLEAN or CLEAN DESIGN.

202 Annual surveys

The basic requirement is that the unit holds a valid international pollution prevention certificate.

For the oil pollution prevention certificate, the following shall be checked onboard during survey:

- certificates for type approved oily water separating or filtering equipment, process unit and oil content meters
- oil record book entries
- approved SOPEP manual
- means of control of sludge
- standard discharge connection.

Additionally, the following shall be examined and tested, as applicable:

- oil filtering equipment (15 ppm) and process unit with alarm
- automatic stopping device (15 ppm)
- separation of oil fuel and water ballast system
- sludge tank and discharge arrangement externally.

203 In addition the following shall be checked or verified as applicable:

- all refrigerant consumption figures
- consumption figures for fire fighting substances with global warming potential (GWP) > 0
- garbage record book
- oil record books and cargo record book
- fuel oil log
- NOx emission control equipment log, where applicable
- ballast water management log
- documentation of antifouling used during dry-dockings since last review.

R 300 Vapour Control Systems (VCS)

301 Application

The requirements in O apply to units or installations with class notations:

VCS-1, VCS-1B

VCS-2, VCS-2B

VCS-3.

302 Complete periodical survey

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 notations **Storage Unit** or **Storage Installation**.

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 notations **Storage Unit** or **Storage Installation**.

For **VCS-3** the details of periodical survey requirements will be specified in the unit's or installation's "Appendix to the classification certificate".

S. Safety and Environmental Protection Management System

S 100 Application

101 The requirements in S apply to units or installations with class notation:

SBM.

S 200 Survey requirements

201 Surveys shall be in compliance with the Rules for Classification of Ships, Pt.7 Ch.3.

T. Noise, Vibration and Comfort Rating

T 100 General

101 Application

The requirements in T apply to units with the class notations:

VIBR and/or **COMF**.

102 General

If major modifications to the vessel, which may influence the vibration conditions onboard, are carried out, new measurements may have to be taken in order to maintain the notation. This will be decided by the Society. Otherwise requirements for survey of these additional class notations are considered covered by the renewal survey main class.

U. Special Feature Notations

U 100 Tailshaft Monitoring

101 The requirements in U apply to units with class notation:

Tailshaft Monitoring (TMON).

102 General

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 U500 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.

The class notation is applicable to conventional, podded and thruster propulsion systems. Other arrangements will be subject to special consideration.

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:

- a) Complete records are presented to the Society containing relevant measurements concerning **TMON** for a period covering the last 3 years, showing satisfactory results.
- b) 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.
- c) 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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103 Annual survey

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/maintenance supervisor.
- 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.

104 Dismantling of propellers

Dismantling of keyed propellers will be required at intervals of maximum 5 years, and keyless propellers every 15 years. The following parts shall be surveyed as applicable:

- propeller nut
- tailshaft threaded end
- key and cone including examination of the keyway and the fore part of the taper by an approved crack detection method.

SECTION 7 MACHINERY ALTERNATIVE SURVEY ARRANGEMENTS

A. General

A 100 General

101 Machinery systems and equipment listed in Table A1 shall be surveyed according to one of the four machinery survey arrangements if not part of a separate survey.

