Classification of Drilling Equipment

April 2013

Rule Note
NR 570 DT R00 E

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BUREAU VERITAS

MARINE DIVISION
GENERAL CONDITIONS

ARTICLE 1

1.1. - BUREAU VERITAS is a Society the purpose of whose Marine Division (the "Society") is the classification (" Classification ") of any ship or vessel or structure of any type or part of it or system therein collectively hereinafter referred to as a "Unit" whether linked to shore, river bed or sea bed or not, whether operated or located at sea or in inland waters or partly on land, including submarines, hovercrafts, drilling rigs, offshore installations of any type and of any purpose, their related and ancillary equipment, subsea or not, such as well head and pipelines, mooring legs and mooring points or otherwise as decided by the Society.

The Society:

- prepares and publishes Rules for classification, Guidance Notes and other documents ("Rules");
- issues Certificates, Attestations and Reports following its interventions ("Certificates");
- publishes Registers.

1.2. - The Society also participates in the application of National and International Regulations or Standards, in particular by delegation from different Governments. Those activities are hereafter collectively referred to as " Certification ".

1.3. - The Society can also provide services related to Classification and Certification such as ship and company safety management certification; ship and port security certification, training activities; all activities and duties incidental thereto such as documentation on any supporting means, software, instrumentation, measurements, tests and trials on board.

1.4. - The interventions mentioned in 1.1., 1.2. and 1.3. are referred to as " Services ". The party and/or its representative requesting the services is hereinafter referred to as the " Client ". **The Services are prepared and carried out on the assumption that the Clients are aware of the International Maritime and/or Offshore Industry (the "Industry") practices.**

1.5. - The Society is neither and may not be considered as an Underwriter, Broker in ship's sale or chartering, Expert in Unit's valuation, Consulting Engineer, Controller, Naval Architect, Manufacturer, Shipbuilder, Repair yard, Charterer or Shipowner who are not relieved of any of their expressed or implied obligations by the interventions of the Society.

ARTICLE 2

2.1. - Classification is the appraisement given by the Society for its Client, at a certain date, following surveys by its Surveyors along the lines specified in Articles 3 and 4 hereafter on the level of compliance of a Unit to its Rules or part of them. This appraisement is represented by a class entered on the Certificates and periodically transcribed in the Society's Register.

2.2. - Certification is carried out by the Society along the same lines as set out in Articles 3 and 4 hereafter and with reference to the applicable National and International Regulations or Standards.

2.3. - **It is incumbent upon the Client to maintain the condition of the Unit after surveys, to present the Unit for surveys and to inform the Society without delay of circumstances which may affect the given appraisement or cause to modify its scope.**

2.4. - The Client is to give to the Society all access and information necessary for the safe and efficient performance of the requested Services. The Client is the sole responsible for the conditions of presentation of the Unit for tests, trials and surveys and the conditions under which tests and trials are carried out.

ARTICLE 3

3.1. - **The Rules, procedures and instructions of the Society take into account at the date of their preparation the state of currently available and proven technical knowledge of the Industry. They are not a standard or a code of construction neither a guide for maintenance, a safety handbook or a guide of professional practices, all of which are assumed to be known in detail and carefully followed at all times by the Client.**

Committees consisting of personalities from the Industry contribute to the development of those documents.

3.2. - The Society only is qualified to apply its Rules and to interpret them. Any reference to them has no effect unless it involves the Society's intervention.

3.3. - The Services of the Society are carried out by professional Surveyors according to the applicable Rules and to the Code of Ethics of the Society. Surveyors have authority to decide locally on matters related to classification and certification of the Units, unless the Rules provide otherwise.

3.4. - **The operations of the Society in providing its Services are exclusively conducted by way of random inspections and do not in any circumstances involve monitoring or exhaustive verification.**

ARTICLE 4

4.1. - The Society, acting by reference to its Rules:

- reviews the construction arrangements of the Units as shown on the documents presented by the Client;
- conducts surveys at the place of their construction;
- classes Units and enters their class in its Register;
- surveys periodically the Units in service to note that the requirements for the maintenance of class are met.

