RULES FOR CLASSIFICATION

Offshore units


Floating LNG/LPG production, storage and loading units

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FOREWORD

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

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CHANGES – CURRENT

General

This document supersedes DNV-OSS-301, April 2012.

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

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

Main changes July 2015, entering into force 1 January 2016

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

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

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

In addition to the above, the structure of this document has been converted to decimal numbering, replacing the earlier alphanumeric numbering of subsections, e.g. A100 becomes [1.1], B102 becomes [2.1.2] etc.

• Ch.1 Sec.1 Introduction
— New definition for rope access control + updated description for offshore installation.

• Ch.1 Sec. 2 Classification principles
— [1.2.1]: Updated clause on approval body.
— [1.2] removal of the former clause A207/ 1.2.7 already given in [1.2.4].

• Ch.1 Sec. 3 Classification scope and notations
— Table 1 to Table 6 (xmt. table 2): Updated tables in line with latest updates of class notation portfolio.
— [2.9]: New clauses handling of service restrictions.
— [2.10.1]: New clause on field specific design notation.

• Ch.1 Sec. 4 Assignment of class
— [2.3]: Included new clauses to clarify follow up of vessels previously classed by other IACS member society.

• Ch.1 Sec. 5 Retention of class
— [3.2.5]: New clause on certificate validity.

• Ch.1 Sec. 6 Certification of materials, components and systems
— [1.2.1]: Included clause referring to general description on requirements to builders.
— [2.1]: Including certification types for DNVGL and EU Mutual Recognition Type Approval.
— [2.2.2]: New clause on case-by-case plan approval.
Changes – current

• Ch.2 Sec. 1 Design and construction requirements for 1A MOU main class and
  — [4]: Updated description on structural requirements scope.
  — Table 1 and Table 2: Updated to include tension leg main structure.

• Ch.2 Sec.2 Design and construction requirements for OI Floating Offshore
  Installation main Class
  — [4]: Updated description on structural requirements scope.
  — Table 1 and Table 2: Updated to include tension leg main structure.

• Ch.2 Sec.6 Additional class notations: design and construction requirements for
  special equipment and systems
  — Updated descriptions of all notations to improve overview, including new descriptions for the notation
    'REGAS' in (8) and 'Non-self propelled' in (21.2) and the qualifier 'R' for the 'POSMOOR' notation in
    (2.2).

• Ch.3 Sec. 1 General provisions for periodical surveys
  — [1.1.5]: Updated clause.
  — [2.5]: Replacing previous table with overview on additional class notation with new sub-section.

• Ch.3 Sec. 2 General requirements for hull and machinery surveys
  — [1.1]: Removing former clause A102 also stated in [2.1.3].
  — [2.1.2]: New clause on follow up of ceilings etc.
  — [4]: Updated descriptions on special provisions for ageing units.

• Ch.3 Sec. 4 Periodical survey extent for main class
  — Table 1: Updated table.
  — [1.3]: New guidance note to clarify the application of extended hull survey requirements as defined in
    ship classification.
  — [1.3.5]: New clause on location of thickness gaugings.
  — [2.1.2]: New clause on survey on location.
  — [2.5.7]: Updated description with minor changes.
  — [4.2]: Removal of original clause D206 on remote controls and alarms for doors etc. as already covered
    by [2.3.8].
  — [5.1.4]: New clause on survey of gas turbines replacing previous sub-section in Sec. 7.
  — [5.1.5]: New clause on check on watertight integrity of shaft sealing.
  — [12]: Removal on previous clauses describing intermediate survey requirements.

• Ch.3 Sec. 6 Periodical survey extent for additional class; special equipment and
  system notations
  — Improved overview on operational follow up on class notations by:
    — Replacing earlier descriptions on notations DYNPOS, LCS, HELIDECK, CRANE F, HMON, RECYCLING and VCS with references to DNV Rules for Ship updating the descriptions for
      WINTERIZATION and VIBR.
    — Removed the description on the SEMP (not longer in use).
    — Removed the description on Single Point Mooring and FMS Including a descriptions on the REGAS
      and ISDS notations.
  — [2]: Removal on clauses describing intermediate survey requirements.
  — [8]: Removal superfluous clause on applicability on annual survey requirements.

• Ch.3 Sec.7 Machinery alternative survey arrangements
  — Removal of previous sub-section on gas-turbines.
• Appendix A Special considerations for conversions
  — [3.2]: Replacing descriptions on hull and topside structure with reference.

Editorial corrections
In addition to the above stated main changes, editorial corrections may have been made.
CONTENTS

CHANGES – CURRENT .............................................................................................................. 3

CH. 1 PRINCIPLES AND PROCEDURES FOR CLASSIFICATION ......................................................... 18

Sec.1 Introduction .................................................................................................................... 18

1 General .................................................................................................................................. 18

1.1 General ......................................................................................................................... 18
1.2 Document structure ................................................................................................. 18
1.3 Objects covered ....................................................................................................... 18

2 Definitions ......................................................................................................................... 19

2.1 Verbal forms .............................................................................................................. 19
2.2 Definitions .................................................................................................................. 19

3 Normative references .................................................................................................... 23

3.1 General ...................................................................................................................... 23
3.2 DNV GL and DNV reference documents ............................................................... 23
3.3 Other references ...................................................................................................... 24

4 Informative references ................................................................................................. 24

4.1 DNV GL and DNV publications ........................................................................... 24
4.2 Other references ...................................................................................................... 24

5 Abbreviations .................................................................................................................. 25

5.1 General ...................................................................................................................... 25

Sec.2 Classification principles .............................................................................................. 26

1 The classification concept ............................................................................................... 26

1.1 Introduction .............................................................................................................. 26
1.2 Applicable rules ....................................................................................................... 26
1.3 Basis for assignment of class.................................................................................... 27
1.4 Basis for maintenance of class .............................................................................. 27
1.5 Documentation ........................................................................................................ 28
1.6 Disclosure of information ....................................................................................... 28
1.7 Access ....................................................................................................................... 29
1.8 Calibration of equipment ......................................................................................... 29
1.9 Service suppliers ..................................................................................................... 30
1.10 Limitation of DNV GL’s responsibility ................................................................. 30

2 Appeals ............................................................................................................................ 30

2.1 Decisions taken by the Society .............................................................................. 30

3 Statutory certification ...................................................................................................... 30

3.1 General ...................................................................................................................... 30
3.2 Service suppliers ..................................................................................................... 31

Sec.3 Classification scope and notations ............................................................................... 32

1 Scope of classification ................................................................................................... 32

1.1 General ...................................................................................................................... 32
1.2 Rule parts .................................................................................................................. 32
1.3 Rule particulars ........................................................................................................ 32

2 Class notations ................................................................................................................. 33

2.1 General ...................................................................................................................... 33
2.2 Construction symbols ............................................................................................. 33
2.3 Main character of class ............................................................................................ 33
2.4 Structural design notations ....................................................................................... 33
2.5 Service notations ................................................................. 34
2.6 Additional class; special equipment and systems notations 35
2.7 Optional class notations related to cold climate operation 35
2.8 Special feature notations ..................................................... 36
2.9 Notations related to restrictions ........................................... 36
2.10 Area specific notations ......................................................... 36
2.11 Combination of notations .................................................... 37

Sec.4 Assignment of class .......................................................... 38

1 Assignment of class - new vessels ............................................. 38
  1.1 General ............................................................................. 38
  1.2 Requirements for builder or designer .............................. 38
  1.3 Applicable rules ............................................................... 38
  1.4 Plan approval ................................................................. 40
  1.5 Survey during construction ............................................ 40
  1.6 Installation of systems and equipment ........................... 40
  1.7 Testing and commissioning ............................................. 41

2 Assignment of class - existing vessels ...................................... 41
  2.1 General ............................................................................. 41
  2.2 Applicable rules ............................................................... 41
  2.3 Design approval ............................................................. 41
  2.4 Class entry survey .......................................................... 41

3 The class certificate ................................................................. 42
  3.1 General ............................................................................. 42
  3.2 Late commissioning ......................................................... 42

4 The register of vessels ............................................................. 42
  4.1 General ............................................................................. 42

Sec.5 Retention of class ............................................................... 43

1 Conditions for retention of class .............................................. 43
  1.1 General requirements ..................................................... 43
  1.2 The customer’s obligations .............................................. 43
  1.3 Maintenance .................................................................... 44

2 Classification society involvement ........................................... 44
  2.1 Applicable rules ............................................................... 44
  2.2 Surveys ............................................................................ 44
  2.3 Conditions and memoranda ............................................ 44
  2.4 Survey reports and survey status ................................... 45
  2.5 Damage and repairs ....................................................... 46
  2.6 Conversions and alterations .......................................... 46
  2.7 Temporary equipment .................................................. 46

3 Endorsement and renewal of the class certificate ...................... 47
  3.1 Endorsement of the class certificate ............................... 47
  3.2 Renewal of the class certificate ...................................... 47

4 Suspension and withdrawal of class ....................................... 48
  4.1 General ............................................................................. 48
  4.2 Suspension of class ........................................................ 48
  4.3 Reinstatement following class suspension ..................... 49
  4.4 Withdrawal of class ....................................................... 49
  4.5 Re-assignment of class following class withdrawal ........... 49

5 Change of owner or manager .................................................. 50
  5.1 General ............................................................................. 50
6 Force majeure ........................................................................................................ 50

Sec. 6 Certification of materials, components and systems ...................................... 51

1 General ................................................................................................................. 51
   1.1 General ........................................................................................................... 51
   1.2 Requirements for manufacturer .................................................................. 51

2 The classification involvement .......................................................................... 51
   2.1 General ........................................................................................................... 51
   2.2 Plan approval ............................................................................................... 52
   2.3 Type approval ............................................................................................. 52
   2.4 Survey .......................................................................................................... 53
   2.5 Manufacturing survey arrangement ............................................................. 53

3 Suspension and withdrawal of certificates ......................................................... 54
   3.1 General ........................................................................................................... 54

Sec. 7 Legal provisions ............................................................................................ 55

1 Liability and jurisdiction ....................................................................................... 55
   1.1 Limited liability ............................................................................................. 55
   1.2 Use by other parties ..................................................................................... 55
   1.3 Governing law ............................................................................................. 55
   1.4 Venue ............................................................................................................ 55

CH. 2 DESIGN AND CONSTRUCTION PROVISIONS ...................................... 56

Sec. 1 Design and construction requirements for 1A MOU main class ..................... 56

1 General ................................................................................................................. 56
   1.1 Introduction .................................................................................................... 56
   1.2 Technical reference documents ................................................................... 56
   1.3 General assumptions .................................................................................. 57

2 Safety principles and arrangement ..................................................................... 57
   2.1 General ........................................................................................................... 57
   2.2 Design principles ........................................................................................ 57
   2.3 Arrangement ................................................................................................ 57
   2.4 Escape and evacuation .............................................................................. 57

3 Materials ............................................................................................................. 57
   3.1 Technical requirements .............................................................................. 57
   3.2 Supplementary classification requirements .............................................. 57

4 Structural design ................................................................................................. 58
   4.1 Scope ............................................................................................................. 58
   4.2 Technical requirements .............................................................................. 58

5 Fabrication and testing of offshore structures ...................................................... 58
   5.1 Technical requirements .............................................................................. 58
   5.2 Supplementary classification requirements .............................................. 58

6 Stability and watertight/weathertight integrity ..................................................... 59
   6.1 Technical requirements .............................................................................. 59

7 Position keeping and towing .............................................................................. 59
   7.1 General ........................................................................................................... 59
   7.2 Position keeping .......................................................................................... 59
   7.3 Temporary mooring ................................................................................... 59
   7.4 Towing .......................................................................................................... 59
   7.5 Supplementary classification requirements .............................................. 60

8 Marine and machinery systems and equipment ................................................. 60
   8.1 Technical requirements .............................................................................. 60
8.2 Supplementary classification requirements ........................................... 60

9 Electrical systems and equipment ........................................................... 60
9.1 Technical requirements ..................................................................... 60
9.2 Supplementary classification requirements ........................................... 61

10 Automation, safety and telecommunication systems .............................. 61
10.1 Technical requirements ..................................................................... 61
10.2 Supplementary classification requirements ........................................... 61

11 Fire protection .................................................................................... 61
11.1 Technical requirements ..................................................................... 61
11.2 Supplementary classification requirements ........................................... 61

12 Preparation for surveys and inspections on location............................... 61
12.1 General ........................................................................................... 61

13 Summary of technical reference standards ............................................. 62

Sec.2 Design and construction requirements
for OI Floating Offshore Installation main class .......................................... 64

1 General ............................................................................................... 64
1.1 Introduction ..................................................................................... 64
1.2 Technical reference documents ........................................................... 64
1.3 General assumptions ......................................................................... 65
1.4 Certification of materials and components ............................................ 65

2 Safety principles and arrangement ......................................................... 65
2.1 General ........................................................................................... 65
2.2 Design principles .............................................................................. 65
2.3 Arrangement .................................................................................... 65
2.4 Escape and evacuation ...................................................................... 65

3 Materials ............................................................................................... 65
3.1 Technical requirements ..................................................................... 65
3.2 Supplementary classification requirements ........................................... 66

4 Structural design .................................................................................... 66
4.1 Scope ............................................................................................. 66
4.2 Technical requirements ..................................................................... 66

5 Fabrication and testing of offshore structures ........................................ 66
5.1 Technical requirements ..................................................................... 66
5.2 Supplementary classification requirements ........................................... 67

6 Stability and watertight integrity ............................................................ 67
6.1 Technical requirements ..................................................................... 67

7 Position keeping and towing ................................................................. 67
7.1 General ........................................................................................... 67
7.2 Supplementary classification requirements ........................................... 67

8 Utility systems and equipment .............................................................. 67
8.1 Technical requirements ..................................................................... 67
8.2 Supplementary classification requirements ........................................... 68

9 Electrical systems and equipment .......................................................... 68
9.1 Technical requirements ..................................................................... 68
9.2 Supplementary classification requirements ........................................... 68

10 Automation, safety and telecommunication systems .............................. 68
10.1 Technical requirements ..................................................................... 68
10.2 Supplementary classification requirements ........................................... 68
Contents

11 Fire protection ........................................................................................69
11.1 Technical requirements .....................................................................69
11.2 Supplementary classification requirements .......................................69

12 Preparation for surveys and inspections on location...............................69

13 Summary of technical reference standards.............................................69
13.1 General...........................................................................................69

Sec.3 Supplementary requirements for service notation LNG (or LPG)
Production Unit or Installation................................................................. 71
1 General...................................................................................................71
1.1 Introduction........................................................................................71

2 Safety principles and arrangement .........................................................71
2.1 General...........................................................................................71
2.2 Arrangement....................................................................................71
2.3 Area classification.............................................................................71
2.4 Emergency shutdown........................................................................71
2.5 Escape, evacuation and communication...............................................71

3 Structural design ....................................................................................71
3.1 General...........................................................................................71
3.2 Supplementary technical requirements ................................................72

4 Marine and machinery and utility systems..............................................72
4.1 General...........................................................................................72
4.2 Supplementary technical requirements ................................................72

5 Instrumentation and telecommunication systems ..................................72
5.1 Supplementary technical requirements ................................................72

6 Fire protection ........................................................................................72
6.1 General...........................................................................................72
6.2 Supplementary technical requirements ................................................72

7 Position keeping .....................................................................................73
7.1 General...........................................................................................73

8 Industrial equipment..............................................................................73
8.1 General...........................................................................................73

9 Hydrocarbon import and export..............................................................73
9.1 General...........................................................................................73
9.2 Hydrocarbon import ..........................................................................73
9.3 Hydrocarbon Offloading ....................................................................73

Sec.4 Supplementary requirements for service notation LNG (or LPG)
Storage Unit or Installation......................................................................... 74
1 General...................................................................................................74
1.1 Introduction........................................................................................74

2 Safety principles and arrangement .........................................................74
2.1 General...........................................................................................74
2.2 Arrangement....................................................................................74
2.3 Area classification.............................................................................74
2.4 Emergency shutdown........................................................................74
2.5 Escape, evacuation and communication...............................................74

3 Structural design ....................................................................................74
3.1 General...........................................................................................74
3.2 Supplementary technical requirements ................................................75

4 Marine and machinery or utility systems and equipment .......................75
4.1 General...........................................................................................75
4.2 Supplementary technical requirements ............................................. 75

5 Instrumentation and telecommunication systems ............................. 75
  5.1 Supplementary technical requirements ............................................. 75

6 Fire protection .................................................................................... 75
  6.1 General ....................................................................................... 75
  6.2 Supplementary technical requirements ............................................. 76

7 Position keeping ................................................................................ 76
  7.1 General ....................................................................................... 76

8 Export/import of LNG/LPG/condensate ............................................. 76
  8.1 General ....................................................................................... 76

9 Preparation for surveys and inspections on location ....................... 76

Sec. 5 Supplementary requirements for service notation LNG (or LPG) Loading Unit or Installation .......................................................... 77
  1 General ....................................................................................... 77
     1.1 Introduction ............................................................................ 77
     1.2 Design requirements ................................................................. 77

Sec. 6 Additional class notations: Design and construction requirements for special equipment and systems ................................................. 78
  1 Introduction ................................................................................... 78
     1.1 General ................................................................................... 78
     1.2 Technical reference documents ...................................................... 78
     1.3 General assumptions ................................................................. 78

2 Position mooring system .................................................................. 78
  2.1 General ..................................................................................... 78
  2.2 Application .................................................................................. 79
  2.3 Technical requirements ................................................................. 79
  2.4 Certification of materials and components ....................................... 79

3 Dynamic positioning systems ........................................................... 79
  3.1 General ..................................................................................... 79
  3.2 Technical requirements ................................................................. 80
  3.3 Certification of materials and components ....................................... 80

4 Single point mooring (SPM) ............................................................... 80
  4.1 General ..................................................................................... 80
  4.2 Technical requirements ................................................................. 81
  4.3 Certification of materials and components ....................................... 81

5 Bow loading ...................................................................................... 81
  5.1 General ..................................................................................... 81
  5.2 Technical requirements ................................................................. 81
  5.3 Certification of materials and components ....................................... 81

6 Submerged turret loading ................................................................. 81
  6.1 General ..................................................................................... 81
  6.2 Technical requirements ................................................................. 82
  6.3 Certification of materials and components ....................................... 82

7 Hydrocarbon production plant ......................................................... 82
  7.1 General ..................................................................................... 82
  7.2 Technical requirements ................................................................. 82
  7.3 Certification of materials and components ....................................... 82

8 Regasification .................................................................................... 82
  8.1 General ..................................................................................... 82
  8.2 Technical requirements ................................................................. 83
21.4 Special feature notation BIS ................................................................. 93
22 Summary of reference documents for additional class notations .......... 93
   22.1 General .......................................................................................... 93

CH. 3 CLASSIFICATION IN OPERATION ................................. 95
Sec.1 General provisions for periodical surveys ........................................... 95
   1 General .................................................................................................. 95
      1.1 Introduction .................................................................................... 95
      1.2 Survey pre-planning and record keeping ....................................... 95
      1.3 Accessibility and facilities for surveys on location ......................... 95
   2 Periodical surveys .................................................................................. 96
      2.1 General ........................................................................................... 96
      2.2 Postponement of periodical surveys ............................................. 96
      2.3 Survey of units out of commission ................................................. 97
      2.4 Survey schedules ........................................................................... 97
      2.5 Class notations ............................................................................. 99

Sec.2 General requirements for hull and machinery surveys .......................... 101
   1 General ................................................................................................. 101
      1.1 Preparation for survey .................................................................. 101
   2 Requirements for hull surveys .............................................................. 101
      2.1 Conditions for survey and access to structures ............................ 101
      2.2 Survey extent ............................................................................... 102
      2.3 Repair of structural damage or deterioration ................................ 103
   3 Requirements for machinery surveys .................................................... 103
      3.1 Maintenance and preparation for survey ....................................... 103
      3.2 Replacement of machinery components ....................................... 103
      3.3 Machinery verification .................................................................... 104
   4 Special provisions for ageing offshore units ......................................... 104
      4.1 General ......................................................................................... 104
      4.2 Corrosion measurements and condition of protective coating ....... 105
      4.3 Fatigue utilization index ................................................................ 105

Sec.3 Alternative survey arrangements and surveys performed by approved
   companies .................................................................................................... 107
   1 Alternative survey arrangements .......................................................... 107
      1.1 General overview of survey arrangements .................................. 107
      1.2 Hull PMS (planned maintenance system) ...................................... 107
      1.3 Survey arrangement based on reliability centred maintenance (RCM)
         system .......................................................................................... 107
   2 Surveys by approved companies or service suppliers ........................... 109
      2.1 General ......................................................................................... 109
      2.2 Thickness measurements ............................................................... 109
      2.3 Bottom survey afloat .................................................................... 109
      2.4 Non-destructive testing .................................................................. 109
      2.5 Mooring chain inspections ............................................................. 109
      2.6 Condition monitoring .................................................................... 109

Sec.4 Periodical survey extent for main class .................................................. 110
   1 General .................................................................................................. 110
      1.1 Introduction .................................................................................... 110
      1.2 Hull survey - general ................................................................. 110
      1.3 In-service inspection program (IIP) ............................................. 110
2 Annual survey .....................................................................................114
  2.1 Survey extent ................................................................................114
  2.2 Hull and equipment for ship-shaped units ..................................115
  2.3 Structure and equipment for column-stabilised and self-elevating units ... 115
  2.4 Machinery and safety systems for ship-shaped units or installations ...... 115
  2.5 Machinery and safety systems for column-stabilised and self-elevating units or installations ........................................................................ 116

3 Intermediate survey .............................................................................116
  3.1 General ........................................................................................116
  3.2 Hull and equipment for ship-shaped units ......................................117
  3.3 Structure and equipment for column-stabilised and self-elevating units or installations ................................................................. 117
  3.4 Machinery and safety systems for ship-shaped units or installations ...... 117
  3.5 Machinery and safety systems for column-stabilised and self-elevating units or installations ........................................................................ 117

4 Renewal survey, structure and equipment ............................................117
  4.1 Hull and equipment of ship-shaped units ............................................117
  4.2 Column-stabilised and self-elevating structures .................................118
  4.3 Alternative survey ..........................................................................120

5 Renewal survey, machinery and safety systems ...................................120
  5.1 General ........................................................................................120
  5.2 Electrical installations ......................................................................121
  5.3 Instrumentation and automation .......................................................122

6 Renewal survey, tailshaft survey ..........................................................123
  6.1 Standard requirements ....................................................................123
  6.2 Alternative survey ..........................................................................123
  6.3 Tailshaft condition monitoring survey arrangement .............................123

7 Survey of geared thrusters for main propulsion and positioning ...........123
  7.1 Definitions .....................................................................................123
  7.2 Survey extent ................................................................................123

8 Survey of podded thrusters for main propulsion and positioning ..........125
  8.1 General ........................................................................................125
  8.2 Scheduled surveys ..........................................................................125

9 Boiler survey ........................................................................................126

10 Thermal oil heater survey ......................................................................126

11 Survey of the outside of unit's bottom and related items .......................126
  11.1 Schedule ......................................................................................126
  11.2 Parts to be examined .....................................................................126
  11.3 Survey planning and record keeping ...............................................126

12 Survey of towing, temporary and position mooring equipment .............127
  12.1 Types of survey ............................................................................127
  12.2 Annual survey ..............................................................................127
  12.3 Renewal survey ............................................................................127
  12.4 Anchor chains; acceptance criteria and repair ..................................127

Sec.5 Periodical survey extent for additional service notations .................129
  1 General ..........................................................................................129
    1.1 Introduction ................................................................................129
  2 LNG or LPG production and/or LNG or LPG storage units and installations ..................................................................................129
    2.1 Application ..................................................................................129
    2.2 Survey arrangement ....................................................................129
2.3 Annual survey ................................................................. 129
2.4 Cargo handling and containment system – annual survey ... 130
2.5 Complete periodical survey .............................................. 130
2.6 Cargo Handling and containment system – complete periodical survey... 131

3 LNG/LPG loading units and installations ........................................ 131
3.1 Application........................................................................... 131
3.2 Survey arrangement ............................................................. 131

Sec.6 Periodical survey extent for additional class; special equipment and system notations .............................................................. 132

1 General.................................................................................... 132

2 Position mooring equipment .................................................... 132
2.1 Application........................................................................... 132
2.2 Types of surveys .................................................................. 132
2.3 Annual survey ...................................................................... 133
2.4 Complete periodical survey of fairleads and winches irrespective of fatigue life factors of the mooring system ........................................ 133
2.5 Complete periodical survey - systems designed before 1996 (no fatigue analysis and corrosion allowance) ......................... 133
2.6 Complete periodical survey – fatigue design life factor 3 ......... 134
2.7 Complete periodical survey – fatigue life factor 5-8 or greater ... 135
2.8 Additional requirements - tropical waters only ....................... 136

3 Dynamic positioning systems .................................................. 136
3.1 General................................................................................. 136
3.2 Specific requirements ........................................................... 136
3.3 Annual and complete survey ................................................ 136

4 Loading computers for damage control .................................... 136
4.1 Application........................................................................... 136
4.2 Annual survey and complete surveys .................................... 137

5 Production plant .................................................................. 137
5.1 Application........................................................................... 137
5.2 Survey arrangement ............................................................. 137
5.3 Annual survey ...................................................................... 137
5.4 Complete periodical survey .................................................. 138

6 Regasification ........................................................................ 138
6.1 Application........................................................................... 138
6.2 Annual and complete survey ................................................ 138

7 Helicopter deck .................................................................... 138
7.1 Application........................................................................... 138
7.2 Complete survey ................................................................. 139

8 Crane ..................................................................................... 139
8.1 Application........................................................................... 139
8.2 Annual and complete surveys .............................................. 139

9 Additional fire protection arrangements .................................... 139
9.1 General................................................................................. 139
9.2 Complete survey ................................................................. 139

10 Periodically unattended machinery space and machinery centrally operated .............................................................. 139
10.1 Application........................................................................... 139
10.2 Annual and complete surveys .............................................. 139
11 Hull monitoring system ................................................................. 139
  11.1 Application ............................................................................. 139
  11.2 Objective .............................................................................. 139
  11.3 Annual survey ...................................................................... 139
12 Noise, vibration and comfort rating ........................................... 140
  12.1 Application .......................................................................... 140
  12.2 General .............................................................................. 140
  12.3 Complete .......................................................................... 140
13 Cold climate notations ................................................................. 140
  13.1 Winterization application ...................................................... 140
  13.2 Annual survey .................................................................... 140
  13.3 Complete survey ............................................................... 141
14 Environmental notations .............................................................. 141
  14.1 Ballast water management systems ....................................... 141
  14.2 CLEAN or CLEAN DESIGN .............................................. 141
  14.3 Recycling ........................................................................... 141
  14.4 Vapour control systems (VCS) ............................................. 141
15 Integrated software dependent systems .................................... 141
  15.1 General .............................................................................. 141
  15.2 Annual survey .................................................................... 142
  15.3 Complete survey ............................................................... 142
16 Special feature notations ............................................................... 142
  16.1 Non self-propelled units ....................................................... 142
  16.2 Self-propelled self-elevating units ....................................... 142
  16.3 Tailshaft monitoring .......................................................... 142

Sec. 7 Machinery alternative survey arrangements ...................... 144
1 General ................................................................................ 144
  1.1 General ............................................................................. 144
  1.2 Machinery survey arrangements ........................................ 147
2 Machinery renewal .................................................................. 148
  2.1 General ............................................................................. 148
  2.2 Annual survey .................................................................... 148
  2.3 Renewal survey ................................................................. 148
  2.4 Structure and equipment for column-stabilised and self-elevating units ........................................................................ 148
  2.5 Machinery and safety systems for ship-shaped units or installations ........................................................................ 149
  2.6 Machinery and safety systems for column-stabilised and self-elevating units or installations ................................................................. 149
3 Machinery continuous ............................................................... 150
  3.1 General ............................................................................. 150
  3.2 Annual survey .................................................................... 150
  3.3 Renewal survey ................................................................. 150
4 Machinery planned maintenance system ................................... 150
  4.1 General ............................................................................. 150
5 Machinery condition monitoring .................................................. 153
  5.1 General ............................................................................. 153
  5.2 Approval of CM programme ............................................... 153
  5.3 Implementation survey ....................................................... 154
  5.4 Annual survey .................................................................... 154
  5.5 Renewal survey ................................................................. 154
6 PMS RCM ................................................................................... 154
  6.1 General ............................................................................. 154
CHAPTER 1 PRINCIPLES AND PROCEDURES FOR CLASSIFICATION

SECTION 1 INTRODUCTION

1 General

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

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

1.3 Objects covered
These Rules cover classification of floating offshore objects for the following services:
— LNG/LPG production
— LNG/LPG storage and offloading
— LNG/LPG loading (buoy).