Table A1 Machinery surveys				
<i>Item</i>		<i>Machinery Renewal and Machinery Continuous</i>	<i>Machinery PMS</i>	<i>Machinery CM</i>
		<i>Survey method ¹⁾</i>		
Main propulsion				
Prime movers	Diesel engine	1	3	3 and 4
	Steam turbines ²⁾	1	1	4*16)
	Gas turbines	See F	See F	See F
	Electrical main motors, including frequency converters	2	3	3 or 4*
Shafting	Thrust-and intermediate shaft including bearings, clutch, couplings and torsional and axial vibration damper	2	3	3 and 4
	Tailshaft	Separate survey Sec.4 F	Separate survey Sec.4 F	Separate survey Sec.4 F
Gears ³⁾	Shafts, pinions, gear wheels, couplings and bearings, clutch	1	3	3 and 4*
	Power Take Off /In (PTO/PTI)	1	3	4*
Power consumption	Propeller	Separate survey Sec.4 G	Separate survey Sec.4 G	Separate survey Sec.4 G
	Thruster, Pods	Separate survey Sec.4 G	Separate survey Sec.4 G	Separate survey Sec.4 G
Steering				
Power actuating system	Actuator	2	3	3 or 4
	Hydraulic pumps	2	3	3 or 4
	Electric motors	2	3	3 or 4
	Pipes, valves and filters	2	3	3
Auxiliary machinery				
Prime movers	Diesel engine	1	3	3 and 4
	Turbines ²⁾	1	3	4*
	Electrical motors, including frequency converters	2	3	3 or 4*
	Hydraulic motors	2	3	3
Thruster	Shafts, pinions, gear wheels, couplings and bearings ^{12) 13) 14) 15)}	2	3	3 or 4
Generators		2	3	3 or 4*
Shafting	Shaft, couplings, clutch and torsional and axial vibration damper	2	3	3
Gears ³⁾	Shafts, pinions, gear wheels, couplings and bearings	2	3	4*
	Power Take Off (PTO)	2	3	4*
Sea water cooling system	Pumps, Electrical motor and starter	1	3	4
	Heat exchangers	2	3	3 or 4
	Pipes, valves and filters ^{5) 10)}	1	3	3 or 4
		2	3	3
Fresh water cooling system	Pumps, electrical motor and starter	2	3	4
	Heat exchangers	1	3	3 or 4
	Pipes, valves and filters ¹⁰⁾	2	3	3
Lubricating oil system	Pumps, electrical motor and starter	2	3	4
	Heat exchangers	1	3	3 or 4
	Pipes, valves and filters ^{4) 9) 10)}	2	3	3
Fuel oil system	Pumps, electrical motor and starter	2	3	4
	Heat exchangers	1	3	3 or 4
	Pipes, valves and filters ^{9) 13)}	2	3	3

Table A1 Machinery surveys (Continued)				
<i>Item</i>		<i>Machinery Renewal and Machinery Continuous</i>	<i>Machinery PMS</i>	<i>Machinery CM</i>
		<i>Survey method ¹⁾</i>		
Bilge and ballast system	Pumps, Electrical motor and starter	1 2	3	4
	Ejectors/ Eductors	1	3	3
	Pipes, valves and filters inside machinery space ^{5) 8) 10)}	2	3	3
Steam system	Boiler, main and auxiliary	Separate survey Sec.4 H	Separate survey Sec.4 H	Separate survey Sec.4 H
	Thermal oil	Separate survey Sec.4 I	Separate survey Sec.4 I	Separate survey Sec.4 I
	Heat exchangers	1	3	3 or 4
	Pipes, valves and filters inside machinery space ^{6) 10)}	2	3	3
Feed water and condensate system	Pumps, electrical motors and starters	2	3	4
	Turbines ²⁾	1	1	4*
	Evaporators and condensers with ejectors	1	3	3
	Heat exchangers	1	3	3 or 4
	Pipes, valves and filters ¹⁰⁾	2	3	3
Compressed air system	Air compressors, piston	2	3	3 or 4*
	Air compressors, screw	2	3	3 or 4
	Emergency compressors	2	3	3 or 4
	Compressed air receivers ⁷⁾	1	3	3
	Pipes, valves and filters inside machinery space ¹⁰⁾	2	3	3
Hydraulic system	Pumps, electrical motor and starter	2	3	4
	Pipes, valves and filters inside machinery space ¹⁰⁾	2	3	3
	Controllable pitch propeller oil distribution box	2	3	3
	Controllable pitch propeller inboard actuators	2	3	3
	Hydraulic motors	2	3	3 or 4
Cargo handling systems				
	Piston pumps	2	3	4*
	Centrifugal pumps	2	3	4
	Screw pumps	2	3	4
	Electrical motors and starters	2	3	3 and 4
	Turbines ²⁾	1	1	4*
	Heat exchangers	1	3	3 or 4
	Pipes, valves and filters ¹⁰⁾	2	3	3
	Gas compressors	1	3	3 or 4*
Diesel engine	1	3	3 and 4	
Control, alarms, safety systems and indications				
Control systems	Propulsion	2	3	3
	Steering	2	3	3
	Auxiliary machinery	2	3	3
	Cargo handling systems	2	3	3
Alarms	Propulsion	2	3	3
	Steering	2	3	3
	Auxiliary machinery	2	3	3
	Cargo handling systems	2	3	3
Safety systems	Propulsion	2	3	3
	Steering	2	3	3
	Auxiliary machinery	2	3	3
	Cargo handling systems	2	3	3
Indicating systems	Propulsion	2	3	3
	Steering	2	3	3
	Auxiliary machinery	2	3	3
	Cargo handling systems	2	3	3