The Client is to inform the Society without delay of circumstances which may cause the date or the extent of the surveys to be changed.

ARTICLE 5

5.1. - The Society acts as a provider of services. This cannot be construed as an obligation bearing on the Society to obtain a result or as a warranty.

5.2. - The certificates issued by the Society pursuant to 5.1. here above are a statement on the level of compliance of the Unit to its Rules or to the documents of reference for the Services provided for.

In particular, the Society does not engage in any work relating to the design, building, production or repair checks, neither in the operation of the Units or in their trade, neither in any advisory services, and cannot be held liable on those accounts. Its certificates cannot be construed as an implied or express warranty of safety, fitness for the purpose, seaworthiness of the Unit or of its value for sale, insurance or chartering.

5.3. - The Society does not declare the acceptance or commissioning of a Unit, nor of its construction in conformity with its design, that being the exclusive responsibility of its owner or builder, respectively.

5.4. - The Services of the Society cannot create any obligation bearing on the Society or constitute any warranty of proper operation, beyond any representation set forth in the Rules, of any Unit, equipment or machinery, computer software of any sort or other comparable concepts that has been subject to any survey by the Society.

ARTICLE 6

6.1. - The Society accepts no responsibility for the use of information related to its Services which was not provided for the purpose by the Society or with its assistance.

6.2. - If the Services of the Society cause to the Client a damage which is proved to be the direct and reasonably foreseeable consequence of an error or omission of the Society, its liability towards the Client is limited to ten times the amount of fee paid for the Service having caused the damage, provided however that this limit shall be subject to a minimum of eight thousand (8,000) Euro, and to a maximum which is the greater of eight hundred thousand (800,000) Euro and one and a half times the above mentioned fee.

The Society bears no liability for indirect or consequential loss such as e.g. loss of revenue, loss of profit, loss of production, loss relative to other contracts and indemnities for termination of other agreements.

6.3. - All claims are to be presented to the Society in writing within three months of the date when the Services were supplied or (if later) the date when the events which are relied on of were first known to the Client, and any claim which is not so presented shall be deemed waived and absolutely barred. Time is to be interrupted thereafter with the same periodicity.

ARTICLE 7

7.1. - Requests for Services are to be in writing.

7.2. - **Either the Client or the Society can terminate as of right the requested Services after giving the other party thirty days' written notice, for convenience, and without prejudice to the provisions in Article 8 hereunder.**

7.3. - The class granted to the concerned Units and the previously issued certificates remain valid until the date of effect of the notice issued according to 7.2. here above subject to compliance with 2.3. here above and Article 8 hereunder.

7.4. - The contract for classification and/or certification of a Unit cannot be transferred neither assigned.

ARTICLE 8

8.1. - The Services of the Society, whether completed or not, involve, for the part carried out, the payment of fee upon receipt of the invoice and the reimbursement of the expenses incurred.

8.2. Overdue amounts are increased as of right by interest in accordance with the applicable legislation.

8.3. - The class of a Unit may be suspended in the event of non-payment of fee after a first unfruitful notification to pay.

ARTICLE 9

9.1. - The documents and data provided to or prepared by the Society for its Services, and the information available to the Society, are treated as confidential. However:

- clients have access to the data they have provided to the Society and, during the period of classification of the Unit for them, to the **classification file** consisting of survey reports and certificates which have been prepared at any time by the Society for the classification of the Unit;
- copy of the documents made available for the classification of the Unit and of available survey reports can be handed over to another Classification Society, where appropriate, in case of the Unit's transfer of class;
- the data relative to the evolution of the Register, to the class suspension and to the survey status of the Units, as well as general technical information related to hull and equipment damages, are passed on to IACS (International Association of Classification Societies) according to the association working rules;
- the certificates, documents and information relative to the Units classed with the Society may be reviewed during certificating bodies audits and are disclosed upon order of the concerned governmental or inter-governmental authorities or of a Court having jurisdiction.