Although this document refers primarily to liquefied natural gas (LNG) and liquefied petroleum gas (LPG), the principles herein may also be used for other offshore gas installations such as those involving primarily compressed natural gas (CNG), and gas to liquid (GTL) products.

A floating offshore installation which processes hydrocarbons and refrigerates gas to produce LNG will be termed here an LNG FPSO (LNG floating production, storage and offloading unit). LNG FPSOs are also commonly termed FLNG. The installation may be fed gas directly from a gas well or a gas network or may process associated gas in conjunction with oil production. Such units may also produce, store and offload quantities of LPG and condensate.

A floating offshore installation which processes hydrocarbons and refrigerates gas to produce LPG will be termed here an LPG FPSO (LPG floating production, storage and offloading unit). The installation may be fed gas directly from a gas well or a gas network or may process associated gas in conjunction with oil production. Such units may also produce, store and offload quantities of condensate.

An offshore installation which receives and regasifies LNG is termed an FSRU (floating storage and regasification unit). The storage and hull may generally follow the requirements to a storage unit described in Ch.2 Sec.4. The regasification plant and safety systems may follow the requirements in DNV Rules for ships Pt.6 Ch.30 on regasification vessels. FSRUs which follow a ship class regime may refer to DNV Rules for Ships Pt.5 Ch.5 and Pt.6 Ch.30.

Note: This document addresses floating steel structures. Concrete structures, both floating and bottom fixed have also been proposed for offshore gas applications. For such designs reference is also made to DNV Offshore Standard DNV-OS-C503 Concrete LNG Terminal Structures and Containment Systems. Where such units are classified, the principles in this document may be applied.
# 2 Definitions

## 2.1 Verbal forms

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

## 2.2 Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>approval or approved</td>
<td>denotes acceptance by DNV GL of documentation showing design solutions, arrangements and equipment that complies with the rules</td>
</tr>
<tr>
<td>assessment</td>
<td>an act of assessing, appraising or evaluating a condition of a product, process or system</td>
</tr>
<tr>
<td>assigning class</td>
<td>originally signified designation of one of several classes to a unit based on its condition, ranging from good to bad. Today only the highest class is assigned, comprising the main class 1A for mobile offshore units and OI for permanently placed installations, together with an obligatory additional class notation, e.g. LNG Production Unit, where applicable. Voluntary additional class notations may also be assigned covering special service, equipment or systems, e.g. PROD(LNG) denoting a classed LNG production plant.</td>
</tr>
<tr>
<td>builder</td>
<td>signifies the party contracted to build a vessel in compliance with the Society’s rules</td>
</tr>
<tr>
<td>certificate</td>
<td>a document confirming compliance with the Society’s rules or with other rules and regulations for which the Society has been authorized to act</td>
</tr>
<tr>
<td>certification</td>
<td>a service confirming compliance with applicable requirements on the date that the survey was completed</td>
</tr>
<tr>
<td>certification of materials and components (CMC)</td>
<td>the activity of ensuring that materials, components and systems used in vessels to be classed by the Society comply with the rule requirements. Depending on the categorisation, certification may include both plan approval and survey during production and/or of the final product.</td>
</tr>
<tr>
<td>class</td>
<td>class is assigned to and will be retained by vessels complying with applicable requirements of the Society’s rules</td>
</tr>
<tr>
<td>classification</td>
<td>a service which comprises the development of independent technical standards for vessels - class rules and standards, and to verify compliance with the rules and standards throughout the vessels’ life</td>
</tr>
<tr>
<td>close-up examination</td>
<td>an examination where the details of structural components are within the close visual inspection range of the surveyor, i.e. preferably within reach of hand</td>
</tr>
<tr>
<td>coating conditions</td>
<td>— &quot;GOOD&quot;: Condition with only minor spot rusting. — &quot;FAIR&quot;: 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. — &quot;POOR&quot;: Condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.</td>
</tr>
<tr>
<td>commissioning</td>
<td>a process of assuring that components, equipment and the systems are functioning in accordance with the functional requirements</td>
</tr>
<tr>
<td>concurrent surveys</td>
<td>surveys required to be concurrently completed shall have the same date of completion A survey required to be carried out in conjunction with or carried out as part of another survey shall be completed on or before the completion of the other survey, however, within the time window for that survey.</td>
</tr>
<tr>
<td>condition of class (CC)</td>
<td>constitutes a requirement that specific measures, repairs or surveys shall be carried out within a specific time limit in order to retain class</td>
</tr>
</tbody>
</table>
### Table 2 Definitions (Continued)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>condition on behalf of the flag administration (CA)</td>
<td>constitutes specific measures, repairs or surveys that shall be carried out within a specific time limit in order to retain the statutory certificate. A CA will be issued only when the Society has been authorised to carry out statutory surveys on behalf of the flag administration.</td>
</tr>
<tr>
<td>contract</td>
<td>the specific agreement between DNV GL and the customer. It defines the extent of services requested by the customer, and is concerned with: — the classification of vessels or installations, both new buildings and in operation — statutory work carried out on behalf of national maritime authorities — equipment and materials.</td>
</tr>
<tr>
<td>critical structural areas</td>
<td>areas that have been identified from calculations to require monitoring or from the service history of the subject vessel or from similar or sister vessels to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the vessel.</td>
</tr>
<tr>
<td>customer</td>
<td>signifies the party who has requested the Society’s service</td>
</tr>
<tr>
<td>designer</td>
<td>signifies a party who creates documentation submitted to the Society for approval or information</td>
</tr>
<tr>
<td>emergency towing</td>
<td>towing related to an emergency situation normally caused by failure of the units own propulsion (compare with normal towing as defined in (normal) towing)</td>
</tr>
<tr>
<td>exceptional circumstances</td>
<td>means unavailability of dry-docking facilities; unavailability of repair facilities; unavailability of essential materials, equipment or spare parts; or delays incurred by action taken to avoid severe weather conditions</td>
</tr>
<tr>
<td>flag administration</td>
<td>the maritime administration of a vessel’s country of registry</td>
</tr>
<tr>
<td>floating offshore installation</td>
<td>a buoyant construction engaged in offshore operations including drilling, production, storage or support functions, and which is designed and built for installation at a particular offshore location</td>
</tr>
<tr>
<td>guidance note</td>
<td>contain advice which is not mandatory for the assignment or retention of class, but with which the Society, in light of general experience, advises compliance</td>
</tr>
<tr>
<td>IACS member society</td>
<td>a classification society being a member of IACS</td>
</tr>
<tr>
<td>independent tank</td>
<td>self-supporting tank which does not form part of the vessel’s hull and does not contribute to the hull strength. <em>Independent gravity tank</em> is a tank with design vapour pressure not exceeding 0.7 bar. <em>Pressure vessel</em> is a tank with design gas or vapour pressure exceeding 0.7 bar.</td>
</tr>
<tr>
<td>interpretation</td>
<td>norms for fulfilling the associated principle requirements as defined by other regulatory bodies on matters which are left to the satisfaction of the flag administration or are vaguely worded. These do not preclude the use of other alternative solutions but these shall be documented and approved for compliance to the principal requirement equivalent to the original interpretation.</td>
</tr>
<tr>
<td>lay-up</td>
<td>a terminology used for vessels that are out of commission. In this state the offshore vessel may be at anchorage or permanently moored in a safe harbour.</td>
</tr>
<tr>
<td>LRFD methodology</td>
<td>load and resistance factor design methodology</td>
</tr>
<tr>
<td>manufacturer</td>
<td>signifies the entity that manufactures the material or product, or carries out part production that determines the quality of the material or product, or does the final assembly of the product</td>
</tr>
<tr>
<td>mechanical completion (MC)</td>
<td>verification that the components, equipment and the systems are constructed, installed and tested in accordance with applicable drawings and specifications and are ready for testing and commissioning in a safe manner</td>
</tr>
<tr>
<td>memorandum to owner (MO)</td>
<td>constitutes information related to the ship, its machinery and equipment or to rule requirements. A MO will be issued in relation to information that does not require any corrective action or survey.</td>
</tr>
<tr>
<td>mobile offshore unit (MOU)</td>
<td>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</td>
</tr>
</tbody>
</table>
Table 2 Definitions (Continued)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>offshore installation</td>
<td>a buoyant or non-buoyant construction engaged in offshore operations including drilling, production, storage or support functions, and which is designed and intended for use at a location for an extended period</td>
</tr>
<tr>
<td>overall examination</td>
<td>an examination intended to report on the overall condition of the structure</td>
</tr>
<tr>
<td>owner</td>
<td>signifies the registered owner or manager of the vessel or any other organization or person who has assumed the responsibility for operation of the vessel and who on assuming such responsibility has agreed to take over all the duties and responsibilities</td>
</tr>
<tr>
<td>position mooring</td>
<td>anchoring system for position keeping at the unit’s working location</td>
</tr>
<tr>
<td>plan approval</td>
<td>signifies a systematic and independent examination of drawings, design documents or records in order to verify compliance with the rules or statutory requirements Plan approval will be carried out at the discretion of the Society, which also decides the extent and method of examination.</td>
</tr>
<tr>
<td>plan approval staff</td>
<td>personnel authorized to carry out plan approval and to conclude whether or not compliance has been met</td>
</tr>
<tr>
<td>prompt and thorough repair</td>
<td>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</td>
</tr>
<tr>
<td>quality audit</td>
<td>a systematic and independent examination to determine whether established work processes and quality systems are adhered to</td>
</tr>
<tr>
<td>quality system</td>
<td>signifies both the quality management system and established production and control procedures</td>
</tr>
<tr>
<td>quality survey plan (QSP)</td>
<td>a plan that systematically identifies activities related to the classification project (e.g., construction, installation, testing, mechanical completion, pre-commissioning, testing and commissioning) and the extent of involvement each party (i.e., Yard's QC, Yards' QA, DNV GL and Owners [if desired]) will undertake Such a plan needs to be submitted to the Society for approval prior to commencement of classification projects.</td>
</tr>
<tr>
<td>recognised classification society</td>
<td>a classification society which is a full or associate member of IACS</td>
</tr>
<tr>
<td>reliability</td>
<td>the ability of a component or a system to perform its required function under given conditions for a given time interval</td>
</tr>
<tr>
<td>representative tanks</td>
<td>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.</td>
</tr>
<tr>
<td>retroactive requirement (RR)</td>
<td>constitutes a class or statutory requirement that will enter into force for certain vessel’s in operation and under construction at a given date or an upcoming survey The RR will specify the required actions to be taken in order to retain class or statutory certification. RR related to statutory certification will be issued only if the Society has been authorised to carry out statutory certification on behalf of the flag administration.</td>
</tr>
<tr>
<td>review</td>
<td>signifies a systematic examination of drawings, design documents or records in order to evaluate their ability to meet requirements, to identify any problems and to pro-pose necessary actions</td>
</tr>
<tr>
<td>rope access personnel</td>
<td>specialized trained personnel who use climbing techniques to reach places not reachable by other workers</td>
</tr>
<tr>
<td>the rules</td>
<td>all rule requirements accepted by the appropriate approval body as basis for classification</td>
</tr>
<tr>
<td>sighting survey</td>
<td>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</td>
</tr>
<tr>
<td>significant repair</td>
<td>a repair where machinery is completely dismantled and re-assembled Significant repairs will, furthermore, be cases of repairs after serious damage to machinery.</td>
</tr>
<tr>
<td>the Society</td>
<td>signifies DNV GL</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>safety systems</td>
<td>systems, including required utilities, which are provided to prevent, detect/warn of an accidental event/abnormal conditions and/or mitigate its effects</td>
</tr>
<tr>
<td></td>
<td><strong>Interpretation:</strong></td>
</tr>
<tr>
<td></td>
<td>1) The following should be considered as safety systems:</td>
</tr>
<tr>
<td></td>
<td>— ESD, including blowdown where relevant</td>
</tr>
<tr>
<td></td>
<td>— PSD</td>
</tr>
<tr>
<td></td>
<td>— Fire &amp; gas (F&amp;G) detection</td>
</tr>
<tr>
<td></td>
<td>— PA/GA</td>
</tr>
<tr>
<td></td>
<td>— Fire-fighting systems</td>
</tr>
<tr>
<td></td>
<td>— BOP incl. control system</td>
</tr>
<tr>
<td></td>
<td>— Safety systems for essential or important services</td>
</tr>
<tr>
<td></td>
<td>2) RuleSafety systems are normally considered as “on-demand” functions.</td>
</tr>
<tr>
<td></td>
<td><strong>---end of Interpretation---</strong></td>
</tr>
<tr>
<td>spaces</td>
<td>separate compartments including holds and tanks</td>
</tr>
<tr>
<td>statement of compliance</td>
<td>a document confirming compliance with specified requirements</td>
</tr>
<tr>
<td></td>
<td>Such documents may be issued by the Society in cases where it has not been authorised to certify compliance.</td>
</tr>
<tr>
<td>statutory certificates</td>
<td>IMO convention certificates issued on behalf of, or by, national authorities</td>
</tr>
<tr>
<td>statutory survey</td>
<td>survey carried out by or on behalf of a flag administration</td>
</tr>
<tr>
<td>substantial corrosion</td>
<td>extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75% of allowable margins, but within acceptable limits</td>
</tr>
<tr>
<td>survey</td>
<td>signifies a systematic and independent examination of a vessel, materials, components or systems in order to verify compliance with the rules and/or statutory requirements</td>
</tr>
<tr>
<td></td>
<td>Surveys will be carried out on the vessel, at the construction or repair site as well as at sub-suppliers and other locations at the discretion of the Society, which also decides the extent and method of control.</td>
</tr>
<tr>
<td>survey staff</td>
<td>personnel authorized to carry out surveys and to conclude whether or not compliance has been met</td>
</tr>
<tr>
<td>suspect areas</td>
<td>areas showing substantial corrosion and/or are considered by the surveyor to be prone to rapid wastage</td>
</tr>
<tr>
<td>temporary conditions</td>
<td>design conditions not covered by operating conditions, e.g. conditions during fabrication, mating and installation phases, dry transit phases</td>
</tr>
<tr>
<td>temporary equipment</td>
<td>equipment intended for use on installations and which is covered by class, requires hook-up to systems covered by class and/or is a significant deck load and/or may pose a risk for fire, explosion and escape routes</td>
</tr>
<tr>
<td>temporary mooring</td>
<td>anchoring in sheltered waters or harbours exposed to moderate environmental loads</td>
</tr>
<tr>
<td>tentative rules and standards</td>
<td>apply to new fields to which DNV GL reserves the right to make adjustments during a period in order to obtain the purpose intended</td>
</tr>
<tr>
<td>(normal) towing</td>
<td>drawing or pulling the unit by a chain or line using a tug boat</td>
</tr>
<tr>
<td></td>
<td>Normally towing is performed for units without any propulsion for (re-)location (compare with emergency towing as defined in emergency towing).</td>
</tr>
<tr>
<td>transit conditions</td>
<td>all wet vessel movements from one geographical location to another</td>
</tr>
<tr>
<td>transverse section</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>For transversely framed vessels, a transverse section includes adjacent frames and their end connections in way of transverse sections.</td>
</tr>
<tr>
<td></td>
<td><strong>Guidance note:</strong> Adverse frames include the frames located just forward and aft of the transverse section.</td>
</tr>
<tr>
<td></td>
<td><strong>---end---of---gu-i-d-a-n-c-e---n-o-t-e---</strong></td>
</tr>
</tbody>
</table>
3 Normative references

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

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

Table 3  DNV GL and DNV reference documents

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNVGL-OS-A101</td>
<td>Safety principles and arrangement</td>
</tr>
<tr>
<td>DNVGL-OS-B101</td>
<td>Metallic materials</td>
</tr>
<tr>
<td>DNVGL-OS-C101</td>
<td>Design of offshore steel structures, general</td>
</tr>
<tr>
<td>DNVGL-OS-C102</td>
<td>Structural design of offshore ships</td>
</tr>
<tr>
<td>DNVGL-OS-C103</td>
<td>Structural design of column-stabilised units (LRFD method)</td>
</tr>
<tr>
<td>DNVGL-OS-C104</td>
<td>Structural design of self-elevating units (LRFD method)</td>
</tr>
<tr>
<td>DNVGL-OS-C105</td>
<td>Structural design of TLPs (LRFD method)</td>
</tr>
<tr>
<td>DNVGL-OS-C106</td>
<td>Structural design of deep draught floating units (LRFD method)</td>
</tr>
<tr>
<td>DNVGL-OS-C201</td>
<td>Structural design of offshore units (WSD method)</td>
</tr>
<tr>
<td>DNVGL-OS-C301</td>
<td>Stability and watertight integrity</td>
</tr>
<tr>
<td>DNVGL-OS-C401</td>
<td>Fabrication and testing of offshore structures</td>
</tr>
<tr>
<td>DNVGL-OS-D101</td>
<td>Marine and machinery systems and equipment</td>
</tr>
<tr>
<td>DNVGL-OS-D201</td>
<td>Electrical installations</td>
</tr>
<tr>
<td>DNVGL-OS-D202</td>
<td>Automation, safety, and telecommunication systems</td>
</tr>
<tr>
<td>DNVGL-OS-D301</td>
<td>Fire protection</td>
</tr>
<tr>
<td>DNVGL-OS-E201</td>
<td>Hydrocarbon production plant</td>
</tr>
<tr>
<td>DNVGL-OS-E301</td>
<td>Position mooring</td>
</tr>
<tr>
<td>DNVGL-OS-E401</td>
<td>Helicopter decks</td>
</tr>
<tr>
<td>DNVGL-OS-E403</td>
<td>Offshore loading buoys.</td>
</tr>
<tr>
<td>DNV Rules for ships Pt.5 Ch.5</td>
<td>Liquefied Gas Carriers</td>
</tr>
<tr>
<td>DNV Rules for ships Pt.5 Ch.15</td>
<td>Compressed Natural Gas Carriers</td>
</tr>
</tbody>
</table>

Table 2 Definitions (Continued)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>verification</td>
<td>a service that signifies a confirmation through the provision of objective evidence (analysis, observation, measurement, test, records or other evidence) that specified requirements have been met</td>
</tr>
<tr>
<td>vertical contract audit</td>
<td>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.</td>
</tr>
<tr>
<td>vessel</td>
<td>in the context of these rules mean a mobile offshore unit (MOU)</td>
</tr>
<tr>
<td>witnessing</td>
<td>signifies attending tests or measurements where the surveyor verify compliance with agreed test or measurement procedures</td>
</tr>
<tr>
<td>WSD methodology</td>
<td>working stress design methodology</td>
</tr>
</tbody>
</table>
3.3 Other references

Other normative reference documents are listed in Table 4. See Sec.2 [1.2] for applicable editions.

Table 4 Non-DNV normative reference documents

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>API RP 2SK</td>
<td>Design and Analysis of Station keeping Systems for Floating Structures</td>
</tr>
<tr>
<td>IACS</td>
<td>Shipbuilding and Repair Quality Standard ref. <a href="http://www.iacs.org.uk">www.iacs.org.uk</a></td>
</tr>
</tbody>
</table>

4 Informative references

4.1 DNV GL and DNV publications

4.1.1 The publications in Table 5 are referenced in the text of this document, and may be used as a source of supplementary services and information.

4.1.2 See Sec.2 [1.2] for applicable editions.

Table 5 DNV GL and DNV informative references

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNV GL OTG-02</td>
<td>Offshore technical guidance – floating liquefied gas terminals</td>
</tr>
<tr>
<td>DNVGL-SI-0166</td>
<td>Verification for compliance with Norwegian Shelf Regulations</td>
</tr>
<tr>
<td>DNVGL-SI-0167</td>
<td>Verification for compliance with UK Shelf Regulations</td>
</tr>
<tr>
<td>DNVGL-SI-0003</td>
<td>Verification for compliance with United States regulations on the outer continental shelf</td>
</tr>
<tr>
<td>DNV Classification note 30.7</td>
<td>Fatigue Assessment of Ship Structures</td>
</tr>
<tr>
<td>DNV Classification note 72.1</td>
<td>Allowable Thickness Diminution for Hull Structures</td>
</tr>
<tr>
<td>DNV Classification note 30.3</td>
<td>Buckling Criteria of LNG Spherical Cargo Tank Containment Systems - Skirt and Sphere</td>
</tr>
<tr>
<td>DNV Classification note 30.9</td>
<td>Sloshing Analysis of LNG Membrane Tanks</td>
</tr>
<tr>
<td>DNV Classification note 31.9</td>
<td>Strength Analysis of Hull Structure in Liquefied Gas Carriers with Membrane Tanks</td>
</tr>
<tr>
<td>DNV Classification note 61.2</td>
<td>LNG Boil-off Re-Liquefaction Plants and Gas Combustion Units</td>
</tr>
<tr>
<td>DNV Standard for Certification 1.2</td>
<td>Type Approval</td>
</tr>
</tbody>
</table>

4.2 Other references

Other normative reference documents are listed in Table 6. See Sec.2 [1.2] for applicable editions.

Table 6 Other references

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

### 5.1 General

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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>In full</th>
</tr>
</thead>
<tbody>
<tr>
<td>API</td>
<td>American Petroleum Institute</td>
</tr>
<tr>
<td>BS</td>
<td>British Standard (issued by British Standard Institution)</td>
</tr>
<tr>
<td>CNG</td>
<td>compressed natural gas</td>
</tr>
<tr>
<td>DFF</td>
<td>design fatigue factors</td>
</tr>
<tr>
<td>DNV</td>
<td>Det Norske Veritas</td>
</tr>
<tr>
<td>DP</td>
<td>design pressure</td>
</tr>
<tr>
<td>DP</td>
<td>dynamic positioning</td>
</tr>
<tr>
<td>ESD</td>
<td>emergency shut down</td>
</tr>
<tr>
<td>FMECA</td>
<td>failure mode effect and consequence analysis</td>
</tr>
<tr>
<td>FUI</td>
<td>fatigue utilisation index</td>
</tr>
<tr>
<td>GTL</td>
<td>gas to liquid</td>
</tr>
<tr>
<td>HP</td>
<td>high pressure</td>
</tr>
<tr>
<td>IACS</td>
<td>The International Association of Classification Societies Unified rules, interpretations, guidelines and recommendations may be found on <a href="http://www.iacs.org.uk">www.iacs.org.uk</a>.</td>
</tr>
<tr>
<td>IC</td>
<td>inspection category</td>
</tr>
<tr>
<td>IGC</td>
<td>international gas carrier code</td>
</tr>
<tr>
<td>IIP</td>
<td>in service inspection program</td>
</tr>
<tr>
<td>IMO</td>
<td>The International Maritime Organization.</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organisation for Standardisation</td>
</tr>
<tr>
<td>LNG</td>
<td>liquefied natural gas</td>
</tr>
<tr>
<td>LPG</td>
<td>liquefied petroleum gas</td>
</tr>
<tr>
<td>LRFD</td>
<td>load and resistance factor design</td>
</tr>
<tr>
<td>MPI</td>
<td>magnetic particle inspection</td>
</tr>
<tr>
<td>NDT</td>
<td>non-destructive testing</td>
</tr>
<tr>
<td>OEM</td>
<td>original equipment manufacturer</td>
</tr>
<tr>
<td>OS</td>
<td>offshore standard</td>
</tr>
<tr>
<td>RBI</td>
<td>risk based inspection</td>
</tr>
<tr>
<td>RCM</td>
<td>reliability centred maintenance</td>
</tr>
<tr>
<td>RP</td>
<td>recommended practice</td>
</tr>
<tr>
<td>SCF</td>
<td>stress concentration factor</td>
</tr>
<tr>
<td>SWL</td>
<td>safe working load</td>
</tr>
<tr>
<td>UT</td>
<td>ultrasonic testing</td>
</tr>
<tr>
<td>WSD</td>
<td>working stress design</td>
</tr>
</tbody>
</table>
SECTION 2 CLASSIFICATION PRINCIPLES

1 The classification concept

1.1 Introduction

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

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

1.1.2 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.

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

1.2 Applicable rules

1.2.1 Rules and amendments accepted by the appropriate approval body will come into force when decided by the appropriate approval body. Unless stated otherwise, the coming into force date shall be six (6) months after the date of publication.

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

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

Subsequent amendments not made mandatory according to [1.2.4] may be applied to objects under construction provided both builder and owner agree to such application.

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

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

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

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

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

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

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

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

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

1.2.8 Exceptionally, if for some reason, it is impossible to comply with a rule requirement or to find a fully
equivalent solution, then other solutions may be accepted by DNV GL, provided the parties to the classification contract all agree and always provided that 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 GL. The solution shall be recorded in the “Appendix to the Classification Certificate”.

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

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

1.2.11 The Rules are an integral part of the Society’s classification service. The safety objectives inherent in the Rules are achieved in conjunction with this service.

Using the Rules without the corresponding classification services may have the result that safety objectives are not met.

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

1.3 Basis for assignment of class

1.3.1 Having assigned a specific class implies that DNV:

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

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

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

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

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

1.3.6 DNV GL 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.

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

1.4 Basis for maintenance of class

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

Valid statutory certificates

For flagged 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 equipment are maintained at a standard complying with the requirements of the Rules.

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

Handling of the 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.

1.5 Documentation

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

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

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

1.6 Disclosure of information

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

Guidance note: Table 1 indicates which parties will be entitled to various kinds of information.

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

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

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

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

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

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

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

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

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

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

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

1.8 Calibration of equipment

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

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

Any document issued by DNV GL 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.

2 Appeals

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

3 Statutory certification

3.1 General

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

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

3.1.2 It is assumed by the Society that required statutory surveys for ships classed by the Society will be carried out by the Society or by officers of the flag administration itself and that statutory certificates will be issued by the Society or by the flag administration with the exceptions mentioned in [3.1.3] to [3.1.6].

3.1.3 The Society assume the right to withdraw class if statutory certificates are not issued as above.

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

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

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

3.1.7 For a dually classed vessel, where the Society has not been authorised by the flag administration to issue statutory certificates, the Society may accept that such certificates are issued by the dual class society and provided the other class society is authorised by the flag administration.
3.2 Service suppliers

Where surveyors use the services of service suppliers in making decisions affecting statutory requirements, the suppliers shall be approved by either:

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

1  Scope of classification

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

1.2  Rule parts

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

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

1.3  Rule particulars
These Rules with reference standards give requirements in the following areas:

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

<table>
<thead>
<tr>
<th>Marine, machinery and utility installations and equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>System installations and equipment, including their related auxiliary functions, with respect to strength and performance as applicable to the following functions:</td>
</tr>
<tr>
<td>— power generation</td>
</tr>
<tr>
<td>— propulsion (as applicable)</td>
</tr>
<tr>
<td>— positioning keeping</td>
</tr>
<tr>
<td>— steering (as applicable)</td>
</tr>
<tr>
<td>— fire and gas protection, detection and fire extinguishing</td>
</tr>
<tr>
<td>— drainage and bilge pumping</td>
</tr>
<tr>
<td>— ballasting</td>
</tr>
<tr>
<td>— emergency shutdown (as applicable).</td>
</tr>
</tbody>
</table>

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.
2 Class notations

2.1 General
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).

2.2 Construction symbols

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

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

2.3 Main character of class

2.3.1 The notation 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 GL offshore standards referred to in the Rules.

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

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

2.4 Structural design notations

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

Table 1 Class notations related to structural design

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column-stabilised</td>
<td>A structure dependent on the buoyancy of widely spaced columns for floatation and stability in all modes of operation.</td>
<td>Ch.2 Sec.1 and Ch.2 Sec.2</td>
<td>Ch.3</td>
</tr>
<tr>
<td>Deep Draught</td>
<td>A floating structure having a relatively deep draught to obtain high heave eigenperiod avoiding resonance responses. The structure can have single or multi-vertical columns, with or without moonpools.</td>
<td></td>
<td>Ch.3</td>
</tr>
<tr>
<td>Self-elevating</td>
<td>A structure with hull of sufficient buoyancy for safe transport which is raised above sea surface on legs supported by the sea bed during operation.</td>
<td>Ch.2 Sec.1</td>
<td>Ch.3</td>
</tr>
<tr>
<td>Ship-shaped</td>
<td>Monohull ship and barge structures having displacement hulls with or without propulsion machinery.</td>
<td>Ch.2 Sec.1</td>
<td>Ch.3</td>
</tr>
</tbody>
</table>
Table 1 Class notations related to structural design (Continued)

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylindrical</td>
<td>A cylindrical shaped displacement hull with or without propulsion machinery.</td>
<td>Unit</td>
<td>Ch.2 Sec.1</td>
<td>Ch.3</td>
</tr>
<tr>
<td>Mobile Offshore</td>
<td>A structure not properly characterised by the above notations.</td>
<td>Unit</td>
<td>Ch.2 Sec.1</td>
<td>Ch.3</td>
</tr>
<tr>
<td>Floating Offshore</td>
<td>A structure not properly characterised by the above notations.</td>
<td>Unit</td>
<td>Ch.2 Sec.2</td>
<td>Ch.3</td>
</tr>
</tbody>
</table>

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

＊IA1 Mobile Offshore Unit

＊OI Floating Offshore Installation

may be used.