Table A1 Machinery surveys (Continued)				
<i>Item</i>		<i>Machinery Renewal and Machinery Continuous</i>	<i>Machinery PMS</i>	<i>Machinery CM</i>
		<i>Survey method ¹⁾</i>		
Electrical installations				
	Switchboards	2	3	3
	Distribution board	2	3	3
	Electrical equipment	2	3	3
	Cable installations	2	3	3
	Navigation light controllers	2	3	3
	Mechanical ventilation of battery lockers or rooms	2	3	3
Miscellaneous				
	Forced draught fan	2	3	4
	Other turbines ²⁾	1	1	4*
	Sea and sanitary valves	1	1	1
	Incinerator arrangement	1	3	3
	Inert arrangement for vessels without notation INERT	1	3	3
	Instrumentation and automation for vessels without notation E0 or ECO	2	3	3
<p>1) The survey methods are defined as follows: Survey method No. 1: Visual inspection by opening up fully or partly. Function testing and or pressure testing to be carried out when relevant and found necessary by the surveyor. Survey method No. 2: Visual inspection without dismantling and performance test to be carried out. Opening up if found necessary. Last overhaul to be verified. Survey method No. 3: Audit of maintenance history in the planned maintenance system and selected spot checks. Survey method No. 4: Audit of condition monitoring results. Survey method No. 4*: Audit of condition monitoring results. FFT analysis mandatory.</p> <p>2) As an alternative to Survey method No.1, a performance test and a condition analysis may be carried out.</p> <p>3) Selected bearings shall be examined. Gears and roller bearings may as far as practicable be inspected without dismantling complicated assemblies.</p> <p>4) Strainers to be opened. Selected pipes and main engine(s) system tanks to be surveyed for sludge.</p> <p>5) Valves, cocks and strainers to be opened.</p> <p>6) For steam pipes with temperature 450°C and above: Crack detection and/or thickness examination may be required. Selected pipes to be pressure tested to 1.5 times working pressure. Steam pipes of copper to be pressure tested to 2 times working pressure</p> <p>7) To be pressure tested to 1.2 times working pressure if internal survey not possible.</p> <p>8) For piping systems outside machinery spaces, see Rules for Classification of Ships Pt.7 Ch.1 Sec.4 B114.</p> <p>9) Settling tank and daily service tanks for both heavy fuel oil and diesel oil as well as lubrication oil circulation tanks shall be internally surveyed for assessment of tank condition and presence of sludge. If inspection and cleaning of above mentioned tanks have been carried out by the crew during the last 12 months and relevant log extracts are provided and confirmed, this may be credited as surveyed at the surveyor's discretion.</p> <p>10) 10.Valves where the function in the piping system is not evident are to be adequately and readably marked.</p> <p>11) Filters to be opened and system oil tanks internally surveyed for presence of sludge, dirt and particles.</p> <p>12) It is advised to take oil analysis at regular intervals and always prior to docking in order to ensure that there is no need for opening of the thruster (e.g. water in the oil).</p> <p>13) Survey of gear and bearings through inspection openings or by other means (may be carried out concurrent with bottom survey).</p> <p>14) Opening up and Survey of bearings, gear and shafts and other relevant parts if any indications of abnormalities are observed. Satisfactory maintenance according to manufacturer's recommendations to be documented and considered as a base for extent of possible opening. Any opening up of a thruster to be witnessed by a DNV surveyor.</p> <p>15) Hydraulic oil, lubrication oil, alarm and safety systems are to be surveyed as applicable for respective systems.</p> <p>16) In addition to the renewal survey for Machinery CM, a limited internal inspection shall be carried out on main steam turbines.(ref. CN 10.2 Ch.3.1)</p>				

A 200 Machinery survey arrangements

201 The different machinery survey arrangements are based on the same inventory list established for the vessel. The difference is the conditions for obtaining and maintaining the survey arrangement. If a survey arrangement is not specified, Machinery Renewal is set as default.

The following survey arrangements are available:

- Machinery Renewal, see B
- Machinery Continuous, see C
- Machinery PMS (Planned Maintenance System), see D
- Machinery CM (Condition Monitoring), see E

B. Machinery Renewal

B 100 General

101 Machinery renewal is the default survey arrangement for machinery.

102 Machinery systems and equipment with corresponding survey method for this arrangement see Table A1.

B 200 Annual survey

201 Annual survey of the machinery and safety systems shall be carried out according to Sec.4 B400 and B500.

B 300 Renewal survey

301 The survey shall include the machinery systems and equipment given in the vessels Inventory List at least to the extent specified in Table A1.