The documents and data are subject to a file management plan.

ARTICLE 10

10.1. - Any delay or shortcoming in the performance of its Services by the Society arising from an event not reasonably foreseeable by or beyond the control of the Society shall be deemed not to be a breach of contract.

ARTICLE 11

11.1. - In case of diverging opinions during surveys between the Client and the Society's surveyor, the Society may designate another of its surveyors at the request of the Client.

11.2. - Disagreements of a technical nature between the Client and the Society can be submitted by the Society to the advice of its Marine Advisory Committee.

ARTICLE 12

12.1. - Disputes over the Services carried out by delegation of Governments are assessed within the framework of the applicable agreements with the States, international Conventions and national rules.

12.2. - Disputes arising out of the payment of the Society's invoices by the Client are submitted to the Court of Nanterre, France.

12.3. - **Other disputes over the present General Conditions or over the Services of the Society are exclusively submitted to arbitration, by three arbitrators, in London according to the Arbitration Act 1996 or any statutory modification or re-enactment thereof. The contract between the Society and the Client shall be governed by English law.**

ARTICLE 13

13.1. - **These General Conditions constitute the sole contractual obligations binding together the Society and the Client, to the exclusion of all other representation, statements, terms, conditions whether express or implied. They may be varied in writing by mutual agreement.**

13.2. - The invalidity of one or more stipulations of the present General Conditions does not affect the validity of the remaining provisions.

13.3. - The definitions herein take precedence over any definitions serving the same purpose which may appear in other documents issued by the Society.

RULE NOTE NR 570

NR 570
Classification of Drilling Equipment

April 2013

Section 1 General

Section 2 Drilling Systems and Equipment

Section 3 Survey and Certification

Section 4 In-Service Survey

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The present Note provides requirements for the classification and certification of drilling systems and associated equipment.

1.1.2 The present note is primarily intended to apply to drilling systems installed onboard floating offshore units covered by the Offshore Rules, and having the service notation **drilling**, as defined in Pt A, Ch 1, Sec 2 of the Offshore Rules.

Most requirements may however be applied to fixed offshore installations.

Note 1: The requirements of the present Note are applicable for all structural type notations defined in Pt A, Ch 1, Sec 2 of the Offshore Rules. These notations cover all types of offshore rigs, such as drillships, drilling barges, semi-submersible units, jack-up, TLP, SPAR or other special types of floater.

1.1.3 Offshore units that the equipment complies with the provisions of the present Note may be granted the additional class notation **DRILL**, as defined in [1.2].

1.1.4 The requirements of the present Note are complementary to the relevant provisions of the Offshore Rules, which remains applicable except when otherwise specified in the present Note.

1.2 Class notations

1.2.1 The additional class notation **DRILL** may be assigned to floating offshore units fitted with drilling systems and associated equipment meeting the requirements of the present Rule Note.

Note 1: The additional class notation **DRILL** is optional, but strongly recommended for all types of offshore rig, so as to allow a global approach of unit's safety.

1.2.2 The involvement of the Society and the scope of the classification relating to the additional class notation **DRILL**, are defined in [2].

2 Involvement of the Society – Limits of Classification

2.1 Scope

2.1.1 The present Rule Note covers the safety aspects of equipment and systems used in connection with drilling and temporary well testing activities. The scope of classification under the additional class notation **DRILL**, includes but is not limited to systems and equipments given as example in Tab 1.

The detailed list of equipment covered by classification will be defined for each project on a case-by-case basis, taking into account the specificities of the rig and drilling plant.

2.1.2 Classification of the drilling systems covered by the present Note requires the following activities:

- design verification,
- survey during fabrication,
- survey during installation and commissioning
- in-service survey.