2.5 Service notations

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

2.5.2 Service notations currently in use are defined in Table 2.

Table 2 Class notations related to service

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

2.5.3 The service notations in shall be considered mandatory for the relevant types of units or installations.
2.6 Additional class; special equipment and systems notations

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 3.

Table 3 Class notations related to equipment and systems

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bow Loading</td>
<td></td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>BWM</td>
<td>Ballast Water Management</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>CLEAN/CLEAN DESIGN</td>
<td>Arrangements for controlling and limiting operational emissions and discharges</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>COMF</td>
<td>Confort class</td>
<td>Ch.2 Sec.6</td>
<td>N/A</td>
</tr>
<tr>
<td>CRANE</td>
<td>Onboard crane</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>DPS</td>
<td>Dynamic positioning system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>DYNPOS</td>
<td>Dynamic positioning system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>E0</td>
<td>Periodically unattended machinery space</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>ECO</td>
<td>Machinery centralised operated</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>ESV</td>
<td>Enhanced System Verification</td>
<td>Ch.2 Sec.6</td>
<td>N/A</td>
</tr>
<tr>
<td>F</td>
<td>Additional fire protection</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>FMS</td>
<td>Fatigue methodology for ship-shaped units</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>HELDK</td>
<td>Helicopter deck</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>HMON</td>
<td>Hull Monitoring System</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>ISDS</td>
<td>Integrated Software Dependent System</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>LCS</td>
<td>Loading computer system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>OPP-F</td>
<td>Oil pollution prevention – fuel systems</td>
<td>Ch.2 Sec.6</td>
<td>N/A</td>
</tr>
<tr>
<td>POSMOOR</td>
<td>Position mooring system</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>PROD</td>
<td>Production plant</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>Recyclable</td>
<td>Inventory of Hazardous Materials Part 1</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>REGAS</td>
<td>Regasification plants</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>SPM</td>
<td>Single Point Mooring</td>
<td>Ch.2 Sec.6</td>
<td>N/A</td>
</tr>
<tr>
<td>STL</td>
<td>Submerged Turret Loading</td>
<td>Ch.2 Sec.6</td>
<td>N/A</td>
</tr>
<tr>
<td>VCS</td>
<td>Vapour Control Systems</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
<tr>
<td>VIBR</td>
<td>Vibration level criteria for machinery, components, equipment and structure</td>
<td>Ch.2 Sec.6</td>
<td>Ch.3 Sec.6</td>
</tr>
</tbody>
</table>

2.7 Optional class notations related to cold climate operation

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

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

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

Table 4 Class notations related to cold climate

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAT</td>
<td>Design ambient air temperature for material selection suitable for regular service during winter to Arctic or Antarctic waters</td>
<td>Ch.2 Sec.6 [17]</td>
<td>NA</td>
</tr>
<tr>
<td>ICE</td>
<td>Structural strength for navigation in ice</td>
<td>Ch.2 Sec.6 [17]</td>
<td>N/A</td>
</tr>
<tr>
<td>PC</td>
<td>Polar Class – structural strength for navigation in ice-infested polar waters</td>
<td>Ch.2 Sec.6 [17]</td>
<td>NA</td>
</tr>
<tr>
<td>WINTERIZED</td>
<td>Systems designed for operation in cold climate</td>
<td>Ch.2 Sec.6 [17]</td>
<td>Ch.3 Sec.6 [13]</td>
</tr>
</tbody>
</table>
2.8 Special feature notations

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

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

### Table 5: Class notations related to special features

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Design requirements</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIS</td>
<td>Built for in-water survey</td>
<td>Ch.2 Sec.6 [21]</td>
<td>NA</td>
</tr>
<tr>
<td>INERT</td>
<td>Inert gas system</td>
<td>DNV Rules for ships Pt.5 Ch.3 Sec.11</td>
<td>NA</td>
</tr>
<tr>
<td>NON SELF-PROPELLED</td>
<td>Towing assistance will be required during transit</td>
<td>Ch.2 Sec.6 [21]</td>
<td>Ch.3 Sec.6 [16]</td>
</tr>
<tr>
<td>SELF-PROPELLED</td>
<td>Units with propulsion (applicable for self-elevating units only)</td>
<td>Ch.2 Sec.6 [21]</td>
<td>Ch.3 Sec.6 [16]</td>
</tr>
<tr>
<td>TMON</td>
<td>Tailshaft monitoring</td>
<td>Ch.2 Sec.6 [21]</td>
<td>Ch.3 Sec.6 [16]</td>
</tr>
</tbody>
</table>

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

2.9 Notations related to restrictions

2.9.1 Limitations of scope

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

Example:

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

2.9.2 Service restrictions

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

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

2.10 Area specific notations

2.10.1 Field specific design

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

**Guidance note:**

The notation is equally applicable to new builds and conversions.

Transits to the field should take into account the limitations of the applied design environmental loads.

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

2.10.2 Compliance with coastal state legislation

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

**PROD(N).**
2.10.3 Coastal state code notations currently in use, are listed in Table 6.

Table 6 Notations for coastal state verification

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

2.10.4 For further information on procedures and scope of verification for coastal state requirements, see DNV GL Statutory Interpretations for coastal state compliance services listed in Ch.1 Sec.1 Table 5.

2.11 Combination of notations

2.11.1 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 Ship Shaped LNG Production Unit

POSMOOR TMON.

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

1 Assignment of class - new vessels

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

1.2 Requirements for builder or designer

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

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

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

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

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

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

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

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

1.3 Applicable rules

1.3.1 The Rules that apply for assignment of class to a new unit are generally those in force at the date of "contract for construction". The term date of "contract for construction" shall be construed as follows:

1) The date of "contract for construction" of a unit is the date on which the contract to build the unit is signed between the prospective owner and the builder. This date and the construction numbers (i.e. hull numbers) of all the units included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.
2) The date of "contract for construction" of a series of units, including specified optional units for which
the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the builder.

Units built under a single contract for construction are considered a "series of units" if they are built to the same approved plans for classification purposes. However, units within a series may have design alterations from the original design provided:

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

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

3) If a contract for construction is later amended to include additional units or additional options, the date of "contract for construction" for such units is the date on which the amendment to the contract, is signed between the prospective owner and the builder. The amendment to the contract is to be considered as a "new contract" to which 1 and 2 above apply.

4) If a contract for construction is amended to change the unit type, the date of "contract for construction" of this modified unit, or units, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the builder. (IACS PR 29 Rev.4)

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

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

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

1.3.4 For a unit where the flag administration undertakes approval and surveys of items covered by the Rules, the Society may accept their decisions as basis for assigning class, provided the Society’s requirements for main class are complied with.

Necessary documentation, such as copies of approved plans, reports and other particulars approved by the flag administration shall be submitted.

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

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

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

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

In case of class being assigned on the basis of flag administration requirements according to [3.1.6] an Memorandum to Owner shall also be issued (see Sec.5 [2.3.7]).
1.4 Plan approval

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

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

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

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

1.5 Survey during construction

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

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

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

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

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

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

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

1.6 Installation of systems and equipment

1.6.1 Systems and equipment to be installed on newbuildings, which serves as a part of the main functions, shall in general be new.

Guidance note:
If second hand equipment complies with applicable Rules for the newbuilding, it may upon special consideration be installed on newbuildings, provided the owner has given a written acceptance.

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

1.7 Testing and commissioning

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

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

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

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

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

2 Assignment of class - existing vessels

2.1 General

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

2.2 Applicable rules

Applicable rules for units at class entry are given in [1.3].

2.3 Design approval

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

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

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

2.4 Class entry survey

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

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

3.1 General

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

3.1.2 Class may be assigned with Conditions of Class.

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

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

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

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

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

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

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

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

3.2 Late commissioning

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

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

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

4 The register of vessels

4.1 General

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

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

1 Conditions for retention of class

1.1 General requirements

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

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

1.1.3 The unit, its hull structure, machinery, systems and equipment shall be maintained at a standard complying with the requirements of the Rules.

1.1.4 Installed systems and equipment carried onboard in excess of the minimum required for main class shall either be maintained to applicable standards, or be removed or disconnected in such a way as to ensure that the installed system or equipment cannot be used. Installed diving systems are subject to special provisions as given in DNV Rules for ships Pt.6 Ch.1 Sec.4 and Pt.7 Ch.1 Sec.6(9). These provisions include transferable diving systems installed temporarily.

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

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

1.2 The customer's obligations

1.2.1 In order to retain a unit's class with the Society, the customer shall:

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

1.2.2 If the hull structure, machinery, systems or equipment covered by classification sustain damage to such an extent that it may be presumed to lead to a CC, the Society shall immediately be informed. The unit shall be surveyed at first opportunity or according to instructions from the Society. The survey shall be of an extent considered necessary by the attending surveyor for ascertaining the extent of the damage.
1.2.3 In case inspections by port or flag authorities reveal deficiencies related to certificates issued by DNV, the customer shall immediately notify the Society.

1.3 Maintenance

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

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

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

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

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

2 Classification society involvement

2.1 Applicable rules

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

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

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

2.1.4 Amendments to the rules may be made retroactive.

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

2.2 Surveys

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

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

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

2.3 Conditions and memoranda

2.3.1 A condition of class (CC) will be imposed for the following:

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

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

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

2.3.3 A CC may contain the following:
— a description of the deficiency, defect, damage or the examination required
— required action
— due date for the required action to be completed
— possible temporary requirements imposed until the required action has been completed.

Alternatively the CC may refer to a survey report for above details. An approved repair method may be recommended as part of the required action.

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

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

2.3.6 For information related to the unit, its machinery and equipment or to rule requirements, the Society may issue a memorandum to owner (MO). An MO may supplement information given otherwise, e.g. in the Appendix to the class certificate or the Society’s "Register of Vessels".

2.3.7 An MO may be used in the following cases:
— exemptions from rule requirements
— accepted deviations from rule requirements
— limitations on the use of the unit or its equipment
— defects or deficiencies of no concern to class
— deleted class notations
— equipment in excess of class requirements disused
— information related to agreed survey arrangements.

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

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

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

2.3.11 The owner will be informed of Retroactive Requirements.

2.4 Survey reports and survey status

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

2.4.2 Survey reports may contain the following information, to the extent applicable in each case:
— types of surveys carried out
— certificates issued, endorsed or extended
— damage, defects and/or deficiencies observed
— confirmation that repairs have been completed and accepted by the surveyor
— CC issued or deleted
— MO issued or deleted
— Retroactive Requirements (RR) issued or deleted.

2.4.3 The Society will make class status reports available to customers on the Society’s Internet website. It is the customer’s responsibility to obtain this information from the Society’s Internet website. Survey and certificate status reports, on paper, may be distributed upon request.

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

2.5 Damage and repairs

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

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

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

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

2.6 Conversions and alterations

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

2.6.2 When conversion or alteration involves modification which:
— substantially alters the dimensions or carrying capacity of the unit (e.g. ≥ 5% change in the unit’s displacement), or
— changes the type of unit, or
— changes the main class of the unit,
the Society will decide on the Rules to be applied.

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

Guidance note:
Alterations to the hull structure, machinery, systems and equipment made possible by amendments of the applicable Rules may be undertaken provided the general safety and reliability level required for retention of class will be maintained.

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

2.7 Temporary equipment

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

2.7.2 Temporary equipment covered by class scope shall be approved and certified ilw [1.1.5]
2.7.3 For temporary equipment outside class scope, it shall be confirmed that placement of this equipment on board does not negatively affect the safety of the unit.

**Guidance note:**
For the consideration, the following is typically to be considered:

- escape ways shall not been blocked
- the fire and gas system covers the temporary equipment
- the equipment is covered by the ESD logic
- the equipment’s load is within deck load limits
- the definition of hazardous areas takes into account the temp. equipment
- the interface to other systems covered by main class does not negatively affect their availability.

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3 Endorsement and renewal of the class certificate

3.1 Endorsement of the class certificate

3.1.1 The class certificate will be endorsed upon satisfactory completion of annual, intermediate and renewal surveys for main class. The class certificate will not be endorsed unless the following has been dealt with and accepted by the Society:

- overdue periodical class surveys
- overdue continuous survey items
- overdue Conditions of Class
- overdue Retroactive Requirement.

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

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

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

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

**Guidance note:**
Expiry date of the class certificate may remain unchanged, but additional surveys may be required so that the prescribed survey intervals are not exceeded.

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3.2 Renewal of the class certificate

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

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

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

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

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

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

4 Suspension and withdrawal of class

4.1 General

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

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

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

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

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

4.1.5 When class is suspended or withdrawn the Society will:

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

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

4.2 Suspension of class

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

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

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

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

4.2.5 In addition to the conditions laid down in [4.2.1], [4.2.2] and [4.2.3], a vessel’s class may be suspended with immediate effect in cases where:
— repair of deficiencies has not been carried out or otherwise dealt with in an appropriate manner, or
— repair of deficiencies has not been surveyed and accepted by the surveyor,
— other requirements imposed by the Society.

4.2.6 Class will not be automatically suspended according to [4.2.1] or [4.2.2] whilst a vessel is laid up, provided the requirements in Ch.3 Sec.1 [2.3] for lay-up surveys are complied with.

4.2.7 If a ship has been detained as a result of port state inspections twice in a two year period and the deficiencies are found to be serious, the Society may decide to suspend or delete class.

4.3 Reinstatement following class suspension

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

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

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

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

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

4.4 Withdrawal of class

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

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

4.4.3 When a vessel 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.

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

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

4.4.6 If the outstanding debt owed to the Society is not paid within a notified date, the Society may withdraw the vessel’s class with one month’s written notice. This also applies when the obligation to pay rests with a yard or with the vessel’s previous owners. In special cases a shorter notice may be given.

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

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

4.5 Re-assignment of class following class withdrawal

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

4.5.2 The Society reserves the right to decline an application for re-assignment of class.
4.5.3 A new class certificate will be issued when the survey has been satisfactory completed and the Society is satisfied that the requirements for retention of class have been met.

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

5 Change of owner or manager

5.1 General

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

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

6 Force majeure

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

1  General

1.1  General

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

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

1.2  Requirements for manufacturer

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

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

2  The classification involvement

2.1  General

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

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

2)  DNV GL type approval certificate (TA):
    A document validated and signed by a surveyor of the Society stating:
    — conformity with rule design requirements.

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

  Guidance note:
  These certificates are normally mutually accepted by all EU RO’s.
  Covers only agreed components. These are at any time listed in the overview of Type Approval for Mutual Recognition on the DNV GL Internet.

4)  Works certificate (W)
    A document signed by the manufacturer stating:
— conformity with rule requirements
— that tests are carried out on the certified product itself
— that tests are made on samples taken from the certified product itself
— that tests are witnessed and signed by a qualified department of the manufacturers.

5) Test Report (TR)
A document signed by the manufacturer stating:
— conformity with rule requirements
— that tests are carried out on samples from the current production.

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

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

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

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

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

2.2 Plan approval

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

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

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

2.3 Type approval

2.3.1 Type approval is a procedure for plan approval. Type approval can be applied to:
— products
— groups of products
— systems
— retention survey.

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

2.3.2 The type approval procedure may consist of the following elements:
— plan approval
— initial survey
— type testing
— issue of a type approval certificate.

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

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

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

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

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

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

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

2.4 Survey

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

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

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

2.5 Manufacturing survey arrangement

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

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

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

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

2.5.5 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 certificate no longer is valid.
3 Suspension and withdrawal of certificates

3.1 General

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

3.1.2 The decision to suspend or withdraw a certificate is made by the Society.

Suspension or withdrawal of a certificate may take effect immediately or after a specified period of time. In special cases, the withdrawal of a certificate may be made with retroactive effect.

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

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

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

1 Liability and jurisdiction

1.1 Limited liability

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

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

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

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

1.2 Use by other parties

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

1.3 Governing law

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

1.4 Venue

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

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

1 General

1.1 Introduction

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

1.1.2 The following discipline areas are covered within main class:

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

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

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

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

1.1.4 The requirements of this section are given as:

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

1.2 Technical reference documents

1.2.1 Technical requirements are given by reference to selected:

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

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

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

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

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

2 Safety principles and arrangement

2.1 General
Safety principles and arrangement include the following discipline areas:

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

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

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

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

3 Materials

3.1 Technical requirements
Materials for:

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

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

3.2 Supplementary classification requirements

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

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

4.1 Scope

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

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

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

4.1.2 Excluded from the scope are

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

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

4.2 Technical requirements

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

Table 1 Overview of structural design requirements and methods

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

5 Fabrication and testing of offshore structures

5.1 Technical requirements

Requirements for:

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

shall be in accordance with DNVGL-OS-C401.

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

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

5.2 Supplementary classification requirements

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

6.1 Technical requirements

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

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

7 Position keeping and towing

7.1 General

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

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

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

7.2 Position keeping

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

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

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

7.3 Temporary mooring

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

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

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

7.4 Towing

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

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

7.5 Supplementary classification requirements

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

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

8 Marine and machinery systems and equipment

8.1 Technical requirements

8.1.1 Requirements for marine and machinery systems and equipment include:

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

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

8.2 Supplementary classification requirements

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

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

9 Electrical systems and equipment

9.1 Technical requirements

Electrical systems and equipment include:

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

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

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

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

10 Automation, safety and telecommunication systems

10.1 Technical requirements
Instrumentation and telecommunication systems and equipment include:

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

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

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

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

11 Fire protection

11.1 Technical requirements
Fire protection includes:

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

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

11.2 Supplementary classification requirements

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

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

12 Preparation for surveys and inspections on location

12.1 General

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

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

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

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

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

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

Markings should be adequately documented.

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

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

13 Summary of technical reference standards

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

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

<table>
<thead>
<tr>
<th>Technical item</th>
<th>Reference standard</th>
<th>Applicable parts or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY PRINCIPLES AND ARRANGEMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design principles</td>
<td>DNVGL-OS-A101</td>
<td>Ch.2 Sec.1: Design Principles and Accidental loads</td>
</tr>
<tr>
<td>Arrangement</td>
<td></td>
<td>Ch.2 Sec.2: Arrangement</td>
</tr>
<tr>
<td>Escape and evacuation</td>
<td></td>
<td>Ch.2 Sec.5: Escape and Communication</td>
</tr>
<tr>
<td>MATERIALS</td>
<td>DNVGL-OS-B101</td>
<td></td>
</tr>
<tr>
<td>STRUCTURAL DESIGN (select type as appropriate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship-shape structure</td>
<td>DNVGL-OS-C102</td>
<td>LRFD and WSD methodology</td>
</tr>
<tr>
<td>Column-stabilised type structure</td>
<td>DNVGL-OS-C103</td>
<td>LRFD methodology</td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C201</td>
<td>WSD methodology</td>
</tr>
<tr>
<td>Self-elevating type structure</td>
<td>DNVGL-OS-C104</td>
<td>LRFD methodology</td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C201</td>
<td>WSD methodology</td>
</tr>
</tbody>
</table>
### Table 2  Technical reference standards for main character of class (1A MOU)  (Continued)

<table>
<thead>
<tr>
<th>Technical item</th>
<th>Reference standard</th>
<th>Applicable parts or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HULL FABRICATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabrication, including welding and NDT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
  DNV Rules for Ships Pt.2 Ch.3 Sec.7 | For ship-shaped units                          |
  
  DNVGL-OS-C401                                      | For self-elevating and semi-submersible units |
| **STABILITY AND WATERTIGHT INTEGRITY**              |                                      |                                                  |
| Stability, watertight integrity, freeboard and weathertight closing appliances | DNVGL-OS-C301                          | Covers all types of structures                  |
| **POSITION KEEPING AND TOWING**                     |                                      |                                                  |
| Temporary mooring, towing                          |  
  DNV Rules for ships Pt.3 Ch.3 Sec.3 | Ship-shaped units                              |
  
  DNVGL-OS-E301                                      | All other types of units               |
| **MARINE AND MACHINERY SYSTEMS AND EQUIPMENT**      |                                      |                                                  |
| Piping design, manufacturing and testing; platform piping systems; machinery piping systems; machinery and mechanical equipment | DNVGL-OS-D101                  | All sections                                    |
| **ELECTRICAL SYSTEM EQUIPMENT**                     |                                      |                                                  |
| Electrical systems including switchgear and controlgear assemblies, rotating machinery, static convertors, cables, installation, testing, and electric propulsion | DNVGL-OS-D201                  | All sections                                    |
| **AUTOMATION, SAFETY AND TELECOMMUNICATION SYSTEMS**|                                      |                                                  |
| Instrumentation systems including design principles, system design, computer based systems, component design and installation, and user interface | DNVGL-OS-D202                  | Ch.2:  
  Sec. 1: Design principles  
  Sec. 2: System design  
  Sec. 3: Additional requirements for computer based systems  
  Sec. 4: Component design and installation  
  Sec. 5: User Interface |
| **FIRE PROTECTION**                                 |                                      |                                                  |
| Fire protection including passive fire protection, active fire protection, fire fighting systems, fire and gas detection systems | DNVGL-OS-D301                  | Ch.2:  
  Sec.1: Passive Fire Protection  
  Sec.2: Active Fire Protection of Specific Areas  
  Sec.3: Fire Fighting Systems  
  Sec.4: Fire and Gas Detection Systems  
  Sec.5: Miscellaneous Items |
SECTION 2 DESIGN AND CONSTRUCTION REQUIREMENTS FOR OI FLOATING OFFSHORE INSTALLATION MAIN CLASS

1 General

1.1 Introduction

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

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

1.1.3 The following discipline areas are covered within main class:
- safety principles and arrangement
- materials
- hull design and construction
- mooring
- stability, watertight and weathertight integrity
- utility systems and equipment related to marine and safety functions
- electrical systems and equipment related to marine and safety functions
- instrumentation and telecommunication systems related to marine and safety functions
- fire protection.

1.1.4 Systems and structures will be certified or classified based on the following main activities:
- design approval
- certification of materials and components
- survey during construction and installation
- survey during commissioning and start-up.

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

1.1.5 The requirements of this section are given as:
- references to standards, codes and rules containing technical requirements which shall be complied with for assignment of main class
- supplementary requirements which shall be applied in conjunction with the technical reference documents for assignment of class
- requirements for certification of materials and components.

1.2 Technical reference documents

1.2.1 Technical requirements are given by reference to selected:
- DNV GL offshore standards
- DNV GL class guidelines
- DNV GL recommended practices
- other DNV GL rules and standards
- internationally recognised codes and standards.

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

1.2.3 If the customer for specific reasons should desire to employ codes and standards other than those
1.3 General assumptions

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

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

1.4 Certification of materials and components

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

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

2 Safety principles and arrangement

2.1 General

Safety principles and arrangement include the following discipline areas:

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

2.2 Design principles

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

2.3 Arrangement

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

2.4 Escape and evacuation

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

3 Materials

3.1 Technical requirements

Materials for:

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

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

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

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

4 Structural design

4.1 Scope

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

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

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

4.1.2 Excluded from the scope are:

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

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

4.2 Technical requirements

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

Table 1 Overview of structural design requirements and methods

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

5 Fabrication and testing of offshore structures

5.1 Technical requirements

Requirements for:

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

shall be in accordance with DNVGL-OS-C401.
5.2 Supplementary classification requirements

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

6 Stability and watertight integrity

6.1 Technical requirements

6.1.1 Requirements for:
— intact and damaged stability
— watertight integrity
— freeboard
— weathertight closing appliances

shall be in accordance with DNVGL-OS-C301.

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

7 Position keeping and towing

7.1 General

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

7.2 Supplementary classification requirements

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

8 Utility systems and equipment

8.1 Technical requirements

Requirements for utility systems and equipment include:
— general piping design, fabrication and testing
— pumps, valves and pipe connections
— ballast, bilge and drainage systems
— air, overflow and sounding pipes
— hydraulic, steam and pneumatic systems
— heating, ventilation and air conditioning systems
— pressure vessels and incinerators
— turret machinery, as applicable

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

Guidance note:

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

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

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

9 Electrical systems and equipment

9.1 Technical requirements

9.1.1 Electrical systems and equipment include:

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

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

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

9.2 Supplementary classification requirements

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

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

10 Automation, safety and telecommunication systems

10.1 Technical requirements

Instrumentation and telecommunication systems and equipment include:

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

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

10.2 Supplementary classification requirements

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

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

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

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

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

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

13 Summary of technical reference standards

13.1 General
13.1.1 Technical standards which shall be applied for assignment of main character of class for floating offshore installations are summarised in Table 2.

Table 2 Technical reference standards for OI main class (floating offshore installation)

<table>
<thead>
<tr>
<th>Technical item</th>
<th>Reference standard</th>
<th>Applicable parts or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY PRINCIPLES AND ARRANGEMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design principles</td>
<td>DNVGL-OS-A101</td>
<td>Ch.2 Sec.1: Design Principles and Accidental loads</td>
</tr>
<tr>
<td>Arrangement</td>
<td></td>
<td>Ch.2 Sec.3: Arrangement</td>
</tr>
<tr>
<td>Escape and evacuation</td>
<td></td>
<td>Ch.2 Sec.5: Escape and Evacuation</td>
</tr>
<tr>
<td>METALLIC MATERIALS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metallic materials</td>
<td>DNVGL-OS-B101</td>
<td></td>
</tr>
<tr>
<td>STRUCTURAL DESIGN (select type as appropriate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship-shape structure</td>
<td>DNVGL-OS-C101</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C102</td>
<td></td>
</tr>
<tr>
<td>Column-stabilised type structure</td>
<td>DNVGL-OS-C101</td>
<td>LRFD methodology</td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C103</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C201</td>
<td>WSD methodology</td>
</tr>
<tr>
<td>Self-elevating type structure</td>
<td>DNVGL-OS-C101</td>
<td>LRFD methodology</td>
</tr>
<tr>
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<td>DNVGL-OS-C104</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C201</td>
<td>WSD methodology</td>
</tr>
<tr>
<td>HULL FABRICATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabrication, including welding and NDT</td>
<td>DNV Rules for Ships</td>
<td>For ship-shaped units</td>
</tr>
<tr>
<td></td>
<td>Pt.2 Ch.3 Sec.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DNVGL-OS-C401</td>
<td>For self-elevating and semi-submersible units</td>
</tr>
<tr>
<td>STABILITY AND WATERTIGHT INTEGRITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stability, watertight integrity, freeboard and</td>
<td>DNVGL-OS-C301</td>
<td>Covers all types of structures</td>
</tr>
<tr>
<td>weather-tight closing appliances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical item</td>
<td>Reference standard</td>
<td>Applicable parts or comments</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------</td>
</tr>
<tr>
<td>POSITION KEEPING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offshore mooring system</td>
<td>DNVGL-OS-E301 or API RP 2SK</td>
<td>Ship-shaped, column-stabilised and deep-draught units or installations</td>
</tr>
<tr>
<td>ELECTRICAL SYSTEM EQUIPMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical systems including switchgear and controlgear assemblies, rotating machinery, static convertors, cables, installation, testing, and electric propulsion</td>
<td>DNVGL-OS-D201</td>
<td>All sections</td>
</tr>
<tr>
<td>AUTOMATION, SAFETY AND TELECOMMUNICATION SYSTEMS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Instrumentation systems including design principles, system design, computer based systems, component design and installation, and user interface | DNVGL-OS-D202                     | Ch.2: Design principles  
CH.2: System design  
Sec.3: Additional requirements for computer based systems  
Sec.4: Component design and installation  
Sec.5: User Interface                                                           |
| FIRE PROTECTION                                                               |                                   |                                                           |
| Fire protection including passive fire protection, active fire protection, fire fighting systems, fire and gas detection systems | DNVGL-OS-D301                     | Ch.2: 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 LNG (OR LPG) PRODUCTION UNIT OR INSTALLATION

1 General

1.1 Introduction

1.1.1 This section identifies design and construction requirements for assignment of service notation LNG Production Unit or LNG Production Installation. It also identifies design and construction requirements for assignment of service notation LPG Production Unit or LPG Production Installation.