C. Machinery Continuous

C 100 General

101 Machinery continuous is a survey arrangement based on surveys during the class period.

102 Machinery systems and equipment with corresponding survey method for this arrangement see Table A1.

103 Machinery continuous is operated under the following conditions:

- 1) The machinery systems are to be surveyed according to Table A1.
- 2) General requirements for intervals for continuous surveys are given in the Rules for Classification of Ships Pt.7 Ch.1 Sec.8 C.
- 3) The following items shall always be carried out in the presence of a surveyor:
 - generator parallel operation
 - generator load test
 - testing of protection devices for generators and switchboards
 - survey of the sea and sanitary valves.

104 Machinery continuous allows that some machinery systems and equipment are credited based on documented maintenance history presented by the chief engineer under the following conditions:

- 1) The following information shall be available:
 - name of the chief engineer
 - licence number, date of issue and validity
 - name of the Administration that issued the licence.

The manager shall confirm, through a statement signed by a designated person in the company, the chief engineers that can carry out surveys based on sub-items 2 to 5. This statement shall be found onboard.

Guidance note:

A template for such a statement is available from DNV. For the definition of a designated person, see Rules for Classification of Ships Pt.7 Ch.5 Sec.2 A500.

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- 2) Half of all items covered by the vessels inventory list, of which there is more than one, can be surveyed by the chief engineer.
- 3) Documented maintenance history shall include extract of engine logbook, maintenance history, wear measurements forms, etc.
- 4) The surveyor can, if found necessary, require a re-survey of items surveyed by the chief engineer.
- 5) All surveys taking place at ports where the Society is represented shall be carried out by surveyors of the Society.

C 200 Annual survey

201 Annual survey of the machinery and safety systems are carried out according to Sec.4 B400 and B500.

C 300 Renewal survey

301 Renewal survey is not a part of this survey arrangement.

D. Machinery PMS (Planned Maintenance System)

D 100 General

101 Machinery PMS is a survey arrangement based on audits of the approved and implemented planned maintenance system onboard and spot checks if deemed necessary. Machinery PMS allows the chief engineer to carry out survey on behalf of the Society.

102 The following conditions applies for the Manager:

- 1) If the system is not type approved, the manager shall submit documentation according to 106.
- 2) If the system is type approved, the manager shall submit documentation according to 107.
- 3) The manager shall have established a planned maintenance system that includes at least the machinery and equipment listed in Table A1.
- 4) In case of change of manager, the survey arrangement is automatically cancelled and substituted by either Machinery Renewal or Machinery Continuous.

103 The following conditions applies for the planned maintenance system:

- 1) The planned maintenance system shall be approved (see 105).
- 2) The planned maintenance system is to be computer based.

Guidance note:

If the system is centrally operated with the computer ashore, this can be accepted provided that implementation survey and annual survey are carried out both at the location from where the system is operated, and onboard.

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- 3) The system shall be able to produce a maintenance history report of all main overhauls carried out for a specific time period.
- 4) All corrective actions are to be especially identified in the system.
- 5) The job descriptions and maintenance history shall be in English.

104 The following conditions applies for the vessel:

- 1) The vessel shall be manned by chief engineers who are familiar with the planned maintenance system.
- 2) All machinery and equipment subject to class (see Table A1) shall be clearly identified with the DNV code in the system.
- 3) The job descriptions for the main overhaul for all the machinery and equipment subject to class shall cover the requirements for class survey (see Table A1) and will be credited as a class survey each time these jobs are carried out. If some main overhaul intervals are based on running hours and these intervals normally will exceed 5 years, the items will still be credited after 5 years based on satisfactory documentation of regular maintenance records and tests.
- 4) Maintenance job descriptions and intervals shall be based on manufacturer's recommendations. If experience shows that maintenance intervals need to be adjusted, documentation is required if such intervals shall be extended.
- 5) A system for tracing components that are being re-used in different positions (circulating components, e.g. piston, cylinder cover) shall be established for all machinery and equipment covered by class.

Guidance note:

It is not required that this system shall necessarily be an integrated part of the planned maintenance system.