1.1.2 The requirements in this section are supplementary to those for main class 1A1 as stated in Sec.1 for notation LNG (or LPG) Production Unit and OI in Sec.2 for notation LNG (or LPG) Production Installation.

2 Safety principles and arrangement

2.1 General
Service notation LNG (or LPG) Production Unit or LNG (or LPG) Production Installation specifies additional requirements for:

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

2.2 Arrangement
Production units or installations shall comply with DNVGL-OS-A101, Ch.2 Sec.7 and Sec. 9.

2.3 Area classification
Production units or installations shall comply with DNVGL-OS-A101, Ch.2 Sec.7 and Sec. 9.

2.4 Emergency shutdown
Production units or installations shall comply with DNVGL-OS-A101, Ch.2 Sec.9.

2.5 Escape, evacuation and communication
Production units or installations shall comply with DNVGL-OS-A101, Ch.2 Sec.7 and Sec. 9.

3 Structural design

3.1 General
Service notation LNG (or LPG) Production Unit or LNG (or LPG) Production Installation specifies additional requirements for:

— process area foundations
— riser balcony foundation, turret or submerged turret structures, as applicable.

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.
3.2 Supplementary technical requirements

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

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

4 Marine and machinery and utility systems

4.1 General

Service notation **LNG (or LPG) Production Unit** or **LNG (or LPG) Production Installation** specifies additional requirements for:

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

4.2 Supplementary technical requirements

4.2.1 The items listed in [4.1] shall comply with the relevant sections of DNVGL-OS-D101.

4.2.2 Piping systems in connection with LNG/LPG storage and distribution may be designed and constructed in accordance with DNV Rules for ships Pt.5 Ch.5, provided that the actual operational modes and any additional accidental loads are also taken into account.

Guidance note: Where Rules call for a stress analysis, such should consider the actual operation and motions of the unit. Design Accidental Loads (e.g. fire, explosion, dropped object) should be considered in the design where such is relevant for the overall safety.

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

5 Instrumentation and telecommunication systems

5.1 Supplementary technical requirements

Production units and installations shall comply with DNVGL-OS-D202, Ch.2 Sec7.

6 Fire protection

6.1 General

Service notations **LNG (or LPG) Production Unit** or **LNG (or LPG) Production Installation** specifies additional requirements for:

— passive fire protection
— fire water systems
— fire water distribution
— active fire protection of specific areas including LNG/LPG processing
— fire detection and alarm systems
— gas detection.

6.2 Supplementary technical requirements

Production units or installations shall comply with DNVGL-OS-D301, Ch.2 Sec.7 and Sec.9.
7 Position keeping

7.1 General

7.1.1 For production units of the ship-shaped, column-stabilised and deep draught types, the additional class notation **POSMOOR** is mandatory.

7.1.2 The design of the mooring system shall be in accordance with DNVGL-OS-E301, Ch.2. Alternatively the design may be based on compliance with API RP 2SK.

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

8 Industrial equipment

8.1 General

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

8.1.2 The items specified in [8.1.1] shall comply with relevant requirements given in DNVGL-OS-E201.

9 Hydrocarbon import and export

9.1 General

Service notation **LNG (or LPG) Production Unit** or **LNG (or LPG) Production Installation** specifies additional requirements for:

- Hydrocarbon import systems
- LNG-/LPG-/Condensate- export systems

9.2 Hydrocarbon import

The hydrocarbon import system shall comply with relevant parts of DNVGL-OS-A101 and DNVGL-OS-E201

9.3 Hydrocarbon Offloading

9.3.1 Systems for export of LNG/LPG are generally to comply with DNV Rules for ships Pt.5 Ch.5 Sec.6 and with DNVGL-OS-E201 Ch.2 Sec.11.

9.3.2 Systems for export of condensate are to comply with DNVGL-OS-E201 Ch.2 Sec.12 as for crude oil offloading systems.

9.3.3 Where the given references above refer to bow or stern loading, the general principles will be applicable to export/import arrangements located anywhere on the vessel.
SECTION 4 SUPPLEMENTARY REQUIREMENTS FOR SERVICE NOTATION LNG (OR LPG) STORAGE UNIT OR INSTALLATION

1 General

1.1 Introduction

1.1.1 This section identifies design and construction requirements for assignment of service notations LNG (or LPG) Storage Unit or LNG (or LPG) Storage Installation.

1.1.2 The requirements in this section are supplementary to those for main class 1A1 as stated in Sec.1 for notation LNG (or LPG) Storage Unit and OI in Sec.2 for notation LNG (or LPG) Storage Installation.

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

1.1.4 Units intended to act as offshore regasification units must in addition comply with the additional class notation REGAS and will be given the notation 1A1 (or OI) LNG Storage Unit/Installation REGAS.

2 Safety principles and arrangement

2.1 General
Service notations LNG (or LPG) Storage Unit and LNG (or LPG) Storage Installation specifies additional requirements for:

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

2.2 Arrangement
Storage units or installations shall comply with DNVGL-OS-A101, Ch.2 Sec.8 and Sec.9, applicable parts.

2.3 Area classification
Storage units or installations shall comply with DNVGL-OS-A101, Ch.2 Sec.9.

2.4 Emergency shutdown
Storage units or installations shall comply with DNVGL-OS-A101, Ch.2 Sec.9.

2.5 Escape, evacuation and communication
Storage units or installations shall comply with DNVGL-OS-A101, Ch.2 Sec.9.

3 Structural design

3.1 General
Service notations LNG/LPG Storage Unit or LNG/LPG Storage Installation specifies additional requirements for:

— riser balcony foundation, turret or submerged turret structures, as applicable
— LNG/LPG export/import system
— condensate import/export system
— containment system.
3.2 Supplementary technical requirements

3.2.1 The items listed in [3.1] shall comply with the relevant sections of DNVGL-OS-C101 and: DNVGL-OS-C102 for ship-shaped units.

3.2.2 Containment systems may in general be designed using the methodology described in DNV DNV Rules for ships Pt.5 Ch.5 Gas Carriers, provided the loading conditions and operational modes for an offshore application are taken into account.

Guidance note:
Aspects such as the actual site-specific environmental conditions, partial filling modes, project-specific accidental loads, provision for in-situ inspection for units not intending to drydock will need to be specially assessed.

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

3.2.3 A loading instrument suitable for the intended service shall be installed on ship-shaped storage units/installations.
The instrument shall be approved in accordance with requirements in DNV Rules for ships Pt.6 Ch.9.

3.2.4 Loading from any installed import/export system and shuttle tanker mooring and fendering loads are to be taken into account.

4 Marine and machinery or utility systems and equipment

4.1 General
Service notations LNG (or LPG) Storage Unit and LNG (or LPG) Storage Installation specifies additional requirements for:
— cargo transfer and loading
— cargo storing, segregation and treatment
— venting, inerting, gas freeing and vapour emission control
— ventilation in hazardous areas
— turret machinery.

4.2 Supplementary technical requirements

4.2.1 The items listed in [4.1] shall comply with the relevant sections of DNVGL-OS-D101.

4.2.2 For ship-shaped storage units/installations design and fabrication may be in accordance with DNV Rules for ships Pt.4 and Pt.5 Ch.5. Operational mode and maintenance philosophy should be accounted for in the design.

Guidance note:
Increased commercial consequence of failure compared to maritime applications and ability to inspect and repair offshore should be taken into account in the design.

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

5 Instrumentation and telecommunication systems

5.1 Supplementary technical requirements
Storage units or installations shall comply with DNVGL-OS-D202, Ch.2, Sec.8.

6 Fire protection

6.1 General
Service notations LNG (or LPG) Storage Unit or LNG (or LPG) Storage Installation specifies additional requirements for:
— passive fire protection
— fire water systems
— active fire protection of specific areas including those for treatment and storage of liquefied gas
— fire detection and alarm systems
— gas detection.

6.2 Supplementary technical requirements
Storage units shall comply with DNVGL-OS-D301, Ch.2 Sec.8.

7 Position keeping

7.1 General

7.1.1 For storage units of the ship-shaped, column-stabilised and deep draught types, the additional class notation POSMOOR is mandatory.

7.1.2 The design of the mooring system shall be in accordance with DNVGL-OS-E301, Ch.2. Alternatively the design may be based on compliance with API RP 2SK.

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

8 Export/import of LNG/LPG/condensate

8.1 General

8.1.1 Systems for export/import of LNG/LPG are generally to comply with DNV Rules for ships Pt.5 Ch.5 Sec.6 and with DNVGL-OS-E201 Ch.2 Sec.11.

8.1.2 Systems for import/export of condensate are to comply with DNVGL-OS-E201 Ch.2 Sec.12 as for crude oil offloading systems.

8.1.3 Where the given references above refer to Bow or Stern loading, the general principles will be applicable to export/import arrangements located anywhere on the vessel.

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

1 General

1.1 Introduction

1.1.1 This section identifies design and construction requirements for assignment of service notations LNG (or LPG) Loading Unit or LNG (or LPG) Loading Installation.

1.1.2 The requirements in this section are supplementary to those for main class 1A1 as stated in Sec.1 for notation LNG (or LPG) Loading Unit and OI in Sec.2 for notation LNG (or LPG) Loading Installation.

1.2 Design requirements

To achieve the service notation LNG (or LPG) Loading Unit or LNG (or LPG) Loading Installation, the unit has to be designed, constructed and documented according to DNVGL-OS-E403 - Offshore Loading Buoys.
SECTION 6 ADDITIONAL CLASS NOTATIONS: DESIGN AND CONSTRUCTION REQUIREMENTS FOR SPECIAL EQUIPMENT AND SYSTEMS

1 Introduction

1.1 General

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

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

1.2 Technical reference documents

1.2.1 Technical requirements are given by reference to selected:

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

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

1.3 General assumptions

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

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

2 Position mooring system

2.1 General

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

2.1.2 Objective

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

2.1.3 Scope

The notation covers the following aspects:

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

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

Table 1 POSMOOR class notations

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

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

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

2.3 Technical requirements

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

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

2.4 Certification of materials and components

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

3 Dynamic positioning systems

3.1 General

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

Table 2 Dynamic position class notations

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS</td>
<td>Dynamic positioning system</td>
<td>(A)</td>
<td>Annual survey required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>Without redundancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>With an independent joystick back-up and a position reference back-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>With redundancy in technical design and with an independent joystick back-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>With redundancy in technical design and with an independent joystick back-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(A)</td>
<td>Annual survey required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUT</td>
<td>With redundancy in technical design and with an independent joystick back-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUTR</td>
<td>With redundancy in technical design and with an independent joystick back-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUTRO</td>
<td>With redundancy in technical design and with an independent joystick back-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUTS</td>
<td>Without redundancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ER</td>
<td>Redundancy in technical design</td>
</tr>
</tbody>
</table>
3.1.2 Objective
The objective of the notations is to ensure the availability of dynamic positioning with various grades of redundancy in line with the IMO MSC/Circ.645 “Guidelines for vessels with dynamic positioning systems”.

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

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

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

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

3.2 Technical requirements
3.2.1 Technical requirements for the dynamic positioning notations shall be in accordance with the DNV Rules for ships Pt.6 Ch.7.
3.2.2 Technical requirements for DYNPOS-ER are given in DNV Rules for ships Pt.6 Ch.26.
3.2.3 For DPS notations granted through class entries, see DNV Rules for ships Pt.6 Ch.7.

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

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

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

4.1.3 Scope
The notation covers the following elements:

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

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

4.3 Certification of materials and components
A DNV GL product certificate shall be provided for the bow chain stopper and bow fairlead
4.3.1 Wich and capstand and pedestal roller (if fitted) shall be provided with documentation of max. SWL from manufacturer (works certificate):

5 Bow loading
5.1 General
5.1.1 General
The additional notation BOW LOADING applies to units having a bow loading arrangement satisfying the requirements of [5.2].

5.1.2 Objective
The notation’s objective is to ensure safe and reliable bow loading arrangements.

5.1.3 Scope
The notation covers requirements for:
— materials
— arrangement
  The requirements cover the parts of OCIMF’s Recommendations for equipment
— control and monitoring
— safety installations
— operation manual.

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

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

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

6 Submerged turret loading
6.1 General
6.1.1 General
The additional notation STL applies to units or installations having a submerged turret loading arrangement satisfying the requirements of [6.2].

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

6.1.3 Scope
The notation covers requirements for:
— materials
— arrangement
— control and monitoring
6.1.4 Application
The notation is applicable for all different units as covered by DNVGL-OS-102.

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

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

7 Hydrocarbon production plant

7.1 General
7.1.1 Units or installations fitted with offshore hydrocarbon production facilities in compliance with DNV requirements may be assigned class notation PROD.
7.1.2 Where the principle product is LNG the class notation PROD (LNG) may be assigned.
7.1.3 Where the principle product is LPG the class notation PROD (LPG) may be assigned.
7.1.4 Where the plant is intended for vaporisation of LNG, the class notation REGAS may be assigned.

7.2 Technical requirements
The requirements for production plants are stated in DNV-OS-E201. Regasification plant may be designed in accordance with DNV Rules for ships Pt.6, Ch.30 and relevant parts of DNV-OS-E201.

7.3 Certification of materials and components
7.3.1 Procedures and requirements for classification including certification of equipment shall be in accordance with DNV-OS-E201, Ch.3.
7.3.2 Manufacturers of materials, components and equipment for PROD class shall, prior to construction is started, provide the Society with evidence of their capability to successfully carry out fabrication with adequate quality.

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

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

8 Regasification

8.1 General
8.1.1 Objective
The requirements in this chapter apply to vessels having regasification equipment used for LNG vaporizing and gas export, through a submerged turret buoy offshore or through dedicated gas unloading manifolds.
8.1.2 Scope
The requirements as specified in this sub-section cover safety, loading and offloading, certification, and testing of regasification units.
8.1.3 Application
Vessels built according to these rules may be assigned the class notation REGAS.
8.2 Technical requirements
The requirements of the DNV Rules for ships, Pt.6 Ch.30, shall be complied with as applicable.

8.3 Certification of materials and components
The requirements of the DNV Rules for ships, Pt.6 Ch.30 Sec. 1C, shall be complied with as applicable.

9 Helicopter decks

9.1 General

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

Table 3 HELDK class notation

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

9.1.2 The application of the different qualifiers is restricted as follows:

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

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

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

For additional additional requirements for qualifier (N) see DNVGL-SI-0166, Ch.2, Sec.9.

10 Crane installations

10.1 General

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

10.1.2 Scope
In addition to certification of the crane, the following is covered:

— supporting structure for the crane, (strengthening of deck structure, pedestal etc.)
— devices for locking crane in parked position (unit at sea)
— the crane itself with respect to safety and functioning.
10.1.3 Application
The CRANE notation may be given to units with permanently installed cranes.

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

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

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

11 Additional fire protection

11.1 General

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

Table 4 Class notations for additional fire protection

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

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

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

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

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

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

12 Loading computer

12.1 General

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

The letters are denoting Loading Computer System-Damage Control.
12.1.2 **Objective**
The objective of the notation is to ensure the correct calculating of damage stability following a collision, grounding or other incidents causing flooding.

12.1.3 **Scope**
A loading computer system designed for this purpose is assumed to consist of the following main parts:
- level sensors in all spaces which enables sounding of flooded compartments
- draught readings sensors to read draughts of the ship fore, midship (port and starboard) and aft
- a loading computer system, located on the navigation bridge (and safety centre, if located in a separate space from the navigation bridge), able to calculate the stability based on the input provided by the sensors.

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

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

### 13 Periodically unattended machinery space

13.1 **General**

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

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

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

13.1.3 **Scope**
The scope of the notation covers:
- engine control system
- alarm system
- safety system
- fire detection and alarm system.

13.2 **Technical requirements**

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

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

13.3 **Certification of materials and components**
Certification requirements are given in the DNV Rules for ships.
14 Hull monitoring system

14.1 General

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

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

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

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

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

15 Fatigue methodology for ship-shaped units

15.1 General

15.1.1 Ship shaped units may be assigned class notation FMS.

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

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

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

15.2 Technical requirements
Assignment of class notation FMS is based on compliance with requirements in DNVGL-RP-C206.

16 Noise, vibration and comfort rating notations

16.1 General

16.1.1 Units arranged and equipped with the aim to reduce the impact of noise or vibration may be assigned for the following additional class notations as given below.
16.1.2 Objective
The objective of COMF is to reduce the impact of noise and vibration related to comfort on board may be assigned for the following additional class notations.

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

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

16.1.5 The scope of VIBR covers

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

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

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

16.2 Technical requirements

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

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

16.3 Certification requirements
There are no additional requirements for certification.

17 Cold climate notations

17.1 General

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

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

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

Table 5 Class notations related to noise and vibration
The objective of the notation WINTERIZED is to ensure operational availability of marine systems in cold climate conditions.

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

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

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

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

Table 6 ICE class notations for column stabilised units

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

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

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

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

17.2.5 Ship-shaped units
Ship-shaped units strengthened for navigation in defined ice conditions in accordance with this sub-section may be assigned class notations as described in Table 7.

Table 7 ICE class notations for ship shaped units

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICE</td>
<td>Navigation in ice –baltic ice classes</td>
<td>1A*</td>
<td>normally capable of navigating in difficult ice conditions without the assistance of icebreakers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1A</td>
<td>capable of navigating in difficult ice conditions, with the assistance of icebreakers when necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1B</td>
<td>capable of navigating in moderate ice conditions, with the assistance of icebreakers when necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1C</td>
<td>capable of navigating in light ice conditions, with the assistance of icebreakers when necessary</td>
</tr>
</tbody>
</table>
17.2.6 Technical requirements for DAT are given in DNV Rules for ships Pt.5 Ch.1 Sec.7.

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

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

17.3 Winterized

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

### Table 8 Class notation Winterized

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

17.3.2 Application

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

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

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

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

17.3.6 Technical requirements

The technical requirements are given in DNVGL-OS-A201 Ch.2.

17.3.7 Certification requirements

The certification requirements are given in DNVGL-OS-A201 Ch.3 Sec.2.
18 Environmental notations

18.1 General

18.1.1 Table 9 provides an overview of the environmental related notations.

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BWM</td>
<td>Ballast Water Management</td>
<td>E</td>
<td>Ballast water management system based on Exchange</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>Ballast water management system on Treatment</td>
</tr>
<tr>
<td>CLEAN</td>
<td>Arrangements for controlling and limiting operational emissions and discharges</td>
<td>&lt;none&gt;</td>
<td>Basic operational requirements</td>
</tr>
<tr>
<td>OPP</td>
<td>Oil Pollution Preventive system</td>
<td>F</td>
<td>fuel oil system</td>
</tr>
<tr>
<td>Recyclable</td>
<td>Safe and Environmentally Sound Recycling of Ships</td>
<td></td>
<td>Covering the development of Inventory of Hazardous Materials Part 1</td>
</tr>
<tr>
<td>VCS</td>
<td>Vapour control systems</td>
<td>1</td>
<td>Basic installation (meeting IMO MSC/Circ.585)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>VCS-1 + overfill alarm (meeting USCG CFR 46 part 39)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>VCS-2 + installation for onboard vapour processing</td>
</tr>
</tbody>
</table>

18.2 Objective

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

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

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

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

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

18.3 Technical requirements

18.3.1 **BWM**

The requirements given in the DNV Rules for ships, Pt.6 Ch.18, shall be complied with for assignment of the class notation **BWM** following the different qualifiers as specified.

18.3.2 **CLEAN DESIGN**

The requirements given in the DNV Rules for ships, Pt.6 Ch.12, shall be complied with for assignment of the class notations **CLEAN/CLEAN DESIGN** with the deviations as given in [18.3.3].
18.3.3 For the application of **CLEAN DESIGN** for offshore units, the requirement for **NAUT-AW** or **NAUT-OSV(A)** can generally be waived based on an assumption of the lower navigational risk due to the operational pattern of the unit (i.e. most of time in a fixed location).

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

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

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

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

19 Enhanced system verification

19.1 General

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

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

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

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

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

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

Any combination of selected systems can be made.

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

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

19.1.7 The verification methods are aligned to be applied in conjunction with classification activities of systems at e.g. type approval, manufacturing survey, onboard testing, and on sea trial in order to provide additional evidence of expected and required functionality.

Table 10 Class notations related to environment

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESV</td>
<td>Enhanced System verification</td>
<td><strong>HIL-IS</strong></td>
<td>Hardware in the loop, test package incl simulator provided by independent supplier</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>HIL-DS</strong></td>
<td>As above, simulator provided by supplier target system</td>
</tr>
</tbody>
</table>
19.2 Technical requirements
There are not additional technical requirements to the target system.

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

20 Integrated software dependent systems

20.1 General

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

Table 11 ISDS Class notations

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

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

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

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

20.1.4 Application
Any combination of selected systems can be made.

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

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

20.2 Technical requirements
There are no additional technical product requirements.

20.3 Certification requirements
There are no additional certification requirements.

21 Special feature notations

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

21.2 Special feature notation NON-SELFPROPELLED

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

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

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

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

#### 21.3 Tailshaft monitoring – **TMON**

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

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

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

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

**21.3.5 Certification requirements**
There are no specific certification requirements.

#### 21.4 Special feature notation **BIS**

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

**21.4.2 Scope**
The **BIS** notation covers:

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

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

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

**21.4.5 Certification requirements**
There are no additional certification requirements.

#### 22 Summary of reference documents for additional class notations

**22.1 General**
Rules and standards which shall be applied for assignment of system and special facility class notations are summarised in Table 12.
### Table 12 Summary of reference documents for system and special facility notations

<table>
<thead>
<tr>
<th>Notation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOW LOADING</td>
<td>DNV Rules for ships, Pt.5 Ch.3, Sec. 14</td>
</tr>
<tr>
<td>BWM</td>
<td>DNV Rules for ships, Pt.6 Ch.18</td>
</tr>
<tr>
<td>CLEAN/ CLEAN DESIGN</td>
<td>DNV Rules for ships, Pt.6 Ch.12 Sec.1</td>
</tr>
<tr>
<td>COMF</td>
<td>DNV Rules for ships Pt.6 Ch.33</td>
</tr>
<tr>
<td>CRANE</td>
<td>DNV Rules for ships Pt.6 Ch.1 Sec.3</td>
</tr>
<tr>
<td>DYNPOS</td>
<td>DNV Rules for ships Pt.6 Ch.7</td>
</tr>
<tr>
<td>DYNPOS-ER</td>
<td>DNV Rules for ships Pt.6 Ch.26</td>
</tr>
<tr>
<td>DPS</td>
<td>DNV Rules for ships Pt.6 Ch.7</td>
</tr>
<tr>
<td>ESV</td>
<td>DNV Rules for ships Pt.6 Ch.22</td>
</tr>
<tr>
<td>ED / ECO</td>
<td>DNV Rules for ships Pt.6 Ch.3</td>
</tr>
<tr>
<td>F</td>
<td>DNV Rules for ships Pt.6 Ch.4</td>
</tr>
<tr>
<td>FMS</td>
<td>DNVGL-RP-C206 “Fatigue Methodology of Offshore Ships”</td>
</tr>
<tr>
<td>HELDK</td>
<td>DNVGL-OS-E401</td>
</tr>
<tr>
<td>HMON (...)</td>
<td>DNV Rules for ships Pt.6 Ch.11</td>
</tr>
<tr>
<td>ICE</td>
<td>DNV Rules for ships Pt.5 Ch.1 Sec.3</td>
</tr>
<tr>
<td>ISDS</td>
<td>DNVGL-OS-D203</td>
</tr>
<tr>
<td>LCS-DC</td>
<td>DNV Rules for ships Pt.6 Ch.9 Sec.4</td>
</tr>
<tr>
<td>OFFLOADING</td>
<td>DNVGL-OS-E201, Ch.12</td>
</tr>
<tr>
<td>OPP-F</td>
<td>DNV Rules for ships Pt.6 Ch.1 Sec.5</td>
</tr>
<tr>
<td>POSMOOR</td>
<td>DNVGL-OS-E301</td>
</tr>
<tr>
<td>PROD</td>
<td>DNVGL-OS-E201</td>
</tr>
<tr>
<td>Recyclable</td>
<td>DNV Rules for ships Pt.6, Ch.27</td>
</tr>
<tr>
<td>REGAS</td>
<td>DNV Rules for ships Pt.6, Ch.30 and DNVGL-OS-E201</td>
</tr>
<tr>
<td>SPM</td>
<td>DNV Rules for ships Pt.5 Ch.3 Sec.15</td>
</tr>
<tr>
<td>STL</td>
<td>DNV Rules for ships Pt.5 Ch.3 Sec.14</td>
</tr>
<tr>
<td>VCS</td>
<td>DNV Rules for ships Pt.6 Ch.10 Sec.1</td>
</tr>
<tr>
<td>VIBR</td>
<td>DNV Rules for ships Pt.6 Ch.15 Sec.1</td>
</tr>
<tr>
<td>WINTERIZED</td>
<td>DNVGL-OS-A201</td>
</tr>
</tbody>
</table>
CHAPTER 3 CLASSIFICATION IN OPERATION

SECTION 1 GENERAL PROVISIONS FOR PERIODICAL SURVEYS

1 General

1.1 Introduction

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

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

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

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

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

1.1.6 It is provided that every unit have implemented a maintenance system including machinery system and equipment subject to class (see Ch.3 Sec.7 Table 1). 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.

1.2 Survey pre-planning and record keeping

(IACS UR Z15)

1.2.1 A specific survey program for renewal surveys and continuous surveys must be worked out in advance of the renewal survey by the owner in cooperation with the classification society. The survey program in written format. The IIP is the structural part of the program (ref. Sec.4 [1.3]).

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

1.3 Accessibility and facilities for surveys on location

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

See Ch.2 12 for matters which will be taken into consideration for acceptance of surveys to be carried out on location.
2 Periodical surveys

2.1 General

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

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

— annual survey
— intermediate survey
— complete survey.

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

— renewal survey.

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

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

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

The main class intermediate survey can not serve as commencement of the next renewal survey. For concurrent surveys, the time window may be limited by that of the other survey.

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

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

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

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

2.1.6 Where substantial corrosion is found, additional thickness measurements shall be taken to confirm the extent of substantial corrosion.

2.2 Postponement of periodical surveys

2.2.1 Except for annual and intermediate surveys for main class, the Society may accept to postpone periodical surveys in exceptional circumstances and upon consideration in each separate case.

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

2.3 Survey of units out of commission

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

— the time the unit has been out of commission
— the maintenance and preservative measures taken during lay-up
— the extent of surveys carried out during the time out of commission. As a minimum, a sea trial for function testing of the machinery installation shall be carried out. All overdue surveys shall be completed prior to re-entering service.