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- 6) The sea and sanitary valves and main steam turbines cannot be credited by the chief engineer, and shall always be surveyed by a surveyor. This is to be stated in the instructions in the planned maintenance system.
- 7) The parallel operation, testing of the generators and testing of setting for main and emergency generators protection devices and circuit breaker cannot be credited by the chief engineer, and shall always be carried out in presence of a surveyor. This is to be stated in the instructions in the planned maintenance system.
- 8) Backup routines shall be established.
- 9) Damage to machinery systems or equipment covered by classification shall always be reported to the Society and into the planned maintenance system as a corrective action. The corresponding repair shall always be verified by a surveyor.
- 10) If a vessel has the **E0** or **ECO** class notations, the Machinery PMS survey arrangement shall also include all jobs related to these class notations (survey arrangement **E0** PMS). These jobs shall be especially identified in the system and include test routines and set-points.
- 11) A vessel which operates with the survey arrangement **E0** PMS will be followed up by an annual audit only. This implies that the scope of the annual survey and complete periodical survey listed in Sec.6 N shall be included in the planned maintenance system. These jobs shall be especially identified in the planned maintenance system with maximum interval is 12 months for the jobs listed in Sec.6 N200 and maximum 60 months for the jobs listed in Sec.6 N300.

If these conditions are not complied with, the survey arrangement will be cancelled and substituted by either Machinery Renewal or Machinery Continuous, and all machinery and equipment will be given a due date 5 years from the last survey date.

105 The planned maintenance system can either be type approved or approved on case-by-case basis (system approval). Requirements for type approval are described in the type approval programme 10-706.70-1.

Guidance note:

The supplier of the planned maintenance system can obtain type approval and the manager can obtain system approval.

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106 The system approval of the planned maintenance system is based on a description of the system and the following documentation:

- 1) Examples of how machinery and equipment in Table A1 are included in the planned maintenance system with its corresponding DNV code (see 102 item 3 and 104 item 2).
- 2) Description of how the **E0/ECO** jobs are identified in the planned maintenance system, including examples of job descriptions (see 104 item 10).
- 3) Examples of maintenance descriptions with corresponding time intervals and identification of class related machinery and equipment (DNV code) (see 103 item 5 and 104 item 2, 3, 4).
- 4) Print out of all job descriptions that will cover the requirement in Sec.6 N with special identification and interval (see 104, item 11).

- 5) Job descriptions for MM SEA, MM SAN and XX OVE (see 104, item 6, 7).
- 6) Example of maintenance history report (class report) for crediting of class machinery and equipment. The report shall at least contain component name, DNV code, interval, carried out date (running hours if applicable) and maintenance history (see 103 item 3).
- 7) Procedures for reporting of maintenance activity (access control in the system, which are reporting history into the system etc.).
- 8) Description of how postponed and overdue jobs are handled.
- 9) Description of how components that are being re-used in different positions (circulating components, e.g. piston, exhaust valve) are being traced (see 104, item 5).
- 10) A description of the manager's maintenance strategy including a chart of responsibility for the vessel and the management.
- 11) Description of routines for continuous improvement of the maintenance strategy and intervals on critical machinery systems and equipment. Identification and follow-up of unplanned maintenance, recording of condition before maintenance is carried out, and recording of all changes in the planned maintenance system are important elements in this context.

When the manager is granted a system approval of their system, a system approval certificate will be issued to the manager stating the system type. A copy of this certificate shall be onboard every vessel that applies for the Machinery PMS survey arrangement.

107 A system approval or a type approval is an approval of the system and its functionality as such, and not an approval of how the system is implemented on board each vessel. The company may use the approved system on board all the vessels in their fleet, but an implementation survey shall be carried out on each vessel before the Machinery PMS survey arrangement is granted.

For type approved systems, documentation according to item 1, 2, 7, 8 and 9 in 106 shall be submitted for approval before the implementation survey can be carried out.

108 An implementation survey on board the vessel is required in order to verify that all the conditions listed in 102, 103 and 104 are complied with. Provided that the implementation survey is carried out with a satisfactory result, a certificate for the survey arrangement will be issued for the vessel stating system type and conditions for the survey arrangement.

D 200 Annual survey

201 To prolong the validity of the survey arrangement an annual survey of the implemented PMS system onboard is required. The purpose of this survey is to review and evaluate the previous period's maintenance activities and experience. If found necessary by the surveyor, opening or testing of machinery may be required.