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

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

2.4 Survey schedules

2.4.1 Annual survey schedule is as follows:

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

2.4.2 Intermediate survey schedule is as follows:

— The due date corresponds to the date 2.5 years before the expiry date of the classification certificate.
— The survey shall normally be carried out within a time window of 9 months on either side of the due date.
— The main class intermediate survey shall be completed concurrently with the second or third main class annual survey in each period of the classification certificate.
— The same surveys and UTM of tanks or spaces can not be credited towards both intermediate and renewal survey.

2.4.3 Complete surveys are denoted:

— Complete survey (2.5 years), or
— Complete survey (5 years).
— Complete survey schedule is as follows:
— The due date corresponds to 2.5 years, or 5 years.

The survey shall normally be carried out within a time window of 9 months before and 6 months after the due date.

Survey required to be concurrent with the renewal survey shall be completed no later than at the completion of the renewal survey.

2.4.4 Renewal survey schedule is as follows:

— The due date is set at 5 years interval and corresponds to the expiry date of the classification certificate.
— The survey shall normally be completed within a time window of 3 months before the due date.
— The survey may be commenced at the fourth annual survey or between the fourth and fifth annual surveys.
— In case the survey is commenced more than 15 months before the expiry date of the classification certificate, the due date of the survey will be advanced to a date not later than 15 months after the commencement.
— The renewal survey shall be completed concurrently with the last main class annual survey in each period of the classification certificate.
— The same surveys and UTM of tanks or spaces can not be credited towards both Intermediate and renewal survey.

2.4.5 Bottom survey schedule is as follows:

a) The due date is set at intervals in accordance with the following:
   — two bottom surveys are required during each five-year period of the classification certificate
   — the interval between any two successive bottom surveys is in no case to exceed 36 months.

b) The survey shall be carried out on or before the due date.
   Time window is not applicable.

c) One bottom survey shall be carried out in conjunction with the renewal survey, i.e. not more than 15 months prior to the expiry date of the classification certificate.

2.4.6 Survey of geared and podded thrusters for propulsion, and all DYNPOS/POSMOOR class notations are scheduled according to complete survey (5 year). Podded thrusters shall also have an annual survey.

2.4.7 Survey intervals should in general be as given in Table 1 and Table 2.

Table 1  Periodical surveys main class. (For survey extent, see Sec.4)

<table>
<thead>
<tr>
<th>Main character of class</th>
<th>Survey extent and type (as applicable)</th>
<th>Survey interval, years</th>
<th>Survey time window, (See Fig.1)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A1, OI</td>
<td>Hull, machinery and equipment</td>
<td>Renewal: 5, Annual: 1</td>
<td>Wₐ: 3, Wₐ: 3 (See 2.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intermediate: 2-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A1, OI</td>
<td>Bottom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tailshaft with continuous corrosion</td>
<td>Renewal: 5, Annual: 1</td>
<td>Wₐ: 6, Wₐ: 6</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>resistant metallic liner or shaft of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>corrosion resistant material or shaft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with specially approved protection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>arrangement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A1</td>
<td>Tailshaft with approved oil sealing</td>
<td>Renewal: 5, Annual: 1</td>
<td>Wₐ: 6, Wₐ: 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>glands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thruster</td>
<td></td>
<td></td>
<td></td>
<td>See Sec.4 [7]</td>
</tr>
<tr>
<td>Auxiliary boiler</td>
<td>2.5</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Steam and steam generator</td>
<td>2.5</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Thermal oil heaters</td>
<td>2.5</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
### 2.5 Class notations

#### 2.5.1 Optional class notations where specific surveys have been defined are listed in Table 2.

#### Table 2 Surveys for optional class notations

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Survey type</th>
<th>Conjunction with main class survey</th>
<th>Survey requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEAN</td>
<td>Arrangements for controlling and limiting operational emissions and discharges</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [14]</td>
</tr>
<tr>
<td>CRANE</td>
<td>On board crane</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [8]</td>
</tr>
<tr>
<td>DPS</td>
<td>Dynamic positioning system</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [3]</td>
</tr>
<tr>
<td>DYNPOS</td>
<td>Dynamic positioning system</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [3]</td>
</tr>
<tr>
<td>E0</td>
<td>Periodically unattended machinery space</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [10]</td>
</tr>
<tr>
<td>ECO</td>
<td>Machinery centralised operation</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [10]</td>
</tr>
<tr>
<td>F</td>
<td>Additional fire protection</td>
<td>Complete</td>
<td>Intermediate and renewal</td>
<td>Sec.6 [9]</td>
</tr>
<tr>
<td>HELDK</td>
<td>Helicopter deck</td>
<td>Complete</td>
<td>Renewal</td>
<td>Sec.6 [5]</td>
</tr>
<tr>
<td>HMON</td>
<td>Hull monitoring system</td>
<td>Annual</td>
<td>Renewal</td>
<td>Sec.6 [7]</td>
</tr>
<tr>
<td>ISDS</td>
<td>Integrated Software Dependent Systems</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [15]</td>
</tr>
<tr>
<td>LCS</td>
<td>Loading computer system</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [4]</td>
</tr>
<tr>
<td>POSMOOR</td>
<td>Position mooring system</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [2]</td>
</tr>
<tr>
<td>PROD</td>
<td>Production system</td>
<td>Annual</td>
<td>N/A</td>
<td>Sec.6 [5]</td>
</tr>
<tr>
<td>Recyclable</td>
<td>Inventory of Hazardous Materials Part 1</td>
<td>Complete</td>
<td>Renewal</td>
<td>Sec.6 [14]</td>
</tr>
<tr>
<td>REGAS</td>
<td>LNG Regasification plant</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [6]</td>
</tr>
<tr>
<td>TMON</td>
<td>Tailshaft monitoring</td>
<td>Annual</td>
<td>Annual</td>
<td>Sec.6 [16]</td>
</tr>
<tr>
<td>VIBR</td>
<td>Vibration level limitation</td>
<td>Complete</td>
<td>Renewal</td>
<td>Sec.6 [12]</td>
</tr>
<tr>
<td>Winterized</td>
<td>Operation in cold climate</td>
<td>Annual</td>
<td>Renewal</td>
<td>Sec.6 [13]</td>
</tr>
</tbody>
</table>
2.5.2 Class notations for which no survey requirement is defined, e.g. because the class notation is design related only, are listed in Table 3.

Table 3 Class notations without survey requirements

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

1 General

1.1 Preparation for survey

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

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

2 Requirements for hull surveys

2.1 Conditions for survey and access to structures

2.1.1 In preparation for survey and to allow for a thorough examination, all spaces shall be cleaned including removal from surfaces of all loose accumulated corrosion scale. In tanks where soft 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.

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

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

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

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

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

a) when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage or

b) if a permanent means of access is provided in each bay to allow safe entry and exit. This means:

— access direct from the deck via a vertical ladder and a small platform fitted approximately 2 m below the deck in each bay or
— access to deck from a longitudinal permanent platform having ladders to deck in each end of the tank.

The platform shall, for the full length of the tank, be arranged in level with, or above, the maximum water
level needed for rafting of under deck structure. For this purpose, the ullage corresponding to the maximum water level is to be assumed not more than 3 m from the deck plate measured at the midspan of deck transverses and in the middle length of the tank.

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

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

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

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

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

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

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

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

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

2.2 Survey extent

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

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

2.2.3 When close-up examination is specified by the Rules or required by the surveyor the structure or object is visually examined from a distance normally within reach of hand.

Thickness measurements for general assessment and recording of corrosion pattern shall be taken as specified by the Rules as part of the survey.

Guidance note:
Areas with good coating/original coating intact thickness measurements may be waived. Additional UTM may be required in other areas where corrosion is observed.

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

2.2.4 The surveyor may require thickness measurements in any portion of the structure where signs of wastage are evident or in areas where wastage is normally found. The surveyor may extend the scope of the thickness measurements if considered necessary.

2.2.5 When thickness measurements are specified by the rules or required by the surveyor the measurements shall be carried out to an extent sufficient to determine both general and local corrosion levels.

Thickness measurements shall be carried out by a qualified company approved by the Society and witnessed by a surveyor (see also Sec.3 [2] on Services by approved companies). This requires the surveyor to be on board, while the measurements are taken, to the extent necessary to control the process.

Where it is required to carry out thickness measurements of structures subject to close-up examination, these measurements shall be carried out simultaneously with the close-up examination.

The surveyor shall review the final thickness measurement report and countersign the cover page.
2.2.6 Where substantial corrosion, as defined in Ch.1 Sec.1 [2] is found, additional thickness measurements shall be taken to confirm the extent of substantial corrosion.

The additional measurements shall be taken in patterns corresponding to tables given in DNV Rules for Ships, Pt.7, Ch.1, Sec.4(4) depending on ship type.

These additional thickness measurements shall be carried out before the survey is considered as completed.

2.2.7 The examination may be extended also in cases when:

— information is available of defects suffered on similar structure or details in similar tanks/holds or on similar ships
— the structure under survey has been approved with reduced scantlings due to an approved corrosion control system.

2.3 Repair of structural damage or deterioration

2.3.1 A prompt and thorough repair is a permanent repair completed at the time of survey to the satisfaction of the surveyor, therein removing the need for the imposition of any associated condition of class.

2.3.2 Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the surveyor, will affect the unit's structural, watertight or weathertight integrity, shall be promptly and thoroughly repaired.

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

2.3.4 Additionally, when a survey results in the identification of significant corrosion or structural defects, either of which, in the opinion of the surveyor, will impair the unit's fitness for continued service, remedial measures shall be implemented before the unit continues in service.

3 Requirements for machinery surveys

3.1 Maintenance and preparation for survey

3.1.1 Every unit shall have implemented a maintenance system.

The maintenance system shall ensure that:

— inspections and maintenance are carried out at defined intervals
— any non-conformity is reported with its possible cause, if known
— appropriate corrective action is taken
— records of these activities are maintained.

The machinery and systems subject to class shall be maintained in accordance with the maintenance system implemented.

3.1.2 In preparation for survey and to allow for a thorough examination, machinery components and related spaces shall be cleaned, including removal from surfaces of loose accumulated corrosion scale, mud and oil-residues. The spaces and components of attention shall have proper access including dismantling as necessary.

3.2 Replacement of machinery components

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.
3.3 Machinery verification
If significant repairs are carried out to main or auxiliary machinery, a dock and/or sea trial shall be carried out as required by the attending surveyor.

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.

4 Special provisions for ageing offshore units

4.1 General

4.1.1 Mobile Offshore Units with age exceeding their initial design life (in many cases 20 years) shall be subject to evaluation for special provisions.

4.1.2 The special provisions for maintaining required safety level is related to fatigue and corrosion condition of the hull and supporting structure. Degradation mechanisms due to ageing effects related to other aspects such as marine systems have also to be given due consideration by owner through maintenance, and by DNV surveyors through regular surveys.
4.2 Corrosion measurements and condition of protective coating

The special provisions with regard to condition of protection coating system and minimum measurements are included in the descriptions for the renewal survey as specified in Sec.4 [4]. In addition is referred to [2.2] with regard to thickness measurements and inspection of protective coatings in general.

4.3 Fatigue utilization index

4.3.1 The Fatigue utilization index (FUI) is defined as the ratio between the effective operational time and the initially documented fatigue life.

4.3.2 When the actual age of the unit exceeds the documented fatigue life, the fatigue utilisation index (FUI) shall be calculated for the following types of units:
   - column-stabilised
   - self-elevating.

4.3.3 FUI calculation is not required for ship-shaped units. These units have a more robust fatigue redundancy and are considered adequately covered by standard survey arrangements.

4.3.4 If fatigue cracks have been found in a unit prior to the FUI reaching 1.0, and the findings are located within fatigue sensitive areas of the unit, the owner shall assess structural details in these areas at latest prior to the renewal survey for the 5-year period.

4.3.5 Calculation of effective operational time shall be based on the recorded operation history. For the purpose of calculating the FUI, the following may be assumed:
   - contribution from operation in harsh environment, e.g. North Sea, North Atlantic and Canada, equals actual operating time in such environment
   - contribution from operation in other environments equals one third (1/3) of actual operating time in such environments
   - periods of lay-up and yard stay may be disregarded
   - for self-elevating units; contribution from transit operation.

4.3.6 Owner shall submit FUI as part of the planning process prior to renewal survey, see [4.3.2] above.

4.3.7 Operation of the unit may continue when FUI > 1.0 provided:
   - the required safety level of the vessel is maintained
   - no fatigue cracks have been found in critical areas of the unit
   - the inspection program is extended.

4.3.8 When the FUI > 1.0, the following measures will in general be taken:
   - The Society will issue a MO (Memo to Owner) stating the actual FUI.
   - The installed leak detection system for column stabilized units shall be examined for leakage two times each month and shall be confirmed at each annual survey.

4.3.9 For a unit with FUI > 1.0 and where cracks have been detected in fatigue sensitive areas, the required safety level is in general considered satisfied either by:
   - increasing the inspection frequency (i.e. NDT scope with 2 1/2 year interval) or
   - by performing a condition based assessment for the vessel

**Guidance note:**
For additional inspections to self-elevating units, see DNVGL-OU-0104 Pt.7 Ch.2 Sec.3.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---
Guidance note:
A condition based inspection planning is performed by judging the vessel based on the actual condition rather than on age in order to maintain the required safety level. In this context a scope implementing all or parts of the following procedure can/should be performed:

— Apply the results from a fatigue analysis. The detail level of the analysis will influence the results. Higher detail level reduces the uncertainties and increases the confidence in the results and hence reduces the inspection frequency.
— Mapping of critical connections with regard to fatigue capacity, i.e. ranking of fatigue sensitive details.
— Identify details to be modified/upgraded with regard to fatigue strength.
— Determine required safety level - dependent on consequence and access for inspection.
— Apply the fatigue results in a risk based analysis (RBI) including historical data from inspections/findings and inspection quality for preparing the inspection program.
— Evaluate the result from inspections (findings) and/or analysis and perform modifications/improvements ensuring that the associated risks are adequately controlled.
— Perform a continuous updating of the inspection plan based on inspection results.

The inspection plan obtained from a condition based approach depends on the method and procedure applied, including the confidence level of the parameters considered. Less confidence increases the probability of failure (PoF) and hence the inspection frequency will increase.

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

4.3.10 Previous cracks located in fatigue sensitive areas shall be subject to additional NDE at intermediate surveys corresponding to the extent of the NDE inspection required for the renewal surveys.

4.3.11 Associated plans and procedures, i.e. condition based inspection plans applying risk based approach, shall be approved by the Society. The scope of the improvement program will depend on the initial assessment and owner's plans for further use of the unit. Units which have undergone an assessment and improvement program to the Society's satisfaction will be surveyed based on the modified inspection program.
SECTION 3  ALTERNATIVE SURVEY ARRANGEMENTS AND SURVEYS PERFORMED BY APPROVED COMPANIES

1  Alternative survey arrangements

1.1  General overview of survey arrangements

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

1.1.2  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.
— Hull PMS (Planned Maintenance Systems)
— Machinery continuous, a survey arrangement based on surveys of the machinery items as detailed in Sec.7 [3].
— Machinery PMS, a survey arrangement based on a planned maintenance system. The requirements are detailed in Sec.7 [4].
— 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 [5]
— PMS RCM, a survey arrangement based on review of the company management, the RCM analysis and the implemented maintenance system. The requirements are detailed in Sec.7 [6].
— Offshore CM (condition monitoring).

1.2  Hull PMS (planned maintenance system)

1.2.1  Hull PMS is a survey arrangement offered as an integral part of classification compliance for the hull structure through the alignment and integration of classification requirements with an approved and implemented planned inspection and maintenance system. The system performance and condition of hull structure and maintenance work carried out shall be verified by the Society during annual survey and in connection with renewal survey of the unit.

1.2.2  Hull PMS is applicable for units with survey arrangement hull continuous.

1.2.3  An initial survey shall be carried out onboard the unit in order to verify that the system has been implemented in accordance with the approved documentation and that the system is used as intended. It is required that the planned maintenance system has been operated for at least 6 months before the initial survey is carried out.

1.2.4  If the conditions for the survey arrangement are not complied with or in case of change of technical management of the unit, the survey arrangement will be cancelled and substituted by Hull Continuous survey arrangement.

1.3  Survey arrangement based on reliability centred maintenance (RCM) system

1.3.1  A planned maintenance system based on RCM may be accepted by the Society. An approved planned maintenance system is a pre-requisite for this survey arrangement. Compliance with the relevant requirements as given in Sec.7 [4] 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.

1.3.2  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?

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

1.3.3 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.

1.3.4 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.

1.3.5 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.

1.3.6 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.

1.3.7 Any modifications to equipment or machinery systems which could impact the RCM system must be documented and forwarded to the Society for approval.
2 Surveys by approved companies or service suppliers

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

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

2.2 Thickness measurements

2.2.1 Thickness measurements as part of the periodical surveys shall be carried out by a qualified company approved by the Society unless carried out by the surveyor himself.

2.2.2 Thickness measurements shall normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment shall be proven to the surveyor as required.

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

2.3 Bottom survey afloat
An approved company to be used. The results of the survey are to be verified by a DNV surveyor.

2.4 Non-destructive testing
Non-destructive testing as part of the periodical surveys shall be carried out by a qualified company approved by the Society.

Guidance note:
For more information, see DNV Standard for Certification No. 2.9 / Approval Programme No. 402B: "Firms Engaged in Non Destructive Testing (NDT) on Offshore Projects and Offshore Units/Components".

2.5 Mooring chain inspections
Inspection of mooring lines as part of the periodical surveys shall be carried out by a qualified company approved by the Society.

Guidance note:
For more information, see DNV Standard for Certification No. 2.9 / Approval Programme No. 413: "Service Suppliers Engaged in Renewal Survey Examination of Mooring Chain Intended for Mobile Offshore Units".

2.6 Condition monitoring
Condition monitoring as part of DNV GL's periodical surveys of machinery and equipment can be carried out by a qualified company approved by the Society. This minimizes the requirement to oversee the condition monitoring onboard each individual offshore installation.

Guidance note:
For more information, see Approval Programme "Service Suppliers Engaged in condition monitoring of machinery onboard. Also see Sec.7 in this chapter."
SECTION 4  PERIODICAL SURVEY EXTENT FOR MAIN CLASS

1  General

1.1  Introduction

1.1.1  This section presents the standard extent of surveys for retention of main class 1A1 for mobile offshore units and OI for floating offshore installations.

1.1.2  The requirements for service notations are given in Sec.5, and additional system and special facility class notations are given in Sec.6.

1.1.3  Subsections for tailshaft [6] and thrusters for propulsion [7] are not applicable for OI class.

1.2  Hull survey - general

1.2.1  Conditions of protective coating

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

The condition will be rated GOOD, FAIR or POOR as defined in Table 1.

<table>
<thead>
<tr>
<th>Corrosion prevention system</th>
<th>Condition with only minor spot rusting.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coating condition &quot;GOOD&quot;</td>
<td>Condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.</td>
</tr>
<tr>
<td>Coating condition &quot;POOR&quot;</td>
<td>Condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.</td>
</tr>
</tbody>
</table>

1.2.2  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.

1.3  In-service inspection program (IIP)

1.3.1  The in-service inspection program (IIP) (see Sec.1 [2.1.5]) is developed on the basis of a general, experience-based scope in combination with design and fabrication particulars for the actual unit as well as experience from in-service surveys of units of similar type.

1.3.2  Relevant survey requirements for units of ship-shaped types additional to those stated in the DNV Rules for ships are summarised in Table 2.
1.3.3 The basic scope for development of IIP for units of column-stabilised type is given in Table 3.

1.3.4 The basic scope for development of IIP for units of self-elevating type is given in Table 4.

1.3.5 Detailed locations for thickness gaugings will be prepared based on the condition of the unit and following the applicable table of [4]. Measurements are to be recorded and stored in DNV GL’s Structure Integrity Management (SIM) tool.

1.3.6 The extent of examination specified in the referred tables may be modified based on design documentation evaluation, inspection results / crack history and experience with similar units /details.

1.3.7 The extent of examination specified in the referred tables may be refined by use of RBI / RCM methodologies.

Guidance note:
At the 1st Annual or intermediate survey after construction, column-stabilised and self-elevating units may be subject to examination of major structural components including non-destructive testing, as deemed necessary by the Society. If the Society deems such survey to be necessary, the extent should be agreed to by the Society and the owner or customer prior to commencement of the Survey.

For further guidance on RBI see also DNVGL-RP-0001 Probabilistic methods for planning of inspection for fatigue cracks in offshore structures and DNVGL-RP-0178 Risk Based Corrosion Management.

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Table 2 Basis scope for development of IIP for ship-shaped units

<table>
<thead>
<tr>
<th>Type of Survey</th>
<th>AS</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INT</td>
<td>EXT</td>
<td>INT</td>
</tr>
<tr>
<td>V NDT</td>
<td>V NDT</td>
<td>V NDT</td>
<td>V NDT</td>
</tr>
</tbody>
</table>

Special Areas for Inspection (SP) – connections:

SP1 Moonpool openings C A A A A A A
SP2 Turret A A A A A A

Attachments of:

SP5 Crane pedestals and top flange A A X A X A A A A
SP6 Anchor windlasses X A X A A X
SP7 Anchor chain fairleads C B C A A C
SP8 Helideck, derrick and drill-floor support X X X C A A C
SP9 Other attachment/support connections e.g. sponsons, life-boat support structure X X X X A A X

Primary Areas for Inspection (PR) 2)

PR4 Deck structure and Turret X X X X A A
PR5 Drill floor with substructure X X X X A A
PR6 Crane/ gangway pedestal X A A A A A
## Notes

1) Special Areas for Inspection (SP) are those sections of the structure which are in way of critical load transfer point, stress concentrations, often special steel selection etc. see listing in [4.3.2]

2) Primary Areas for Inspection (PR) are elements which are essential to the overall structural integrity of the unit. See listing in [4.3.2]

3) - of the total number of these parts.

4) The inspection extent might be reduced (be less than 100%) if based on design documentation, see [1.3.6] (above).

### Table 3 Basis scope for development of IIP for column-stabilised units

<table>
<thead>
<tr>
<th>Special Areas for Inspection ¹) (SP) – Connections;</th>
<th>TYPE OF SURVEY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AS</td>
</tr>
<tr>
<td></td>
<td>INT</td>
</tr>
<tr>
<td></td>
<td>V NDT</td>
</tr>
<tr>
<td>PR7 Lifeboat platforms support</td>
<td>A</td>
</tr>
<tr>
<td>PR8 Helideck and flare support structure</td>
<td>X</td>
</tr>
<tr>
<td>PR9 Other support structures</td>
<td>X</td>
</tr>
</tbody>
</table>

A = 100% ⁴)
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.

### Table 2 Basis scope for development of IIP for ship-shaped units (Continued)

<table>
<thead>
<tr>
<th>TYPE OF SURVEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
</tr>
<tr>
<td>INT</td>
</tr>
<tr>
<td>V NDT</td>
</tr>
<tr>
<td>PR1 Horizontal bracings</td>
</tr>
<tr>
<td>Pontoon to pontoon</td>
</tr>
<tr>
<td>PR2 Vertical diagonal bracing</td>
</tr>
<tr>
<td>PR3 Columns to pontoon</td>
</tr>
<tr>
<td>Column to deck</td>
</tr>
<tr>
<td>PR4 Main Barge girder/bulkhead.</td>
</tr>
<tr>
<td>Attachments of:</td>
</tr>
<tr>
<td>PR5 Crane pedestals and top flange</td>
</tr>
<tr>
<td>PR6 Anchor windlasses</td>
</tr>
<tr>
<td>PR7 Anchor chain fairleads and anchor bolsters</td>
</tr>
<tr>
<td>PR8 Helideck, derrick and drill-floor support</td>
</tr>
<tr>
<td>PR9 Other attachment/support connections, e.g. flare and life boat support structures</td>
</tr>
</tbody>
</table>

A = 100% ⁴)
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.

Notes

1) Special Areas for Inspection (SP) are those sections of the structure which are in way of critical load transfer point, stress concentrations, often special steel selection etc. see listing in [4.3.2]

2) Primary Areas for Inspection (PR) are elements which are essential to the overall structural integrity of the unit. See listing in [4.3.2]

3) - of the total number of these parts.

4) The inspection extent might be reduced (be less than 100%) if based on design documentation, see [1.3.6] (above).
### Notes

1) **Special Area for Inspection (SP)** is those sections of the Structure which are in way of critical load transfer point, stress concentrations, often special steel selection etc. see listing in [4.3.2].

2) **Primary Area for Inspection (PR)** are elements which are essential to the overall structural integrity of the unit. See listing in [4.3.2].

3) As a minimum centre bulkhead s and corners to be covered.

4) May be waived if unit operating on DP.

5) - of the total number of these parts.

6) The inspection extent might be reduced (be less than 100%) if based on design documentation, see [1.3.6] above.

7) External NDT may be waived at IS if the unit has an approved leakage detection system according to guidelines issued by the Society.

8) Area adjacent to column connection to deck.

### Table 3  Basis scope for development of IIP for column-stabilised units  (Continued)

<table>
<thead>
<tr>
<th>TYPE OF SURVEY</th>
<th>AS</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INT</td>
<td>EXT</td>
<td>INT</td>
</tr>
<tr>
<td>V</td>
<td>NDT</td>
<td>V</td>
<td>NDT</td>
</tr>
<tr>
<td>PR6 Crane/gangway pedestal</td>
<td>X</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>PR7 Lifeboat platforms support</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>PR8 Helideck support structure</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PR9 Other support structures</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

- A = 100%  
- B = 50%  
- C = 25%  
- X = Spot check 2-5%  
- V = Visual Inspection including Close Visual Inspection of Special Areas  
- NDT = Non-destructive Testing, normally Magnetic Particle Inspection (MPI) and/or Eddy Current (ECI) of selected stress concentrations and fatigue sensitive details

### Table 4  Basic scope for development of IIP for self-elevating units

<table>
<thead>
<tr>
<th>TYPE OF SURVEY</th>
<th>AS (see IACS Z15 3.3.5)</th>
<th>IS</th>
<th>RS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INT</td>
<td>EXT</td>
<td>INT</td>
</tr>
<tr>
<td>V</td>
<td>NDT</td>
<td>V</td>
<td>NDT</td>
</tr>
</tbody>
</table>

**Special Areas for Inspection (SP) – connections:**

- **SP1 Leg to Spudcan**
- **SP2 Leg Nodes and splices above the waterline**
- **SP3 Connections of primary members in Jack House**
- **Leg guides (IACS Z15 3.3.6)**
- **SP4 Main Barge girder/bulkhead connections**
- **Plating in way of leg well (IACS Z15 3.3.6)**

**Attachments of:**

- **SP5 Crane/gangway pedestals and top flange**
- **SP6 Support of Drill Floor and Cantilever**
2 Annual survey

2.1 Survey extent

2.1.1 The survey will normally cover systems and parts for:

— hull and equipment
— machinery and safety systems.
— temporary equipment as defined in Ch.1 Sec.1 [2.2]

The survey for the temporary equipment shall only confirm class involvement as specified in Ch.1 Sec.5 [2.7].
2.1.2 The survey may be performed on location provided that the structure, including submerged parts, can be thoroughly inspected as specified in the in-service inspection programme. If required, underwater inspection shall be in accordance with an approved procedure, and using approved personnel and equipment.

2.2 Hull and equipment for ship-shaped units
Survey requirements for hull and hull equipment of ship-shaped units are to be in accordance with and DNV Rules for ships, Pt.7 Ch.1 Sec.2(2.1) “Hull and Equipment, General - all ships”.

2.3 Structure and equipment for column-stabilised and self-elevating units

2.3.1 The survey may be performed on location provided that the structure, including submerged parts, can be thoroughly inspected as specified in the in-service inspection programme. If required, underwater inspection shall be in accordance with an approved procedure, and using approved personnel and equipment.

2.3.2 Units or installations with submerged primary structural members allowing internal access for inspection may be omitted from external survey, subject to satisfactory results from the internal survey.

2.3.3 Primary structural members which are flooded shall be subject to external survey unless otherwise agreed. The extent of survey is given in the in-service inspection program, and will comprise visual inspection of vital parts and may include non-destructive testing of highly stressed areas.

2.3.4 The means for leakage detection of dry bracings shall be function tested.

2.3.5 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 [4.2.7].

Condition of protective coating according to [1.2.1] 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.