202 Annual survey of the machinery and safety systems are carried out according to Sec.4 B400 and B500.

D 300 Renewal survey

301 Renewal survey is not a part of this survey arrangement.

E. Machinery CM (Condition Monitoring)

E 100 General

101 Machinery CM is a survey arrangement based on audits of the implemented and approved condition monitoring pro-

gramme. It is required to be operating according to a condition based maintenance strategy when applying for the DNV survey arrangement Machinery CM. Machinery CM allows the manager to adjust maintenance intervals based on condition monitoring of applicable components onboard his vessels. See also Classification Note 10.2.

102 The following conditions must be fulfilled before the survey arrangement is valid:

- Approved CM programme (see 200)
- Successful implementation survey (see 300)

103 Machinery systems and equipment with corresponding survey method for this arrangement see Table A1.

104 In case of change of manager, the survey arrangement is automatically cancelled.

Guidance note:

It is required that the applicant is operating according to a condition based maintenance strategy. It is therefore recommended that an assessment of the condition based maintenance system is performed prior to submission of application.

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E 200 Approval of CM programme

201 Following conditions must be fulfilled before applying:

- valid survey arrangement Machinery PMS
- condition monitoring strategy successfully implemented onboard
- condition monitoring shall be an implemented part of a planned maintenance system
- programme for fuel oil bunker analysis to be followed and documented onboard, if applicable
- programme for lubricating oil analysis to be followed and documented onboard.

202 Following to be provided and in use onboard:

- computer based diesel engine performance analyser
- vibration measuring equipment and software.
- when operating on regular ports with intervals no longer than 36 hours, measuring equipment can be shore based with the operator or the condition monitoring company performing the measurements for shearing between ships.

203 Approval of the CM programme is based on a description of the following:

- maintenance strategy
- monitoring methods for components, including baseline*
- condition monitoring equipment*
- implementation of condition monitoring in the planned maintenance system*
- training programme/plan
- programme for fuel oil bunker analysis, if applicable*
- programme for lubricating oil analysis*.

Guidance note:

When documentation as required in E203 is approved and the vessel is ready for implementation survey, a company approval letter stating the company's overall condition based maintenance strategy will be issued. For subsequent vessels within the same company, only documentation marked with * in E203 is subject to approval.

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E 300 Implementation survey

301 An implementation survey onboard the vessel is required in order to verify that the CM programme is properly implemented onboard. It is recommended that the CM pro-

gramme have been implemented and operated for at least 6 months before the implementation survey is carried out. In order to verify baseline readings and the crew's general knowledge, the implementation survey is to be carried out during normal operation (voyage survey). Provided a successful implementation survey, a certificate for the Machinery CM will be issued stating conditions for the survey arrangement.

E 400 Annual survey

401 To maintain the validity of the survey arrangement Machinery CM, an annual survey of the implemented condition monitoring programme is required. This survey replaces the annual and renewal surveys of machinery for components included in the condition monitoring scheme. The purpose of this survey is to review and evaluate the previous period's maintenance activities and experience.

The annual survey shall consist of examination of:

- condition monitoring records
- maintenance records
- assessment of CM handling onboard

If found necessary by the surveyor, opening or testing of machinery may be required.

E 500 Renewal survey

501 To prolong the validity of the survey arrangement a renewal survey of the implemented CM programme during normal operation (voyage survey) is required. The purpose of this survey is to verify that:

- procedures for taking condition monitoring readings are followed
- the vessel's crew are familiar with recording and handling of results
- re-evaluation of baseline data

F. Gas Turbines

F 100 General

101 The society accepts that complete gas turbine units, or modules, are taken ashore for complete overhaul by a qualified company.

102 Complete replacement turbines shall be certified. The company performing the work shall be either the original equipment manufacturer (OEM), or OEM-approved, equipped with the recommended common shop tools and special tools and facilities. Attendance of surveyor during overhaul as considered necessary.

103 Documented history regarding maintenance, running hours and preservation during storage for the unit installed shall be available for examination.

104 Maintenance of gas turbine rotating components, or components in the gas path, shall be carried out using only original spare parts, or spare parts accepted by the OEM.

105 Maintenance carried out in the form of module replacement (e.g. hot section change-out), shall utilise replacement modules that are of identical design and construction, and either possess the appropriate DNV certification (i.e. originate in another DNV certified engine used for a similar application), or are new and produced in accordance with type approved design and under a valid manufacturing survey arrangement (MSA). Modules with other origins will normally not be accepted.