2.3.6 Accessible and visible parts of the unit’s permanent towing arrangement and temporary mooring system shall be inspected. If the temporary mooring system is part of the mooring system for position keeping on location, then accessible and visible parts of the position mooring system shall also be inspected.

2.3.7 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.

2.3.8 Remote controls and alarm systems for doors, hatches and watertight dampers shall be surveyed and function tested.

2.3.9 Guard rails shall be examined.

2.3.10 For units or installations subjected to annual load line inspections by DNV, the requirements in 307 and 309 are considered covered by this inspection.

2.3.11 The “Appendix to the classification certificate” and the documents referred to therein, shall be verified as kept available onboard the unit.

2.4 Machinery and safety systems for ship-shaped units or installations

2.4.1 Survey requirements for machinery and safety systems on ship-shaped units or installations are given in the DNV Rules for ships, Pt.7 Ch.1 Sec.2(3).

2.4.2 Tank level measurements and helifuel systems shall, however, be surveyed in accordance with offshore unit requirements, see [2.5.3].
2.5 Machinery and safety systems for column-stabilised and self-elevating units or installations

2.5.1 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.

2.5.2 Boilers shall be externally surveyed. The general condition of the boiler including mountings, piping and insulation shall be ascertained and the surveyor may require opening, removal of insulation etc. if found necessary. Safety valves, instrumentation and automation systems shall be tested in operating condition when found necessary by the surveyor.

2.5.3 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.

2.5.4 The brake torques of jacking machinery on self-elevating units shall be checked. Where provided, the fixation rack system shall also be checked.

2.5.5 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 1.

2.5.6 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.

2.5.7 In hazardous area the following equipment and systems shall be surveyed and tested:

— ventilation systems shall be function tested. The tests shall include emergency stop systems and alarms for lost ventilation

— self-closing gastight doors and airlocks including other openings or accesses

— alarms or shutdown of pressurised equipment

— electrical equipment and cables

— devices for monitoring of insulation resistance or earth leak monitoring including alarms

— protection devices for combustion engines

(see IACS UR Z15 3.5 and 3.7)

3 Intermediate survey

3.1 General

The survey shall, in general, be carried out as the annual survey, but with extended visual inspection and non-destructive testing of the structure as given in relevant Rules and in-service inspection programme (where relevant), see [1.3].
3.2 Hull and equipment for ship-shaped units
Survey requirements for hull and hull equipment of ship-shaped units are to be in accordance with and DNV Rules for ships, Pt.7 Ch.1 Sec.3(2.1) "Hull and Equipment, General - all ships".
Ship-shaped offshore units are not subject to EHSR or ESP class notation.

3.3 Structure and equipment for column-stabilised and self-elevating units or installations

3.3.1 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.

3.3.2 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.

3.3.3 For column-stabilised units or installations, the survey shall, at minimum, cover accessible areas at light ballast draught.

3.3.4 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.

3.3.5 If the temporary mooring system is part of the mooring system for position keeping on location, then the position mooring system shall also be inspected. The mooring system shall be function tested during typical anchor handling operations.

3.4 Machinery and safety systems for ship-shaped units or installations
Survey requirements for machinery and safety systems on ship-shaped units or installations as are given in the DNV Rules for ships, Pt.7 Ch.1 Sec.3(3).

3.5 Machinery and safety systems for column-stabilised and self-elevating units or installations

3.5.1 The survey shall generally be carried out as for the annual survey.

3.5.2 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.

4 Renewal survey, structure and equipment

4.1 Hull and equipment of ship-shaped units

4.1.1 Survey requirements for hull and hull equipment of ship-shaped units are to be in accordance with and DNV Rules for ships, Pt.7 Ch.1 Sec.4(2.1) "Hull and Equipment, General - all ships".

Ship-shaped offshore units are not subject to EHSR or ESP class notation.

4.1.2 The requirements for close-up examination as per DNV Rules for ships, Pt.7 Ch.1 Sec.4 Table 18 for single hull oil tankers and Table 21 for double hull oil tankers shall be applied in the following cases:

— The ballast tanks have no protective coating or soft coatings.
— Tank coatings are in FAIR or POOR condition as defined by (1.2) of these Rules.
— Substantial corrosion is present.

4.1.3 The requirements for thickness measurements as per DNV Rules for ships, Pt.7 Ch.1 Sec.4 Table 19 for single hull oil tankers and Table 22 for double hull oil tankers shall be applied in the following cases:

— The ballast tanks have no protective coating or soft coatings.
— Tank coatings are in FAIR or POOR condition as defined by (1.2) of these Rules.
— Substantial corrosion is present.

4.1.4 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 [2], Position Mooring Equipment)
— external corrosion
— bottom surveys
— inspection of sea valves
— thruster and tailshaft surveys.

4.1.5 Alternative survey arrangements given in [3.5] may be applied also to ship-shaped units or installations.

4.2 Column-stabilised and self-elevating structures

4.2.1 The extent of the survey is given in the in-service inspection programme, and will additionally include the requirements given in this sub-section.

4.2.2 Survey of pipes, valves, couplings, anodes, equipment for level indication, etc. inside tanks and spaces.

4.2.3 Tanks shall, as a minimum, be internally surveyed in accordance with Table 5, as far as applicable.

### Table 5 Tank survey and pressure testing 1), 2)

<table>
<thead>
<tr>
<th>Tank</th>
<th>Age of unit in years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-5</td>
</tr>
<tr>
<td>Sea water 3)</td>
<td>all</td>
</tr>
<tr>
<td>Fresh water</td>
<td>one</td>
</tr>
<tr>
<td>Fuel, diesel oil</td>
<td>one</td>
</tr>
<tr>
<td>Lubricating oil</td>
<td>none</td>
</tr>
</tbody>
</table>

**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 [5].

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

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

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

4.2.6 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 5, as far as applicable.

4.2.7 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 / pontoon 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).

Average corrosion is defined as the average corrosion rate for a typical structural member.

Local corrosion is defined as the local corrosion limited by an area of $500 \times 500$ mm within a plate-field defined by two stiffeners and adjacent web-frames.

Average corrosion

— 5% reduction is allowed in “special” areas subject to high fatigue loads. These areas are normally identified in the In-Service Inspection Program (IIP)
— 10% reduction is allowed in areas taking part in the global structural strength, or being part of the watertight integrity of the unit
— 15% reduction is allowed in areas not taking part in the global structural strength and not being part of the watertight integrity of the unit.

Local corrosion

— 5% reduction is allowed in “special” areas subject to high fatigue loads. These areas are normally identified in the In-Service Inspection Program (IIP)
— 15% reduction is allowed for plates in areas taking part in the global structural strength, or being part of the watertight integrity of the unit
— 20% reduction is allowed in areas not taking part in the global structural strength and not being part of the watertight integrity of the unit.

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

4.2.8 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.

4.2.9 For self-elevating units or installations, all parts of the legs shall be examined.

4.2.10 The towing and mooring equipment shall be surveyed as follows:

— all chain lockers and anchor stowage arrangements shall be surveyed
— the permanent towing arrangement of the unit shall be surveyed
— the temporary mooring systems shall be surveyed
— if the temporary mooring systems are part of the mooring system for position keeping on location, 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 [12] for detailed survey requirements.

4.2.11 Sea chests and other sea inlets and discharges (above and below the waterline) with valves, including sanitary valves and scupper valves, shall be opened for survey.
Alternative survey methods may be accepted upon special consideration and approved procedures.

4.2.12 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.

4.2.13 The presence of required signboards shall be verified.

4.2.14 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.

4.2.15 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 [4.3].

4.2.16 Fixation of major appurtenances to the main structure shall be surveyed. These may typically include crane pedestals, helicopter decks, lifeboat platforms and heavy deck modules or skids.

4.3 Alternative survey

4.3.1 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.1 [12] for matters that will be taken into consideration for acceptance of surveys on location.

4.3.2 Provisions regarding fatigue safety factors and corrosion protection shall be in accordance with the following requirements:

— DNVGL-OS-C102 Appendix A for ship-shaped units
— DNVGL-OS-C103 Appendix A for column-stabilised units
— DNVGL-OS-C104 Appendix A for self-elevating units.

5 Renewal survey, machinery and safety systems

5.1 General

5.1.1 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 1) 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 [2]
— machinery continuous, see Sec.7 [3]
— machinery PMS (Planned Maintenance System), see Sec.7 [4]
— machinery CM (Condition Monitoring), see Sec.7 [5]
— offshore CM (Condition monitoring), see Sec.7 [5]
— PMSRCM (Planned Maintenance System, RCM based), see Sec.7 [4].

**5.1.2** 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 GL. 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.

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

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

Opening to be carried out normally at least every 10 years.

Any opening up of a thruster shall be witnessed by a surveyor of the Society.

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

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

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

**5.1.4** For ships with gas turbine installations the survey shall include verification of records and major overhaul reports onboard.

Major overhaul on Gas turbines shall be performed by either the original equipment manufacturer (OEM) or an OEM authorized company.

**5.1.5** For non self-propelled units (e.g. most jack ups or semis where the vessel is not intended to do a rig move under its own power) with propellers or thrusters, the renewal survey shall ensure the watertight integrity of the (shaft) sealing of the hull.

**5.2** Electrical installations

**5.2.1** The survey shall comprise examination of the electrical installations with regard to fire and explosion hazards and injury from accidental touching. The survey is also to include testing of correct functioning of equipment covered by class requirements.
5.2.2 The insulation resistance of the complete installation shall be measured, and the results presented to the surveyor. For vessels Survey arrangement PMS and with continuous earth fault monitoring of all distribution systems and alarm to a continuously manned control station, the following alternative may be accepted:

- Megger test of all generators and main electrical motors
- Test of all earth fault monitoring devices
- Verification that the vessel has regular maintenance routines for test of earth fault monitoring devices.

5.2.3 As far as practicable, the following equipment shall be examined for satisfactory condition:

- main and emergency switchboards
- generators
- distribution boards
- motor starters
- electrical motors
- converters (e.g. transformers, rectifiers, chargers)
- cable installations
- enclosures for electrical equipment
- lighting equipment
- heating equipment
- battery installations.

5.2.4 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.

5.3 Instrumentation and automation

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

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

5.3.2 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.
5.3.3 When cancelling of automatic load reduction and/or automatic stop of engine are provided, these functions shall be demonstrated to the satisfaction of the surveyor.

5.3.4 Remote shutdown for fuel-oil transfer service pumps and ventilating equipment, together with oil tank outlet valves where required to be capable of being remotely closed are to be proved satisfactory. 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).

6 Renewal survey, tailshaft survey

6.1 Standard requirements
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.

6.2 Alternative survey

6.2.1 The following alternative requirements do not apply to tailshafts covered by additional class notations DYNPOS-AUTS, DYNPOS-AUT, DYNPOS-AUTR and DYNPOS-AUTRO.

6.2.2 Subject to (6.2.1), 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.

6.2.3 At the first renewal survey, the lubricating oil for each of the stern tubes shall be analysed and the results forwarded to DNV GL. Acceptable analysis results, together with satisfactory survey of accessible parts of the shafts including clearance measurements, will normally be considered sufficient.

6.2.4 From the fourth renewal survey and onwards, a complete tailshaft survey shall be carried out.

6.3 Tailshaft condition monitoring survey arrangement
See Sec.6 [16.3] Tailshaft Monitoring.

7 Survey of geared thrusters for main propulsion and positioning

7.1 Definitions

7.1.1 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.

7.1.2 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 POSMOOR-TA or POSMOOR-ATA.

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

7.2 Survey extent

7.2.1 Thrusters for main propulsion and positioning shall be subjected to oil samples at regular intervals
of not more that 3 months and analysed by recognized laboratories. The result shall be presented in a way that makes it is easy to read the trends from the previous analyses. Record of results shall be available on board at all times.

A representative oil sample shall be taken before the filters and with the unit in its normal running condition. Oil analysis shall detect iron (Fe) and other solid contamination in addition to possible water content. The water content due to condensation is normally not to exceed 0.5%. The oil analysis shall if applicable cover all of the following areas:

- lubrication oil for gears, bearings
- sealing boxes
- steering gear
- propeller.

7.2.2 Outboard (wet) parts of the thruster accessible from the outside are covered by the bottom surveys.

7.2.3 Thrusters for main propulsion and positioning shall be subjected to survey every 5 years. The complete survey shall include:

1) Evaluation of oil analysis of gear lubrication oil, propeller hydraulic system oil and sealing system oil. See [7.2.1]).

2) Opening up of protection covers.

3) Inspection of power transmission gear (gear clearance to be measured), bearings (axial play to be measured), visible parts of shafts and general condition of housing internally.

4) Examination of controllable pitch mechanism oil transmission system and feedback system for wear down and damage.

5) Full stroke ahead and astern to be verified and correct blade position feedback and indication verified.

6) Examination of steering column and related sealing and bearing.

7) Running test at MCR.

Provided the scheduled oil sampling has been done (see [7.2.1] showing no significant development of particle and/or water contents, the scope described from 2 including 4 can be rescheduled to every alternate complete survey.

If an approved thrusters conditioning monitoring (CM) survey arrangement is in place, opening is required only if any indications of abnormalities are observed.

7.2.4 Inboard parts of the thruster accessible from the inside, such as drive motors, shafting system, gear transmissions, pumps and piping systems, alarm, safety and control systems are covered by the main class surveys of machinery. In addition to geared thrusters this will be applicable for e.g. Voith-Schneider and pump type thrusters.

7.2.5 At each overhaul of the thruster unit the following shall be carried out in the presence of a surveyor to the Society:

- all relevant parts of the components made accessible during overhaul shall be surveyed using adequate methods, such as visual inspection MPI or DP, wear down measurements
- NDT for sub-surface cracking of the tooth flanks
- MPI shall be carried out of gear teeth and at least in way of stress raisers in the shafts
- proper assembly of the thruster shall be verified
- proper gear mesh shall be documented in same extent as required for new thruster.

At the first complete survey after a successfully overhaul, provided:

- the scheduled oil sampling has been done (see [7.2.1]) showing no significant development of particle and/or water contents
- an approved thrusters conditioning monitoring (CM) survey arrangement is in place. Ref. Sec.7 [5.1].

The scope described in [7.2.3] from 2 incl.4 can be rescheduled to every alternate complete survey.
Mounting of the thruster on board shall be verified and function tested.
If an approved thrusters Conditioning Monitoring (CM) survey arrangement is in place, opening is required only if any indications of abnormalities are observed.

8 Survey of podded thrusters for main propulsion and positioning

8.1 General

8.1.1 The requirements in this sub-section apply to thrusters of podded design, here after denoted pods, for propulsion and positioning of the unit.

8.1.2 Pod survey implies a survey of the pod's internal power transmission elements and driving motor enclosed in the pod, strut and steering column. Pods have two scheduled surveys:

— annual
— complete.

For some pod sizes it will be limited access from inside the unit and annual survey should be done to the extent that is practically possibly. Complete survey might require some dismantling.

8.1.3 Parts of the survey may be replaced by an approved condition monitoring arrangement, see DNV Classification note 10.2 Appendix H.

8.1.4 At each overhaul, all relevant parts of the components made accessible shall be presented for survey by the Society, see [8.2.3].

Assembly and mounting on board shall be verified and tested.

8.2 Scheduled surveys

8.2.1 Annual survey

Scope of the annual pod survey by the Society shall include:

— evaluation of lube oil analysis from recognized laboratory
— survey of functionality and calibration of onboard control and monitoring system (incl. alarm functions if fitted for continuous monitoring systems)
— review of insulation resistance (megger-test) records
— maintenance records for various items, such as alarm tests for bilges, bearing inspections, pod inspections, maintenance of the slip rings electrical connections, etc
— visual inspection of pod motor air cooling system
— record of running hours.

8.2.2 Complete survey

The complete survey shall include:

— same as for annual
— examination of drive motor rotor and stator condition and associated equipment, shafts, and stator fixation arrangement
— internal overall survey, check for cleanliness, oil leaks, general condition
— verification of seal tightness
— verification of bearing condition (e.g. Boroscopic examination to be carried out)
— external survey in dry dock, check housing for cracks, corrosion, damage
— verification of seals condition (pod/ship)
— verify condition of slewing gears and bearing.
8.2.3 At overhaul of the thruster unit the following shall be included in addition to the survey requirements given in [8.2.2]:

— all relevant parts of the components made accessible during overhaul shall be surveyed using adequate methods, such as visual inspection and MPI or DP, wear down measurements
— MPI shall be carried out in way of stress raisers in the shafts
— proper assembly of the thruster shall be verified.

Mounting of the thruster on board shall be verified and function tested.

9 Boiler survey
Survey of boilers, steam drums, steam generators and/or pipe arrangements shall be carried out according to the DNV Rules for ships, Pt.7 Ch.1 Sec.5(6).

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

10 Thermal oil heater survey
Survey of thermal oil heaters shall be carried out according to the DNV Rules for ships, Pt.7 Ch.1 Sec.5 [7].

11 Survey of the outside of unit's bottom and related items

11.1 Schedule

11.1.1 The outside of the unit's bottom and related items are to be examined two times in any five (5) year period, with an interval not exceeding three (3) years between examinations.

11.1.2 Consideration may be given at the discretion of the Society, to any special circumstances justifying an extension of the interval.

11.2 Parts to be examined

11.2.1 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.

11.2.2 Self-elevating units
External surfaces of 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.

11.2.3 Column-stabilised units
External surfaces of underwater areas of columns, bracing and their connections, sea chests, and propulsion units as applicable, shall be examined.

11.3 Survey planning and record keeping
Plans and procedures for underwater inspection shall be submitted for review in advance of the survey and made available on board. Submitted data, after review by the Society, will be subject to revision if found to be necessary in light of experience.
12 Survey of towing, temporary and position mooring equipment

12.1 Types of survey

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

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

12.2 Annual survey

Towing, Temporary Equipment are to be subject to visual inspection.

12.3 Renewal survey

The towing and mooring equipment shall be surveyed as follows:

- all chain lockers and anchor stowage arrangements shall be surveyed
- the permanent towing arrangement of the unit shall be surveyed
- the temporary mooring systems shall be surveyed
- function testing of the mooring systems shall be performed.

12.4 Anchor chains; acceptance criteria and repair

12.4.1 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.

12.4.2 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.

12.4.3 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.

12.4.4 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 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.
**12.4.5 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.

**12.4.6 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.

**12.4.7 Gross-distortion**

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

**12.4.8 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.

**12.4.9 Distortion**

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

**12.4.10 Tapered pins**

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

**12.4.11 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

1  General

1.1  Introduction
This section presents the standard extent of surveys for retention of additional service notations applicable to offshore LNG/LPG production and storage units. The requirements shall be applied in addition to those for main class notation presented in Sec.4.

2  LNG or LPG production and/or LNG or LPG storage units and installations

2.1  Application
The requirements in B apply to units or installations with class notations:
LNG or LPG Production Unit or LNG or LPG Production Installation
LNG or LPG Storage Unit or LNG or LPG Storage Installation.

2.2  Survey arrangement
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.

2.3  Annual survey

2.3.1  Structures, supporting equipment and heavy modules applied in the production operation shall be surveyed.

2.3.2  The following items shall be subjected to a general examination:
— storage tank (LNG/LPG/Condensate) openings and pressure/vacuum valves
— produced fluid (LNG/LPG/Condensate) piping systems
— pump and compressor rooms
— escape routes
— fire extinction systems in storage tank and pump/compressor room area
— fire extinguishing system associated with transfer systems

2.3.3  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
— storage tank level measurements
— general alarm system and communication between control stations.

2.3.4  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.
2.3.5 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.

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.

2.4 Cargo handling and containment system – annual survey

Annual survey extent for LNG/LPG related handling and storage systems, outside the processing plant, should generally follow the requirements given in DNV Rules for ships Pt.7 Ch.1 Sec. 2(2.5) and (3.2).

2.5 Complete periodical survey

2.5.1 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.

2.5.2 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.

2.5.3 Function test of instrumentation and safety devices for equipment and systems in [2.3.3] shall be carried out.

2.5.4 The fire extinguishing system in or at:

— storage tank (LNG/LPG/Condensate) area
— pump/compressor room
— engine and boiler room
— helicopter deck
— transfer system areas

shall be surveyed and tested for correct functioning.

2.5.5 It shall be verified that required signboards are in order.

2.5.6 The drainage system of hazardous area shall be surveyed.

2.5.7 The insulation resistance of the electrical installation in the hazardous area shall be checked.

2.5.8 The fireman’s outfit shall be surveyed.

2.5.9 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.

2.6 Cargo Handling and containment system – complete periodical survey

Complete periodical survey extent for LNG/LPG related handling and storage systems, outside the processing plant, should generally follow the requirements given in DNV Rules for ships Pt.7 Ch.1 Sec.4(2.5). Offshore units however have the option of conducting surveys in-situ rather than in drydock.

3 LNG/LPG loading units and installations

3.1 Application

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

LNG/LPG Loading Unit or LNG/LPG Loading Installation.

3.2 Survey arrangement

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

1 General

1.1 Introduction
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.

2 Position mooring equipment

2.1 Application
2.1.1 The requirements in this sub-section apply to units with class notation POSMOOR.
2.1.2 If the unit is in DP mode and not in POSMOOR mode at time of survey and hence equipment’s functionality related to the POSMOOR notation is not available for survey/testing a reduced survey scope may be accepted. Annual or complete survey depending on time since last survey is to be carried out before the mode is taking into use.

2.2 Types of surveys
2.2.1 Annual surveys may be carried out with the unit at operational draft and the mooring system in use. No special inspection aids are required and no disruption to the unit’s operation is intended.
2.2.2 Renewal survey will require appropriate cleaning with good access and adequate lighting.

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

Critical parts of all mooring chains or wires and accessories will be thoroughly visually examined and subjected to extensive NDT when required. The extent and type of survey is dependent on the design such as corrosion protection / allowance and fatigue, see [2.5], [2.6] and [2.7].

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

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

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

The following information shall be submitted to the Society:
   — sample chain/wire/fibre rope certificate
   — sample joining shackle certificate (one of each type of shackle used)
   — design fatigue life
   — fatigue life used since new / last inspection
   — latest inspection reports
   — history of chain/wire/fibre rope, e.g. inspections, chain/ wire/fibre rope breaks, joining shackles
— planned remaining field life
— future inspection plans.

2.3 Annual survey

2.3.1 Accessible and visible parts of the unit’s or installation’s mooring system for position keeping on location shall be inspected.

2.3.2 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.

2.3.3 Thruster operation shall be function tested for units or installations with notation POSMOOR-TA or POSMOOR-ATA.

2.4 Complete periodical survey of fairleads and winches irrespective of fatigue life factors of the mooring system

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

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

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

2.4.3 Special attention shall be given to the holding ability of the windlass. The chain stopper and the resultant load path to the unit’s structure should be inspected and its soundness verified.

2.4.4 Special attention shall be given to the holding ability of the winch and the satisfactory operation of the pawls, ratchets and braking equipment. The soundness of the resultant load path to the unit’s structure shall be verified.

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

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

2.5.1 For mooring systems designed without corrosion protection/allowance and not designed with respect to fatigue the following shall be carried out in addition to [2.5]:

— 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 notation TA and ATA are also to be inspected according to Sec.6 [3] 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.

2.5.2 The survey of steel wire ropes consists of a 100% visual control, and the following items shall be covered:

— the nature and number of wire breaks
— wire breaks at the termination
— localised grouping of wire breaks
— fracture of strands
— reduction of rope diameter including breaking of core
— external wear and corrosion
— deformation
— termination area.

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

2.5.4 For acceptance/rejection criteria the following standards shall be used as guideline:
— for fibre rope: DNV-RP-E304
— for chain; Sec.4 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%.

2.6 Complete periodical survey – fatigue design life factor 3

2.6.1 A survey scheme as outlined herein will only apply for mooring systems with recommended connection elements. The scheme applies to all production and/or storage units designed according to:
— DNV MOU Rules Pt.6 Ch.2 Position Mooring (POSMOOR), dated January 1996 (Design life factor 3)
— DNVGL-OS-E301 Position Mooring, dated June 2001 (Design life factor 3).

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

2.6.3 Assumptions and conditions for acceptance of approach:
— the remaining fatigue life exceeds the expected field life by a factor of 3
— loss of one line will not lead to a critical situation for the installation
— if any defects are found on the chain/wire during visual inspection, all chains/wires are to be pulled for visual inspections
— chain/wire inspection is carried out under supervision by DNV 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 [2.5]
— units with notation TA and ATA are also to be inspected according to DNV Rules for ships Pt.7 Ch.1 Sec.6 [12.3].

2.6.4 All mooring lines shall be inspected offshore by use of ROV within 5 years.
At least 2 out of every 8 chain lines (25%) shall be included in visual /MPI inspection at a suitable offshore or onshore facility as follows:
— 100% visual
— 100% MPI of joining links
— 10% of the links are to have overall MPI (may be reduced for benign waters)
— diameter measurements of the chain link every 100th link. The anchor chains shall be replaced if the diameter of the chain with the breaking strength used in the design is reduced by 2%
— 2-neck measurement values to be noted every 100th link (measurement of the two diameters taken at the neck of the link at the mating surface).
2.6.5 All the remaining chain/wires shall be ROV inspected with respect to the following:
   — overall visual inspection (including cleaning if necessary)
   — go/no go gauge on 2 link wear every 100th link
   — wear and scouring in touch down area
   — anchors and anchor jewellery
   — chain/wire attachments to the hull shall be surveyed visually as far as possible, if not accessible by ROV
   — wear and tear in chain links where the mooring line is locked in the chain stopper
   — chain links in the fairlead pockets and close to fairleads shall be given special attention
   — six strand wire ropes shall be inspected according to [2.6.2].

2.6.6 If the ROV inspection reveals defects that are considered as critical, i.e. cracks, severe pitting and wear and tear, a more detailed inspection including MPI will be required.

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

2.7 Complete periodical survey – fatigue life factor 5-8 or greater

2.7.1 The requirements in this sub-section are valid for mooring system design according to:
   — DNV MOU Rules Pt.6 Ch.2 Position Mooring (POSMOOR) dated January 1996 (design life factor 10)
   — DNVGL-OS-E301 Position Mooring, dated June 2001 (design life factors 5 - 8).

2.7.2 For assumptions and conditions for acceptance of approach, see [2.7.4].

2.7.3 All mooring lines shall be inspected offshore by use of ROV during a 5 years period as follows:
   — 100% overall visual inspection (including cleaning if necessary)
   — diameter measurements of the chain link every 100th link of at least 1 out of 8 chains lines (12.5%). The anchor chains shall be replaced when the diameter of the chain with the breaking strength used in the design is reduced by 2%. If unexpected wear and tear or corrosion reveals, the diameter measurements shall be extended. The plan for the extended inspection shall be approved by the surveyor.
   — 2-neck measurement values to be noted every 100th link (measurement of the two diameters taken at the neck of the link at the mating surface)
   — go/no go gauge on 2 link wear every 100th link
   — wear and scouring in touch down area
   — anchors and anchor jewellery if available
   — chain/wire /fibre rope attachments to the hull shall be surveyed visually as far as possible.

2.7.4 Special attention shall by paid to connection elements such as:
   — LTM shackles and their bolts and locking devices
   — wear and tear of connection elements
   — corrosion with attention to severe pitting
   — steel wire rope sockets and their cathodic protection system
   — chain stoppers
   — wear and tear of chain links in chain stoppers and fairleads
   — damage to the protection (sheathing) of steel wire rope.

2.7.5 If the ROV inspection reveals defects that are considered as critical, i.e. cracks, severe pitting and wear and tear, a more detailed inspection including MPI will be required.
2.7.6 Normally connection elements such as kenter shackles, pear links, C-links and D-shackle with locking pin through bow and bolt, and swivels are not accepted in long term mooring systems. However, if such equipment is accepted installed they shall either be dismantled and subjected to non-destructive testing of all machined surfaces, or be replaced with new elements at least every 5 years.

2.8 Additional requirements - tropical waters only
For units located in “tropical waters” chain measurements shall be taken in the splash zone during a 5 years period, or in case of submerged turrets; in the first 8 m zone below the chain attachment to hull/turret table.
The measurements shall be carried out for at least two lines and comprise:
— 2-neck measurements (crown to crown)
— diameter measurements of the chain link (average over two diameters taken at 90° angle).
For FPSOs/FSOs the measurements can be taken from the lowest draught after offloading and for approximately 8 m upwards towards chain stopper on deck. Measurements are to be taken by rope access personnel, or in case of submerged hull attachment, by divers.
All scaling and growth shall be removed at the location of the measurement points.

3 Dynamic positioning systems
3.1 General
3.1.1 These rules do not include verification of requirements or recommendations in regard to the vessels operation or other characteristics.
3.1.2 The requirements in this sub-section apply to units with class notation:
   DYNPOS or DPS.
3.2 Specific requirements
3.2.1 Qualifier (A)
For units with qualifier (A) given as
   DYNPOS-AUTR(A) or
   DYNPOS-AUTRO(A)
notation, the annual survey shall be carried out in accordance with the requirement for complete survey.
3.2.2 An updated FMEA report with a corresponding FMEA test program shall be kept onboard, and shall be used as basis for the testing.
3.2.3 For units in POSMOOR
If the unit is in moored position and not in dynamic positioning mode at time of survey and hence the equipment’s or functionality related the dynamic positioning is not available for survey/testing a reduced survey scope may be accepted. Annual or complete survey depending on time since last survey is to be carried out before the mode is taking into use.

3.3 Annual and complete survey
See DNV Rules for ships Pt.7 Ch.1 Sec.6 [12].

4 Loading computers for damage control
4.1 Application
The requirement in this sub-section applies to units with class notation:
LCS.
4.2 Annual survey and complete surveys
It shall be checked that the approved in-service test programme for all sensors has been followed.

5 Production plant

5.1 Application
The requirements in this section apply to units or installations with class notation:
PROD (LNG) or PROD(LPG).

5.2 Survey arrangement
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.

5.3 Annual survey
5.3.1 An overall survey of production related equipment, structures and systems with particular attention to structural integrity, fire or explosion hazards, safety systems and personnel protection shall be carried out. If deemed necessary by the surveyor running test, NDT, and/or opening up of equipment may be required.

5.3.2 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.

5.3.3 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.

5.3.4 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.

5.3.5 High pressure or capacity pumps and compressors shall be externally surveyed and function tested as deemed necessary by the surveyor.

5.3.6 Piping systems including flexible pipes shall be surveyed as deemed necessary by the surveyor.

5.3.7 Pressure relief and depressurising valves shall be surveyed and tested as deemed necessary by the surveyor.

5.3.8 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.

5.3.9 Survey of accessible parts of the following structures shall be carried out to confirm structural integrity and condition of securing arrangement:
— flare or vent
— pancakes
— skids.

5.3.10 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.

5.3.11 Drainage system for produced liquids for hazardous areas shall be surveyed.

5.3.12 Water protection system in process area shall be surveyed and function tested as deemed necessary by the surveyor.

5.3.13 Drainage and containment system for cryogenic fluids and spray protection measures shall be surveyed.

5.4 Complete periodical survey

5.4.1 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.

5.4.2 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.

5.4.3 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.

5.4.4 Correct setting of valves shall be confirmed.

5.4.5 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.

5.4.6 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.

5.4.7 Structural condition of the venting/flaring arrangement shall be surveyed. NDT of main structural components may be required as deemed necessary by the surveyor.

5.4.8 The fixed fire protection systems in process area and hydrocarbon loading/unloading area shall be surveyed and tested for correct functioning.

5.4.9 Function test of safety devices and instrumentation listed in [5.3.10] shall be carried out.

6 Regasification

6.1 Application

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

6.2 Annual and complete survey

See DNV Rules for ships Pt.7 Ch.1 Sec.6 [37].

7 Helicopter deck

7.1 Application

7.1.1 The requirements in this sub-section apply to units with class notation HELDK.

For the additional survey requirements for this notation with the qualifier (N) as required by the Norwegian authorities is referred to DNVGL-SI-0166 Ch.3.
7.2 Complete survey
See DNV Rules for ships Pt.7 Ch.1 Sec.6 [8].

8 Crane

8.1 Application
8.1.1 The requirements in this sub-section apply to units with class notation: CRANE.
8.1.2 For the additional survey requirements in CRANE(N) as required by the Norwegian authorities is referred to DNVGL-SI-0166 Ch.3.

8.2 Annual and complete surveys
For annual and complete survey see DNV Rules for ships Pt.7 Ch.1 Sec.6 [6].

9 Additional fire protection arrangements

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

9.2 Complete survey
Complete surveys at an interval of 2.5 years shall be i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6 [11].

10 Periodically unattended machinery space and machinery centrally operated

10.1 Application
The requirements in this sub-section apply to units with class notations:
E0
ECO.

10.2 Annual and complete surveys
Annual and complete surveys shall be i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6 [25].

11 Hull monitoring system

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

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

11.3 Annual survey
See DNV Rules for ships Pt.7 Ch.1 Sec.6 [14].
12 Noise, vibration and comfort rating

12.1 Application
The requirements in this sub-section apply to units with the class notations VIBR.

12.2 General
Before the notation can be issued, vibration measurements at the different positions and components, as described in the Protocol, shall be carried out. The Protocol is a table of positions to be measured worked out prior to the measurements based on a risk evaluation and experience. If minor excessive vibration levels are found for non-critical components or positions, dispensation may be given, which may also include a requirement for new measurements, after a limited period. This will be decided by the Society.

12.3 Complete
Complete measurements at the different positions, as described in the Protocol, shall be carried out by or under the supervision of a surveyor of the Society.

13 Cold climate notations

13.1 Winterization application
These requirements apply to units with the following class notation WINTERIZED.

13.2 Annual survey

13.2.1 The Anti-Icing, De-Icing and Anti-Freezing measures applied onboard shall be subject to a general survey to confirm continued satisfactory performance, including the review of the onboard records covering any periods of severe cold climate weather conditions since the last annual survey. The survey shall also assess the effectiveness of the mechanical protection provided against mechanical/water damage for equipment subjected to frequent de-icing activities.

13.2.2 The thermal insulation arrangements relevant to cold climate operations shall be surveyed, with particular attention to the thermal insulation for piping and pressure vessel insulation in areas exposed to weather or deluge. The vessel's “corrosion under insulation” management program shall be reviewed and re-assessed based on the survey findings.

13.2.3 The stability records onboard shall be reviewed to confirm that vessel is adequately monitoring/accounting for potential and actual ice loadings on an ongoing basis.

13.2.4 The fire fighting equipment exposed to cold climate conditions shall be surveyed, with particular attention that the extinguishing agents are appropriate for cold climate conditions.

13.2.5 The electrical heat tracing systems shall be generally surveyed, with particular attention to the insulation resistance values.

13.2.6 The anti-skid coating on exposed deck surfaces shall be surveyed.

13.2.7 The drainage arrangements for meltwater/ washdown water on exposed decks shall be surveyed, with particular attention to the anti-freezing arrangements for the drains.

13.2.8 The drying arrangements for the compressed air systems shall be surveyed.

13.2.9 The Personal Lifesaving Appliances shall be subject to general surveyed to confirm that their storage arrangements are suitable for cold-climate conditions.

13.2.10 The information onboard related to snow/ice "dropped object" incidents/near misses since the last annual survey shall be presented to the attending surveyor for assessment.

13.2.11 The information onboard related to the continuing effectiveness of the lighting (floodlights, emergency lights, navigation lights, helideck lights, helicopter obstacle lighting, ice searchlight) shall be presented to the attending surveyor for assessment.
13.2.12 For units with the qualifier POLAR, the ice searchlight shall be function tested.

13.2.13 For units with the qualifier POLAR, the annual survey requirements for class notation CLEAN shall be carried out, as applicable.

13.3 Complete survey
The heat tracing systems shall be examined.
Electrical heat tracing systems shall be examined with particular attention for damage/deterioration to the heat tracing cabling, recent megger-test results shall be presented to attending surveyor. Heat tracing systems using fluids as the heating medium shall be subject to pressure test to maximum working pressure.

14 Environmental notations

14.1 Ballast water management systems
14.1.1 Application
The requirements in [14.1] apply for vessels with the notation BWM, CLEAN and/or CLEAN DESIGN.

14.1.2 Annual, intermediate and complete surveys
Annual, intermediate and complete surveys shall be carried out i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6(22).

14.2 CLEAN or CLEAN DESIGN
14.2.1 Application
The requirements in [14.2] apply to units with class notations CLEAN or CLEAN DESIGN.

14.2.2 Annual survey
Annual surveys shall be carried out i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6 [16].

14.3 Recycling
14.3.1 Application
These requirements apply for units with the class notation RECYCLING.

14.3.2 Annual survey
Complete surveys shall be carried out in line with DNV Rules for ships Pt.7 Ch.1 Sec.6 [35].

14.3.3 At replacement, or significant repair of the structure, equipment, systems, fittings, arrangements and material, the owner may request an occasional survey as described in DNV Rules for ships Pt.7 Ch.1 Sec.6 [35].

14.4 Vapour control systems (VCS)
14.4.1 Application
These requirements apply for units with the class notation VCS.

14.4.2 Renewal surveys
Renewal surveys shall be carried out i.a.w. DNV Rules for ships Pt.7 Ch.1 Sec.6 [15].

15 Integrated software dependent systems

15.1 General
15.1.1 Application
The requirements in this sub-section apply to units with the class notation ISDS.
15.1.2 Objective
The purpose of the survey is to ensure the confidence that has been built into the unit is actually maintained.

15.1.3 Modifications
The owner is to inform DNV GL whenever a system with the ISDS notation is modified. For major upgrades or conversions of the unit in operation the full set of requirements in DNVGL-OS-D203 may apply.

15.2 Annual survey
15.2.1 The effective implementation and continuous maintenance of the activities required DNVGL-OS-D203 phase E, operation, shall be assessed.
15.2.2 Any changes, introduced after the latest assessment, to the systems within ISDS scope are to be addressed. An impact analysis of changes shall be reviewed and confirmed. Any follow up activities shall be agreed.
15.2.3 Updated records are to be kept and made available for review by the attending surveyor i.a.w. DNVGL-OS-D203 Ch.3 Sec.1 [3.2].

15.3 Complete survey
The complete assessment will have a specific focus on identified process areas or activities. These areas or activities are to be selected based on a discussion with owner of specific focus areas and should also be based on important or frequent findings from the annual assessments carried out since the last complete survey.

16 Special feature notations
16.1 Non self-propelled units
16.1.1 The requirements in [16.1] apply to units with special feature notation NON-SELF PROPELLED.
16.1.2 Extent of surveys of the following items will be restricted to the main safety facets:
   — tailshafts
   — thrusters
   — motors and other equipment for propulsion
   — steering gear.
16.1.3 For these items the scope of classification is to ensure that the equipment does not pose a threat to the unit by its presence onboard when in use. This means the watertightness should be considered and the safety of the equipment for people working in the vicinity must be taken care of. The operation of the equipment is of secondary importance.

16.2 Self-propelled self-elevating units
16.2.1 The requirements in [16.2] apply to self-elevating units with special feature notation SELF PROPELLED.
16.2.2 The extent of the survey shall cover tailshafts, thrusters, motors and other equipment for propulsion and steering gear as defined for main class in Sec.3.

16.3 Tailshaft monitoring
16.3.1 Application
The requirements in [16.3] apply to units with class notation TMON.
16.3.2 General
A tailshaft condition monitoring arrangement (class notation TMON) will be granted for oil lubricated tailshafts that are monitored to ascertain the condition of the tailshaft system during operation, and that
fulfils the design requirements in DNV Rules for ships Pt.4 Ch.4 Sec.1 E300 provided a successful initial survey is carried out.

In such cases DNV GL will not require any specific time interval between propeller shaft withdrawal surveys.

Units with more than 3 years since the last propeller shaft withdrawal are normally to carry out a propeller shaft survey in connection with the TMON initial survey as described in DNV Rules for ships Pt.7 Ch.1 Sec.6 [17.2].

**Guidance note:**
The requirement for a propeller shaft withdrawal at TMON initial survey may be waived on a case by case basis, provided that documentation showing satisfactory condition of the stern tube arrangement is presented to the Society. Such documentation, normally covering the last 3 years, should include:
- monthly measurements of stern tube bearing temperatures with corresponding sea water temperatures, oil consumption, water content in oil
- for vessels with alternative water in oil analysis performed by an accredited laboratory, results from 3 monthly analysis can be accepted
- lub. oil analysis reports from accredited laboratory with conclusion, where available (ref. [16.3.3] d).

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

### 16.3.3 Annual survey
The survey shall include:

a) examination of the TMON record file:

- verification that the on board oil analysis for checking of water content in the stern tube lubricating oil has been performed monthly and recorded in the file by the Chief Engineer.

**Guidance note:**
As an alternative to the monthly onboard checking of the water content in the oil, submitted lubricating oil samples to an accredited laboratory every 3 months is acceptable (ref. [16.3.3] d) below).

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

- verification that the stern tube bearing temperatures have been recorded every month with highest and lowest temperatures, with corresponding seawater temperatures
- verification that the consumption of stern tube lubricating oil has been recorded for every month by the Chief Engineer
- if there are performed any overhauls, complete oil changes or similar, this shall be recorded in the TMON record file on the overhaul page
- verify functionality of tailshaft grounding device, where applicable
- verification that wear down measurements have be taken at every dry-docking.

b) testing of stern tube aft bearing alarm
c) visual inspection of inner and outer shaft seal for leakage, as far as practicable.
d) verification that documentation of laboratory analysis is kept on board:

- at least two oil samples per year shall be submitted to an accredited laboratory for analysis testing of water content, iron, chromium, copper, tin, silicon, Na (sodium) and magnesium
- the documentation shall contain a conclusion regarding the condition of the oil and its suitability for further use
- the report from the latest oil analysis shall be less than three months old.
## SECTION 7 MACHINERY ALTERNATIVE SURVEY ARRANGEMENTS

### 1 General

#### 1.1 General

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

<table>
<thead>
<tr>
<th>Table 1 Machinery surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>**Main propulsion and <strong>DYNPOS</strong></td>
</tr>
<tr>
<td>Prime movers</td>
</tr>
<tr>
<td>Diesel engine</td>
</tr>
<tr>
<td>Steam turbines 2)</td>
</tr>
<tr>
<td>Gas turbines</td>
</tr>
<tr>
<td>Electrical main motors, including frequency converters</td>
</tr>
<tr>
<td>Thrust-and intermediate shaft including bearings, clutch, couplings and torsional and axial vibration damper</td>
</tr>
<tr>
<td>Tailshaft</td>
</tr>
<tr>
<td>Gears 3)</td>
</tr>
<tr>
<td>Shafts, pinions, gear wheels, couplings and bearings, clutch</td>
</tr>
<tr>
<td>Power Take Off /In (PTO/PTI)</td>
</tr>
<tr>
<td>Power consumption</td>
</tr>
<tr>
<td>Propeller</td>
</tr>
<tr>
<td>Thruster, Pods</td>
</tr>
<tr>
<td><strong>Steering</strong></td>
</tr>
<tr>
<td>Actuator</td>
</tr>
<tr>
<td>Hydraulic pumps</td>
</tr>
<tr>
<td>Electric motors</td>
</tr>
<tr>
<td>Pipes, valves and filters</td>
</tr>
<tr>
<td><strong>Auxiliary machinery</strong></td>
</tr>
<tr>
<td>Prime movers</td>
</tr>
<tr>
<td>Diesel engine</td>
</tr>
<tr>
<td>Turbines 2)</td>
</tr>
<tr>
<td>Electrical motors, including frequency converters</td>
</tr>
<tr>
<td>Hydraulic motors</td>
</tr>
<tr>
<td>Thruster</td>
</tr>
<tr>
<td>Generators</td>
</tr>
<tr>
<td>Shafts, couplings, clutch and torsional and axial vibration damper</td>
</tr>
</tbody>
</table>
### Table 1  Machinery surveys (Continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Machinery Renewal and Machinery Continuous</th>
<th>Machinery PMS</th>
<th>Machinery CM</th>
<th>PMS/RCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shafts, pinions, gear wheels, couplings and bearings</td>
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<td>3</td>
<td>4*</td>
<td>5</td>
</tr>
<tr>
<td>Power Take Off (PTO)</td>
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<td>3</td>
<td>4*</td>
<td>5</td>
</tr>
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<td>Pumps, Electrical motor and starter</td>
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<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Heat exchangers</td>
<td>1</td>
<td>3</td>
<td>3 or 4</td>
<td>5</td>
</tr>
<tr>
<td>Pipes, valves and filters</td>
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<td>3</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Pumps, electrical motor and starter</td>
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<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>Heat exchangers</td>
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<td>3</td>
<td>3 or 4</td>
<td>5</td>
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<tr>
<td>Pipes, valves and filters</td>
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<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Pumps, electrical motor and starter</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>Heat exchangers</td>
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<tr>
<td>Pipes, valves and filters</td>
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<td>3</td>
<td>5</td>
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<tr>
<td>Pumps, electrical motor and starter</td>
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<td>Heat exchangers</td>
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<tr>
<td>Pipes, valves and filters</td>
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<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Pumps, Electrical motor and starter</td>
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<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ejectors/ Educturs</td>
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<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Pipes, valves and filters inside machinery space</td>
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<td>3</td>
<td>3</td>
<td>5</td>
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<td>Boiler, main and auxiliary</td>
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<td>Separate survey Sec.9</td>
<td>Separate survey Sec.9</td>
<td>Separate survey Sec.9</td>
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<tr>
<td>Pipes, valves and filters inside machinery space</td>
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<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Pumps, electrical motors and starters</td>
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<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Turbines</td>
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</tr>
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<td>Pipes, valves and filters</td>
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<td>Air compressors, piston</td>
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<td>Pipes, valves and filters inside machinery space</td>
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### Table 1 Machinery surveys (Continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Machinery Renewal and Machinery Continuous</th>
<th>Machinery PMS</th>
<th>Machinery CM</th>
<th>PMS/RCM</th>
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<td>Pipes, valves and filters inside machinery space 10)</td>
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<td>Controllable pitch propeller oil distribution box</td>
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<td>3 or 4</td>
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<td>4*</td>
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<td>Screw pumps</td>
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<tr>
<td>Electrical motors and starters</td>
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<td>3</td>
<td>3 and 4</td>
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</tr>
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<td>Turbines 2)</td>
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<td>4*</td>
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<tr>
<td>Heat exchangers</td>
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<td>3 or 4</td>
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<tr>
<td>Pipes, valves and filters 10)</td>
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<td>3 and 4</td>
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<tr>
<td><strong>Control, alarms, safety systems and indications</strong></td>
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<td><strong>Control systems</strong></td>
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<td>Steering</td>
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<tr>
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<td><strong>Safety systems</strong></td>
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<tr>
<td>Steering</td>
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<td>Auxiliary machinery</td>
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<td><strong>Indicating systems</strong></td>
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<td>Propulsion</td>
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<td>3</td>
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<tr>
<td>Steering</td>
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<td>3</td>
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<td>Auxiliary machinery</td>
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<td>3</td>
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<tr>
<td>Cargo handling systems</td>
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<td>3</td>
<td>3</td>
<td>5</td>
<td></td>
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<td>Switchboards</td>
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<td>Distribution board</td>
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<td>Cable installations</td>
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<td>Navigation light controllers</td>
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<td>5</td>
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</tr>
<tr>
<td>Mechanical ventilation of battery lockers or rooms</td>
<td>2</td>
<td>3</td>
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</table>
### 1.2 Machinery survey arrangements

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.

#### Table 1 Machinery surveys (Continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Machinery Renewal and Machinery Continuous</th>
<th>Machinery PMS</th>
<th>Machinery CM</th>
<th>PMS/RCM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survey method 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forced draught fan</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Other turbines 2)</td>
<td>1</td>
<td>1</td>
<td>4*</td>
<td>5</td>
</tr>
<tr>
<td>Sea and sanitary valves</td>
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<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Incinerator arrangement</td>
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<td>3</td>
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<td>5</td>
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<tr>
<td>Inert arrangement for vessels without notation</td>
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<tr>
<td>Instrumentation and automation for vessels without notation E0 or ECO</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

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.

   *Survey method No. 5*: Verification of maintenance records, assessment of maintenance handling, review of management, safety incidents and continuous improvement processes and fully or partly opening of equipment, if found necessary by surveyor.

2) As an alternative to Survey method No.1, a performance test and a condition analysis may be carried out.

3) Selected bearings shall be examined. Gears and roller bearings may as far as practicable be inspected without dismantling complicated assemblies.

4) Strainers to be opened. Selected pipes and main engine(s) system tanks to be surveyed for sludge.

5) Valves, cocks and strainers to be opened.

6) For steam pipes with temperature 450°C and above: Crack detection and/or thickness examination may be required. Selected pipes to be pressure tested to 1.5 times working pressure. Steam pipes of copper to be pressure tested to 2 times working pressure.

7) To be pressure tested to 1.2 times working pressure if internal survey not possible.

8) For piping systems outside machinery spaces, see DNV Rules for ships Pt.7 Ch.1 Sec.4 (2.1.14).

9) Settling tanks and daily service tanks for both heavy fuel oil and diesel oil as well as lubrication oil circulation tanks shall be internally surveyed for assessment of tank condition and presence of sludge. If inspection and cleaning of above mentioned tanks have been carried out by the crew during the last 12 months and relevant log extracts are provided and confirmed, this may be credited as surveyed at the surveyor's discretion.

10) Valves where the function in the piping system is not evident are to be adequately and readably marked.

11) Filters to be opened and system oil tanks internally surveyed for presence of sludge, dirt and particles.

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).

13) Survey of gear and bearings through inspection openings or by other means (may be carried out concurrent with bottom survey).

14) Opening up and Survey of bearings, gear and shafts and other relevant parts if any indications of abnormalities are observed. Satisfactory maintenance according to manufacturer's recommendations to be documented and considered as a base for extent of possible opening. Any opening up of a thruster to be witnessed by a DNV surveyor.

15) Hydraulic oil, lubrication oil, alarm and safety systems are to be surveyed as applicable for respective systems.

16) In addition to the renewal survey for Machinery CM, a limited internal inspection shall be carried out on main steam turbines (ref. DNV Classification Note 10.2 Ch.3.1).
The following survey arrangements are available:

- machinery renewal, see Sec.7 [2]
- machinery continuous, see Sec.7 [3]
- machinery PMS (Planned Maintenance System), see Sec.7 [4]
- machinery CM (Condition Monitoring), see Sec.7 [5]
- offshore CM (Condition monitoring), see Sec.7 [5]
- PMSRCM (Planned Maintenance System, RCM based), see Sec.7 [4].

2 Machinery renewal

2.1 General

2.1.1 Machinery renewal is the default survey arrangement for machinery.

2.1.2 Machinery systems and equipment with corresponding survey method for this arrangement see Table 1.

2.2 Annual survey

Annual survey of the machinery and safety systems shall be carried out according to Sec.4 [2.4] and [2.5].

2.3 Renewal survey

The survey shall include the machinery systems and equipment given in the vessels Inventory List at least to the extent specified in Table 1.

2.4 Structure and equipment for column-stabilised and self-elevating units

2.4.1 The survey may be performed on location provided that the structure, including submerged parts, can be thoroughly inspected as specified in the in-service inspection programme. If required, underwater inspection shall be in accordance with an approved procedure, and using approved personnel and equipment.

2.4.2 Units or installations with submerged primary structural members allowing internal access for inspection may be omitted from external survey, subject to satisfactory results from the internal survey.

2.4.3 Primary structural members which are flooded shall be subject to external survey unless otherwise agreed. The extent of survey is given in the in-service inspection program, and will comprise visual inspection of vital parts and may include non-destructive testing of highly stressed areas.

2.4.4 The means for leakage detection of dry bracings shall be function tested.

2.4.5 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 Sec.4 [4.2.7].

Condition of protective coating according to Sec.4 [1.2.1] 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.

2.4.6 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.

2.4.7 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.
2.4.8 Remote controls and alarm systems for doors, hatches and watertight dampers shall be surveyed and function tested.

2.4.9 Guard rails shall be examined.

2.4.10 For units or installations subjected to annual load line inspections by DNV, the requirements in [2.4.7] and [2.4.9] are considered covered by this inspection.

2.4.11 The "Appendix to the classification certificate" and the documents referred to therein, shall be verified as kept available onboard the unit.

2.5 Machinery and safety systems for ship-shaped units or installations

2.5.1 Survey requirements for machinery and safety systems on ship-shaped units or installations are given in the DNV Rules for ships, Pt.7 Ch.1 Sec.2 [3].

2.5.2 Tank level measurements and helifuel systems shall, however, be surveyed in accordance with offshore unit requirements, see Sec.4 [2.5].

2.6 Machinery and safety systems for column-stabilised and self-elevating units or installations

2.6.1 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.

2.6.2 Boilers shall be externally surveyed. The general condition of the boiler including mountings, piping and insulation shall be ascertained and the surveyor may require opening, removal of insulation etc. if found necessary. Safety valves, instrumentation and automation systems shall be tested in operating condition when found necessary by the surveyor.

2.6.3 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.

2.6.4 The brake torques of jacking machinery on self-elevating units shall be checked. Where provided, the fixation rack system shall also be checked.

2.6.5 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 Table 1.

2.6.6 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.

2.6.7 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.

3 Machinery continuous

3.1 General

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

3.1.2 Machinery systems and equipment with corresponding survey method for this arrangement see Table 1.

3.1.3 Machinery continuous is operated under the following conditions:

1) The machinery systems are to be surveyed according to Table 1.
2) General requirements for intervals for continuous surveys are given in the DNV Rules for ships Pt.7 Ch.1 Sec.7 [3].

3.1.4 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.

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.

3.2 Annual survey

Annual survey of the machinery and safety systems are carried out according to Sec.4 [2.4] and [2.5].

3.3 Renewal survey

Renewal survey is not a part of this survey arrangement.

4 Machinery planned maintenance system

4.1 General

4.1.1 Machinery planned maintenance system (PMS) is a survey arrangement based on audits of an approved and implemented planned maintenance system onboard which shall cover all component surveys in the machinery list for the vessel.

a) The audits shall be part of the main class annual survey.

b) The Owner/Manager is responsible for ensuring that the chief engineer/maintenance supervisor is qualified to register and carry out maintenance on all class related machinery items.
Guidance note:

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c) The Chief Engineer/Maintenance Supervisor shall be the responsible person on board in charge of the Machinery PMS.

d) If the conditions for the survey arrangement are not complied with, or in case of change of technical management of the vessel, the survey arrangement machinery PMS will be cancelled and substituted by survey arrangement machinery continuous or survey arrangement machinery renewal, as applicable.

4.1.2 The survey arrangement machinery PMS shall be operated under the following conditions:

a) The surveyor may credit relevant component surveys in the machinery list based on the recorded maintenance, except for the following, that shall be surveyed by the Society:

- Main steam piping
- Feed water piping
- Steam turbines for propulsion and power generation
- Reduction gears in steam driven propulsion plants.

b) Change or a major upgrade of planned maintenance system shall always be notified to the Society and will be subject to new approval.

Guidance note:
Major upgrade meaning changes that affects reporting of maintenance on machinery items, or changes that might implicate additional training of crew.

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c) Back up of the PMS database, making it possible to restore all data, shall be taken at least once a week.

d) The surveyor can, if found necessary, require a re-survey of items reported by the Chief Engineer/Maintenance Supervisor.

e) All damage/break-downs on class related machinery items shall be reported to class and included in the system.

4.1.3 The planned maintenance system onboard shall comply with the following requirements:

a) The system shall be computer based.

b) The system shall be able to produce a maintenance history report of all main overhauls carried out for a specific time period.

c) Corrective maintenance shall be possible to be especially identified in the system and traceable.

d) The system shall include at least the applicable machinery and equipment listed in Table 1. All these components shall be identified with their belonging the Society’s machinery item code or alternatively the full name of the component survey according to the machinery list for the specific unit.

e) All main overhaul jobs on class related components shall be identified as class related jobs in the maintenance system.