106 A written agreement shall be established between the maintenance company and the local DNV station regarding the practical details surrounding the class surveys and reviews.

F 200 Annual survey

201 All ships equipped with gas turbines shall have the maintenance of the gas turbines properly implemented in the ship's maintenance system. The maintenance system shall reflect the maintenance activities and intervals, as agreed upon, between the operator and the turbine manufacturer, or as necessary.

202 Annual survey consists of external and internal inspection and documentation review of operational and maintenance records.

203 At each annual survey the extent and criteria specified in Table F1 apply.

204 The survey items may be covered through inspection or overhaul at a service or maintenance centre provided the requirements defined in 100 are adhered to.

205 Further inspections (i.e. through opening up) and tests can be required at annual survey if indications of abnormalities are observed.

Table F1 Gas turbine annual survey

<i>Survey item</i>	<i>Extent</i>	<i>Acceptance criteria</i>	<i>Remarks</i>
Survey of records	Maintenance records check	Maintenance activities shall have been carried out in accordance with manufacturer recommendations	Review of maintenance reports
Survey of gas turbine	Visual inspection and boroscope inspections	No indications of wear or degradation, beyond manufacturers acceptance criteria	Boroscope inspection either performed in surveyor presence, or records ¹⁾ of boroscope inspection performed within last month to be available
Monitoring, control and emergency shut-down system	System functionality testing	Software version(s) to be in accordance with certificate. No deviations in functionality	Spot-checks of functionality. May be performed in combination with machinery and safety systems survey, or E0 survey
1) The report shall describe boroscope extent, findings (if any), and conclusions or evaluation. If inspection is performed in surveyor's presence, such a report shall be prepared subsequently, and submitted to the Society			

F 300 Renewal survey

301 Renewal survey involves internal inspection requiring dismantling. The survey intervals should be specified in each individual case, and conform to the refurbishment or overhaul intervals and extent defined by the manufacturer. Generally, a DNV surveyor shall witness the inspection or overhaul work, verifying that it is carried out in accordance with the manufacturer's own recommendations and criteria. In special cases an agreement can be made with the Society allowing witnessing to be substituted by a review of maintenance or overhaul documentation, showing that the unit has been inspected or overhauled in an appropriate manner complying with the manufacturer's maintenance recommendations.

302 Renewal survey activities are in general of such a nature that they should be performed at a maintenance depot. Upon special request to the Society the survey activities may be carried out onboard, provided the requirements defined in F100

are adhered to.

303 Upon completion of onboard overhaul, or installation of overhauled unit or module, the gas turbine shall be tested. The testing shall cover alarms and shutdown functionality, as well as engine control (i.e. single engine control, backup control) and general performance. Test procedure shall be agreed with the Society. System behaviour and measured parameters are all to satisfy manufacturer acceptance criteria.

Guidance note:

Original operations documentation retained on board will reflect the original manufacturer alarm or acceptance limits and set points as established through the type approval.

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304 Further inspections can be required at renewal survey if any indications of abnormalities are observed.

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 loosing 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:

- a) Determine the condition of the tanker with respect to corrosion and possible reduced scantlings.
- b) Identify the static loads acting on the unit as a consequence of its new function:
 - total topside loads and load distribution (for longitudinal strength).
- c) 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.
- d) 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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- e) 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).

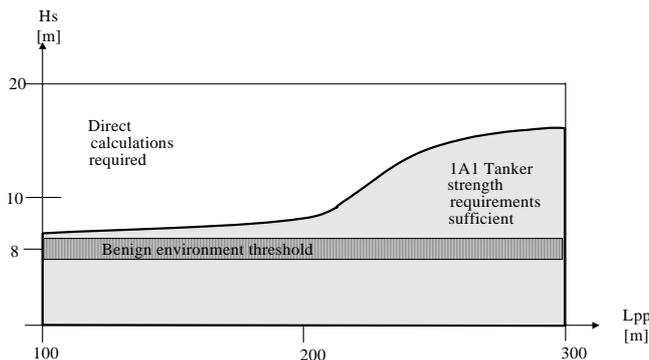


Figure 1
Typical longitudinal strength margins

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, 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 definitions 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.

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

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 and photograph (if necessary) by diver. Overall or spot cleaning may be required.

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 suctions

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.