By units with class notation E0 or ECO, the system shall include the periodical testing of control, alarm and safety components and systems required by DNV Rules for ships Pt.6 Ch.3 Sec.1. These jobs shall be especially identified in the system and include test routines and set-points based on DNV Rules for ships Pt.6 Ch.3 Sec.3 Table A1 to Table A10.

g) The system is subject to approval by the Society, either a Type Approved system or non-Type Approved system.

h) Changes to the system (maintenance intervals, job descriptions, etc) shall be traceable and documented and presented to the attending surveyor at the next annual survey for acceptance.

Guidance note:
Documentation in order to adjust maintenance intervals, job descriptions etc, may be accepted by attending surveyor on the basis of maintenance reports, wear measurement forms, service letters from maker etc.

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i) The job descriptions for the main overhaul for all the machinery and equipment subject to class shall be available either as part of the planned maintenance system and/or as specific reference to makers' manuals. The extent of the job descriptions either within the PMS or in the referred manual, shall be self-explaining to a surveyor. When references to makers' manuals are made, these shall be ready available onboard.

j) Job intervals shall be based on maker's recommendations, adjusted for prevailing operational conditions. Deviations from initial intervals shall only be accepted when documented experience can justify changes.

Guidance note:
For items with few running hours (compared to makers maintenance recommendations) in one class period (e.g. standby functions), or with no running hours recommendations, calendar-based maintenance are recommended.

k) The job descriptions and maintenance history shall be in English.

4.1.4 The approval process for the Machinery PMS survey arrangement is a two step process: The first step, called "Management Approval", is a review by the Society of the set-up of the planned maintenance system prior to the initial survey onboard the first unit in a fleet. The final step is the initial survey onboard each applicable unit, see [4.1.5]. This process applies to each type of planned maintenance system used by the management company.

The "Management Approval" includes, but is not limited to:
— examination of examples of points [4.1.3] items a) to k)

The "Management approval" is valid until cancelled in writing from the Society.

4.1.5 An initial survey shall be carried out onboard the unit in order to verify that the system has been implemented in accordance with the approved documentation and that the system is used as intended. It is recommended that the planned maintenance system has been operated for at least 6 months before the initial survey is carried out.

During the initial survey, it will be verified that:

a) The chief engineer/maintenance supervisor is familiar with the planned maintenance system and is able to demonstrate the different functionalities in the system to the attending surveyor.

b) The general condition of the machinery and the machinery systems in the engine room is good.

c) All the requirements in [4.1.3] except h) are complied with.

Provided the initial survey is carried out with a satisfactory result, the Survey Arrangement Machinery PMS will be granted and a certificate will be issued stating system name and conditions for the survey arrangement for the specific unit.

Guidance note:
Prior to the initial survey onboard, requirements listed under [4.1.5] item c) may be carried out in the owner's/ manager's office, if found convenient both to the Society and owner/manager. This requires that the onboard database is available in subject office. Results of this review must be given to the attending surveyor onboard.

4.1.6 The components in the machinery list are credited at the first annual survey after their main overhaul is carried out.

This also applies if the maintenance interval is based on running hours and the time between main overhauls for this reason exceeds 5 years.

4.1.7 An annual survey shall be carried out onboard the unit in order to verify that the conditions for maintaining the survey arrangement machinery PMS are complied with.

During the annual survey, in addition to [4.1.6], the following will be verified:

a) The unit machinery PMS certificate is valid for present management.
b) The Chief Engineer/Maintenance Supervisor is familiar with the planned maintenance system and is able to demonstrate the different functionalities in the system to the attending surveyor.

c) Reasons for overdue/ postponed (deferred) jobs shall be explained.

d) General maintenance is satisfactory, including an in depth examination of reported maintenance history since last annual survey, to the extent deemed necessary by attending surveyor.

e) The general condition of the machinery and the machinery systems in the engine room is good.

f) The onboard machinery list is reflecting the machinery list of the Society.

Documented changes to the system (maintenance intervals, job descriptions, etc.) shall be presented to the attending surveyor for acceptance.

5 Machinery condition monitoring

5.1 General

5.1.1 Machinery condition monitoring (CM) is a survey arrangement based on audits of the implemented and approved condition monitoring programme. 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 DNV Classification note 10.2.

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

- Approved CM programme (see [5.2])
- Successful implementation survey (see [5.3])

5.1.3 Machinery systems and equipment with corresponding survey method for this arrangement see Table 1.

5.1.4 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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5.2 Approval of CM programme

5.2.1 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.

5.2.2 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.

5.2.3 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 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 * is subject to approval.

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5.3 Implementation survey
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 programme 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.

5.4 Annual survey
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.

5.5 Renewal survey
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.

6 PMS RCM

6.1 General

6.1.1 PMS RCM allows the owner to arrange surveys as part of his planned maintenance system, based on analysis of applicable functions onboard the vessel. PMS RCM is a survey arrangement based on review of the company management, the RCM analysis and the implemented maintenance system. It is required to be operating according to an RCM analysis or equivalent maintenance strategy and to comply with the Machinery PMS before entering PMSRCM. Condition Monitoring may be implemented. PMSRCM survey arrangement is applicable to main class machinery.

6.1.2 The following conditions must be fulfilled before the survey arrangement is valid:
— approved RCM analysis (see [7.2])
— successful management review (see [7.2])
— successful implementation survey (see [7.3]).

6.1.3 Machinery systems and equipment with corresponding survey method for this arrangement see Table 1.

6.1.4 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 RCM based maintenance strategy. It is therefore recommended that an assessment of the RCM based maintenance system is performed prior to submission of application.

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6.2 Approval of RCM based maintenance programme

6.2.1 Following conditions must be fulfilled before applying:
— compliance with the specifications for machinery PMS, except [4.1.4]
— management and organisation in place to support continuous improvement and maintenance of a high safety level
— procedures and systems for performing the RCM analysis.

6.2.2 Following to be verified during management review:
— operational and maintenance philosophy and organisation supporting an RCM PMS survey concept
— organisational chart has the necessary resources and responsibilities defined for an RCM PMS strategy to be supported adequately
— a continuous improvement methodology is implemented
— adequate skill level on involved personnel.

6.2.3 Approval of the analysis is based on the following:
— a Reliability Centred maintenance analysis must have been performed according to IECF 60300-3-11, Application Guide Reliability Centred Maintenance or alike
— the RCM team must consist of experienced people related to the asset that is analysed. If the asset analysed is a new asset, the analysis process should be performed by the use of substitution of experience from comparable assets
— team members representing all relevant operational and Maintenance discipline (electrical, electronic, mechanical) should have been involved
— experienced RCM facilitator coming from outside the asset organisation should have been used
— a documented and approved RCM methodology is in place describing the RCM analysis methodology applied, relevant input data, decision logic and risk matrix.
— references to documentation used are provided
— methodology used for selecting systems
— an inventory list, sorted after unit no or tag no that shows the criticality of all units shall be produced.

Guidance note:
It is recommended that the analysis is performed on a level in the equipment hierarchy where it is possible to identify a suitable failure management policy. For most system this will typically imply that most of the analysis is performed at the level where individual pumps, racking arms, motors etc can be found.

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6.2.4 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 [7] for further details. Condition monitoring of equipment will normally be approved on an individual equipment.

6.3 Implementation survey
A survey of the maintenance system is carried out when the RCM based preventive maintenance routines have been implemented. After approximately 6 months of operation the proper operation of the system is
surveyed onboard. In order to verify the crew’s general knowledge, the implementation survey is to be carried out during normal operation (voyage survey). Provided a successful implementation survey, a certificate for the Machinery PMS RCM will be issued stating conditions for the survey arrangement.

6.4 Annual survey
To maintain the validity of the survey arrangement PMS RCM, an annual survey of the implemented maintenance programme is required, preferably during normal operation. This survey replaces the annual and renewal surveys of machinery for components included in the PMS RCM scheme. The purpose of this survey is to review and evaluate the previous period’s maintenance activities and to ensure that the system is operated correctly.

The annual survey shall consist of:

— spot check of equipment included in the scheme
— verification of maintenance records
— assessment of maintenance handling onboard.

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

6.5 Renewal survey

6.5.1 To prolong the validity of the survey arrangement a renewal survey of the implemented PMS RCM Survey arrangement is required. This can be done during normal operation or during renewal survey. The purpose of the survey is to ensure that the conditions for approval of the system are still adhered to and that the results of the maintenance work achieve acceptable results. The following will normally be reviewed, in addition to scope of annual survey:

— management
— safety incidents
— continuous improvement processes
— functional testing of critical equipment
— verification of critical piping and structures.

The survey scope of each of these topics is outlined in [6.5.2] to [6.5.6].

6.5.2 The management of the unit is to be surveyed during renewal survey in order to verify that the basis of the survey arrangement is still intact. This will include review of procedures, verification of crew training and interviews.

Guidance note:
During the implementation of PMSRCM a review has been made of several parts of the owner’s organization. During renewal survey the same topics will normally be covered as spot checks. However major changes of the organization could give rise to an increase in the survey scope.

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6.5.3 The review of safety incidents is conducted on a spot check basis. It is to be ensured that maintenance related incidents result in traceable improvement actions and that the maintenance work itself is conducted in a safe manner.

6.5.4 The systematic continuous improvement effort is to be evaluated during the renewal survey. It is to be verified that the company procedures are complied with. Additionally it must be verified that the effort actually causes traceable improvements in the preventive maintenance system.

Guidance note:
It is required that the continuous improvement work utilizes input from safety reports, feedback from maintenance personnel and analysis of relevant systems. Furthermore the results of the improvement actions shall be evaluated by the owner in order to ensure that real improvements are achieved.

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6.5.5 The functional testing is intended to verify the physical results of the maintenance work by observing the function of the equipment.
6.5.6 The critical structures are verified by review of NDT jobs in the maintenance system. However, if other tasks have been identified by the RMC analysis for the relevant failure modes, these tasks will normally be accepted as an alternative to NDT.

7 Offshore condition monitoring

7.1 General

7.1.1 Offshore condition monitoring (CM) is a survey arrangement based on use of an approved service provider for execution of condition monitoring. A comprehensive approval process of the service provider is conducted in order to verify the procedures, competence and resources of the company. The implementation survey and the annual survey of this arrangement take place onshore or offshore. The survey arrangement is based on compliance with ISO 17359 and can be applied to main class machinery.

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

— Approved service provider
— Successful implementation survey (see [7.2])
— It is normally required to have survey arrangement PMS implemented, see [4].

7.1.3 Machinery systems and equipment with corresponding survey method for this arrangement see Table 1.

7.1.4 In case of change of manager/owner, the survey arrangement is automatically cancelled. The arrangement is also cancelled if the service provider loses his approval.

Guidance note:
Generally it is necessary to comply with ISO17359 or similarly recognised standard.

7.1.5 In order to facilitate continuous improvement within the service provider organisation the vessel owner must provide feedback at intervals not exceeding 12 months. Also the user is to inform DNV if the service is not delivered in a competent way.

7.2 Implementation survey

7.2.1 An implementation survey is required in order to verify that the CM programme is properly.

7.2.2 Implemented and operated. It shall be demonstrated that the onshore and offshore maintenance and administrative systems ensure a proper operation of the survey arrangement. The survey normally consists of an offshore part and an onshore part. The survey should take place when the system has been operating for approximately 6 months. Based on similar recent survey with the same owner the onshore or offshore survey may be omitted.

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

— maintenance strategy
— implementation of condition monitoring in the planned maintenance system
— training programme/plan for involved crew
  If the crew does measurements, certification to ISO category 1 is normally required.
— name and address of the appointed service provider
— a list of the machinery included in the arrangement drawings that show the measuring points and an overview of the installed equipment
— communications plan that outlines the owner’s communication with DNV and the service provider
— EX certificates are to be provided if equipment is installed in hazardous areas.
Guidance note:
The choice of conditioning monitoring strategy has substantial influence on the scope of work of the crew. For instance an online system requires another level of involvement than use of handheld measuring equipment. This should be reflected in the maintenance system, training manuals etc. It should be verified that the process complies with ISO17359.

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7.3 Annual survey
To maintain the validity of the survey arrangement Offshore CM, an annual survey of the implemented condition monitoring programme is required. Normally the survey takes place onshore, based on submitted documentation from the owner. This survey replaces the annual and renewal survey of machinery and components included in the condition monitoring scheme. The purpose of this survey is to ensure that the system is operated correctly and that the safety integrity level of the vessel is kept intact. Where more than one vessel follow the same scheme, the annual survey can be based on spot checks of a representative selection of vessels

The annual survey shall consist of examination of:
— condition monitoring records
— maintenance records
— CM handling onboard, for instance collection of data and response to recommendations from service provider
— reports and maintenance records from breakdowns.

If it is not properly demonstrated that the system is correctly operated and that it serves to ensure the technical integrity level of the asset, opening or testing of machinery may be required.

7.4 Approval of service provider
The approved service provider is granted a general authorisation to carry out condition monitoring in order to cover the scope of annual and renewal survey of machinery and equipment. This authorisation is valid for three years. In order to obtain this authorisation an audit of the service provider is done. The following shall be covered:

— compliance between knowledge level and responsibility of involved personnel
— routines for informing vessel operator and other relevant stakeholders of potential problems, equipment and methods for conducting the conditioning monitoring.

Guidance note:
Generally it is necessary to comply with ISO17359 and the personnel responsible for the service should be certified to ISO level 3 or 4.

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7.5 Renewal audit of service provider
To prolong the validity of the authorisation an audit of the service provider is arranged. The following shall be covered:

— handling of quality cases
— handling of non-conformities
— handling of fault indications
— general compliance with the basis of the approval
— review of condition monitoring results
— plans for continuous improvement.

Guidance note:
Non-conformities refer to the cases where the system has been operated outside the intention in the procedures. Quality cases refer to the cases where the condition monitoring system has failed to reveal defects or where false failure indications have been reported.

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7.6 Random audit

DNV may initiate random audits if deemed necessary. The Supplier shall on request provide access to relevant records, supplier’s people and facilities, for DNV GL’s auditing personnel.
APPENDIX A SPECIAL CONSIDERATIONS FOR CONVERSIONS

1 Basic principles

1.1 Introduction
This appendix has been prepared to make available DNV GL’s approach for an efficient transfer of existing gas carriers to offshore production and storage units or installations.

1.2 Assumptions
DNV GL assumes that the carrier being proposed for conversion:
— holds a valid class certificate from a recognised classification society
— has been assessed and considered suitable for the intended new duty and service life at a specified location.

1.3 Main principles

1.3.1 All new systems shall comply with the latest DNV GL Rules or standards or recognised international standards. Modified systems will normally be accepted based on Rules or standards applicable at the time of construction. Alternative solutions will be considered based on sound engineering principles.

1.3.2 Standard and ‘field proven’ equipment may be accepted without being subjected to re-certification, when equipment certificate (e.g. from a recognised classification society) or other supporting documentation provides evidence of suitability for intended use.

Guidance note:
Evidence of suitability for intended use of field proven equipment may be documented through records of satisfactory operation with identical equipment at similar climatic conditions, environmental and operating parameters for a representative number of installations (indication > 10) and period of time (indication > 2 years).

1.3.3 Deviations from requirements applicable to unrestricted worldwide operation will be accommodated, by evaluating fitness for purpose at the specific location. The criteria and limitations for the unit or installation, systems or components will be stated in the “Appendix to the classification certificate”.

1.3.4 Approval schemes with terms of reference other than DNV GL rules or standards will be allowed for specific systems, when such references are found to give an acceptable safety level equivalent to the rules or standards.

1.3.5 Renewal surveys on location, avoiding dry-docking, will be accommodated to the extent feasible.

Guidance note:
Owners are encouraged to consider at the conversion stage the in-service inspection aspects of the unit on location.
The following are areas where small changes made at the conversion stage can contribute to better and more cost-effective follow-up in service:

Overboard valves
Consider fitting boroscope fittings downstream of the valves.
Consider how opening/replacing valves can be safely carried out offshore. Attention to be paid to the effect of closing a sea chest, or losing the use of a valve.

Thrusters
Inspection on location, removal if damage is found.

Survey of bottom
Consider markings to allow identification of location of ROV/diver (see Pt. Ch.2 Sec.1 [12]).
Consider fitting of hinged sea chest grids.
Survey of tailshaft systems and rudder systems, e.g. water lubricated rudder bearings should be arranged to allow clearances taken on location.

Mooring systems
How to survey the part of the system that is close to the hull or the unit.
How to survey the area past the thrash zone.
Survey of the SLP/STL connections to the hull and the internals in the hull openings.
2 Class notations

2.1 Conversions
Class notations applicable to conversions will be as given for production and storage units in Ch.1 Sec.3.

3 Technical guidance for classification

3.1 General

3.1.1 All new or modified structures, systems and components shall comply with the current class Rules in force at the time of signing the classification contract.

3.1.2 All other structures, systems and components will in principle be accepted based on Rules applicable at the time of construction (when the tanker was first classed), if suitable for the intended purpose.

3.2 Hull and topside structures
For guidance on hull and topside structure, see DNVGL-OS-C102, App.A, reading ‘tanker for liquefied gas’ for all instances of ‘tanker for oil’.

3.3 Mooring
With few exceptions, the usual station-keeping concepts are spread mooring for relatively shallow to intermediate water depths, and single-point mooring for deeper waters.

There are basically two approaches for certification of the mooring system design:
— in accordance with class rules; or alternatively
— in accordance with recognised international standards (e.g. API RP 2SK).

3.4 Marine systems and equipment
The marine system piping and equipment are categorised in three groups based on the scope of the conversion work:

a) Not subjected to any alteration, or any effect from the modification of the related systems
These systems and equipment will be accepted based on requirements for renewal survey.

b) Subjected to alteration and modifications
These systems will be accepted as long as the modification of the equipment and system is carried out in accordance with Rules, or recognised international standards. Modification to systems and components which are identified as safety critical shall be subject to approval. The modified system shall also undergo satisfactory pressure or function testing as required by the DNV Rules for ships, Pt.7, as applicable for renewal survey.

c) New systems and equipment
New systems and equipment that are covered by the class scope will be subject to approval based on class rules and/or international standards and shall undergo satisfactory pressure or function testing as applicable based on the DNV Rules for ships, Pt.4 and Pt.7, for acceptance.

3.5 Electrical and instrumentation
Typical consequences of conversions will be increased power demand and hazardous zone alterations. This requires incorporation of new elements to the existing systems, and obtaining unambiguous area classification with matching equipment requirements. Integration of instrumentation for marine applications with new process and offloading functions need to be implemented based on a consistent approach. Class requirements are based on IEC standards (61892 - series).

In case of incorporating US based equipment, the hazardous area definitions will need specific attention with particular focus on Div 1 and fulfilment of Zone 0 and 1 requirements. DNV GL accept electrical equipment for hazardous areas provided type test certificates issued by a recognised test laboratory or institution support these. This also applies to US based UL / FM listed electrical equipment upon evaluation
of premises for use and scope of testing. Requirements to electrical installation as per the SOLAS convention applicable to “Liquefied Gas Tankers” may be re-evaluated, taking into account the new intended duty and service.

3.6 Safety systems and arrangement

3.6.1 Safety systems will be subject to approval irrespective of the class scope chosen. The focus will mainly be on systems that have global impact on the safety of the vessel, and the effect from safety and control systems beyond the individual process skid or module.

The safety systems include the following:

— hazardous area classification
— ignition prevention (review of ‘ex’ equipment suitable for hazardous area)
— fire and gas detection system
— fixed fire fighting system
— emergency shutdown system.

3.6.2 Interface between safety and marine systems will be evaluated to ensure that addition of the hydrocarbon process plant has not compromised the safety and functionality of the marine systems.

3.6.3 The arrangement and lay-out of the processing plant should be considered in view of fire and explosion hazards, depending on size and complexity of the plant, as well as location in relation to accommodation, escape, shelter and evacuation facilities. Protection of equipment from operation of the plant should be considered, e.g. cranes and lay down areas to be in locations avoiding lifting operations over pressurised equipment.

3.6.4 Due regards should be given to the already built-in safety features required to fulfil the ICLL, SOLAS and MARPOL requirements.

3.6.5 In addition, special considerations shall be made in case of operational conditions deviating from the design conditions, for example operation in cold climate might call for additional heat tracing.

4 Additional services

Description of additional DNV GL services related to conversion projects within the areas of pre-conversion, class transfer, subsea installations, production facilities and in-service support can be found at the DNV GL web site www.DNV GL.com.
APPENDIX B  INTRODUCTION TO OFFSHORE CLASSIFICATION

1  Introduction
This appendix is informative and should not be understood as rule requirements. The appendix explains the system of classification, how it works, conditions of validity, and its interaction with statutory control. This information is to a large extent implied by the rules, but a brief clarification of the essential points in one place is considered useful.

2  The classification system

2.1  The classification process and its limitations

2.1.1  Classification is a system for safeguarding life and property at sea, and the environment due to operational consequences. It implies a process of verifying offshore objects against a set of requirements. The requirements are laid down in the rules and standards established by DNV GL. Classification has gained worldwide recognition as an adequate level of safety and quality.

2.1.2  Classification implies an activity, in which a unit is surveyed during construction based on design approval, tested before being taken into service, and surveyed regularly during its whole operational life until it is scrapped. The aim is to verify that the required rule standard is built in, observed and maintained.

2.1.3  Classification is not performed as a substitute for the customer's own quality and safety control and related duties, or the customer's obligations to third parties, nor to relieve the customer of any consequences of default. Classification implies that rule requirements are verified at regular intervals. It is the owner's responsibility to maintain the unit so as to comply with the rules at all times.

2.1.4  DNV GL keeps complete files on all classed ships and units covering the documentation required by the rules. Reports will not be disclosed to any party, apart from the national authorities involved, without the owner's consent. DNV GL also undertakes all reporting to national authorities required in connection with the safety certificates.

2.2  Who needs classification?
Classification serves as verification system for a number of parties who have special interest in the safety and quality of units, such as:

— National authorities, who accept units for registry, or let units into their territorial waters, need assurance that they are safe and represent a minimum hazard to their surroundings.

— Insurance underwriters require units to be classed in order to give insurance.

— Owners, who need the technical standard of the rules as basis for building contracts and to document the unit's standard when seeking insurance or financing, or when hiring out or selling the unit.

— Building yards and sub-contractors use the rules as a tool for design and construction, as required by their customer.

— Finance institutions use classification as a documented indicator of the unit's value.

— Charterers require confirmation of the unit's standard before hire.

2.3  Recognition of DNV GL
DNV GL is recognised as an international classification society by virtue of its position in the marine industry, founded on the following criteria:

*Independence*

— By classing a substantial share of the world fleet and through high equity and financial independence, the economic basis for independent decisions in classification matters is ensured.

*High technical competence*

— Extensive research and development in class related fields sustain a process where the rules and...
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 of the rules.

— DNV GL runs a scheme for training and qualification of its technical personnel to ensure correct, uniform quality of approval and survey work throughout the organisation.

Worldwide survey station network

— DNV GL operates survey stations all over the world. Efficient reporting and information systems support the operations, and provide service to customers and national authorities.

2.4 Responsibility for safety at sea

2.4.1 National law institutes national authorities' responsibility for the total safety control of units flying the national flag. Classification cannot in any way relieve the national authorities of that responsibility.

2.4.2 National authorities may use the classification system and DNV GL's worldwide survey station network as their executive branch for safety control. The convenience of this arrangement is proved by the fact that DNV GL has been delegated extensive authorisation to work and certify on behalf of the majority of the maritime nations of the world.

2.4.3 The classification system applied to delegated, statutory work offers the national authorities regular monitoring of survey and certificate status of units flying their flag. Verification of DNV GL's work process and quality systems may also be carried out. In this way, national control is retained at the discretion of the authority involved.

2.5 Classification of newbuildings

2.5.1 The builder initiates the process by submitting a request for classification to DNV GL. In response to a list of documentation issued by DNV GL for the specific class notations requested, the builder and sub-suppliers submit drawings, specifications, related technical descriptions and data, including specification of materials as required by class, for approval.

2.5.2 After examining the above documents, DNV GL informs the builder and sub-supplier whether the design and arrangement of structure, machinery and equipment is acceptable. If not, DNV GL may propose modifications needed to meet the classification requirements.

2.5.3 During the building period DNV GL carries out surveys at the building yard and its suppliers. To assess compliance with the rules the Society may require additional documentation and carry out an assessment of yard’s processes, systems and personnel related to classification projects. The results of the assessment should be used as a basis to decide on the extent of the involvement of surveyors of the Society. They should be clearly reflected in the Quality Survey Plan (QSP).

2.5.4 The purpose of the surveys is to verify that the construction, components and equipment satisfy the rule requirements and are in accordance with the approved plans, that required materials are used, and that functional tests are carried out as prescribed by the rules.

2.5.5 When DNV GL is satisfied that the requirements specified for the unit in question have been met, the appropriate class notation will be assigned and confirmed by the issuance of a classification certificate. Provided the requirements for retention of class are complied with, the certificate will normally have a validity of five years.

2.6 Classification in the operational phase

2.6.1 Compliance with the rule requirements in the operational phase is verified by DNV GL through a system of periodical surveys. The most comprehensive survey is the one carried out in connection with the renewal of the five-yearly classification certificate. During the five year period the unit undergoes annual and intermediate surveys covering various parts, equipment and systems, depending on the class assigned.
2.6.2 In order to confirm retained validity of class, DNV GL evaluates the extent of possible sustained damage and verifies ensuing repairs. Deferred repairs may be accepted by DNV GL, but always associated with a maximum time limit.

2.6.3 The Rules allow periodical surveys to contain an element of sampling. This sampling must be sufficient to enable the surveyor to obtain a proper assessment of the condition of the unit. This assessment is based amongst other things on type, age and technical history of the unit.

2.6.4 Results of the surveys are reported to the owners and to DNV GL's central office for updating records. Special findings are also recorded and used as basis for updating and development of the Rules.

2.6.5 “The register of vessels classed with DNV GL” is available for supplying information on ship's and unit's main particulars and details of their classification.

2.7 Owner's duties

2.7.1 In order to maintain valid class the classification system specifies the following to be observed by the owner:

— The unit has to be competently handled in accordance with the Rules.
— The unit has to be maintained to rule standard at all times. Any conditions of class have to be carried out as specified.
— The unit has to undergo prescribed periodical and renewal surveys, as well as surveys of damage, repairs, conversions and alterations.
— DNV GL must be furnished with all information that may influence its decisions in connection with classification.

2.7.2 Failure to meet any of these requirements may lead to termination of valid class and withdrawal of all class and statutory certificates.

2.7.3 To assist the owner in this regard DNV GL supplies regular status reports on certificates, surveys carried out and becoming due, and possible conditions of class.

3 Remuneration

Remuneration is normally based on a fee system, in which DNV GL invoices each type of survey according to a basic scale of fees. The basic scale of fees is developed by taking into consideration the amount of work needed to execute, process and follow up the survey in question, as well as the items surveyed. The fees also cover investment and development costs of the Rules as well as maintenance of a worldwide survey network, central service support system, etc. Price level and costs vary from country to country and are therefore reflected in the fees charged.

4 Classification support

4.1 General

4.1.1 The staff of DNV GL represents a significant accumulation of knowledge and practical experience in offshore-related technical fields. This is an asset often drawn on by the industry in matters related to classification.

4.1.2 The expertise of DNV GL is available to the owner at any time when needed in connection with operating problems, damage and casualties.

4.2 Pre-contract support

Co-operation with DNV GL early in the design stage, before classification is requested and any contract is signed, is usually very beneficial to both yard and owner. Different technical solutions may be evaluated, thus contributing to a more efficient unit, and ensuring that all safety aspects as specified by the Rules are taken care of. In this way, expensive changes late in a project may be avoided.
4.3  In-service support
Similar services are given in connection with units in operation. Alternative ways of repairs may be indicated, acceptable distributions of crude cargo and ballast to alleviate overstressing may be computed in case of damage, stability may be investigated, etc. These are typical examples.

4.4  Limitations
Two main restrictions prevail on DNV GL when undertaking classification support work:

— DNV GL does not carry out complete, conceptual design of units. In cases where DNV GL has been involved in design support, the plans and calculations must still be independently evaluated by DNV GL before being accepted for classification purposes.

— Information received from customers in connection with assignment of class is not disclosed and used in classification support work.
Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.