3 Statutory requirements

3.1 General

3.1.1 Project specifications

Prior to commencement of the review of drawings, the complete list of Rules, Codes and Statutory Requirements to be complied with must be submitted for information. This list is to detail the requirements to be complied with:

- International Rules
- Flag state requirements
- Coastal state requirements
- Owner standards and procedures
- Industry standards
- Classification notations.

3.1.2 Conflict of Rules

In case of conflict between the Classification Rules and any Statutory Requirements as given by Flag state or Coastal State, the latter ones are to take precedence over the requirements of the present Rules.

3.1.3 IMO MODU Code

Compliance with relevant requirements of IMO MODU Code may be required by Owner, Flag and/or Coastal State.

The Society reserves the right to refer to the requirements in IMO MODU Code, when deemed necessary.

4 Recognized standards

4.1 General

4.1.1 The requirements of the present note include selected references to technical standards recognized by the Society, as well as references to other rules or guidance notes of the Society.

4.1.2 When a recognized standard is referenced for covering an equipment, system or arrangement, all applicable assumptions, requirements and criteria from the concerned standard are to be applied for the purpose of classification.

4.1.3 The requirements of [4.1.2] may be waived, provided that:

- the references of the present note concern only specific parts of recognized standards
- the Society agrees partial application of referenced standards.

4.1.4 Combination of requirements from different standards or rules may be used only after consideration of the compatibility between submitted documentations, and where it is considered safe and feasible from the engineering point of view, at the satisfaction of the Society.

4.1.5 For any conflict between referenced requirements from recognized standards, or between standards and other rules of the Society, the Society is to be consulted for clarification.

Table 1 : Examples of equipment covered by the additional notation DRILL

System	Equipment
Drilling structures	• derricks • masts • drilling towers • pipe racks or equivalent structures • other supporting structures (such as the drill floor)
Hoisting equipment	• crown block • travelling block • drawworks • drilling hook
Rotary equipment	• rotary table • master bushing • topdrive • rotary hose
BOP and pipe handling equipment	• horizontal to vertical pipe handling systems • BOP crane • winches
Dry bulk storage and transfer system	• pressurized tanks • piping for pressurized bulk transport • air compressor • air dryer • control valves • emergency compressor • purge air system • engines
Mud mixing and circulating facilities	• pumps • standpipe manifold • pulsation dampeners • mud hoses • safety valves • mud agitators • mud mixing equipment • degasser • desander • desilter • shale shakers • drill string
Cementing system	• cement pump • cement unit • piping and transfer lines • pulsation dampeners • cement hoses • additives system • control valves
Drill string heave compensation system (active or passive)	• accumulators • hydraulic cylinders • piping (including flexibles) • pressure vessels
Tensioning system	• accumulators • hydraulic cylinders • piping system • pressure vessels • tensioning arms
Marine riser system	• riser joints • telescopic joints and tensioner ring • ball and flexjoints • choke, kill and auxiliary lines • connectors

Well control system	• Blow-Out Preventer (BOP)
	  • rams preventers
	  • annular preventers
	  • test stumps
	  • wellhead connector
	  • accumulators
	  • control pods
	  • acoustic BOP control
	• Koomey unit
	• Choke and kill system
	• Diverter system, including piping and valves

Well test system	• burners • flare booms • piping • pressure vessels • pumps
Other systems	• pressure containing equipment • pipings • electrical systems • control systems

4.2 List of recognized standards

4.2.1 The following standards will be considered for the purpose of the present note:

a) Drilling structures, derrick:
- API Spec 4F "Drilling and Well Servicing Structures"
- API RP 4G "Maintenance and Use of Drilling and Well Servicing Structures"
- AISC Manual of Steel Construction - Allowable Stress Design

b) Well control systems, BOP
- API Spec 16A / ISO 13533 "Drill Through Equipment"
- API Spec 16C "Choke and Kill Systems"
- API Spec 16D "Control Systems for Drilling Well Control Equipment"
- API Spec 16E "Design of Control Systems for Drilling Well Control Equipment"
- API Spec 6A "Wellhead and Christmas Tree Equipment"
- API RP 53 "Blowout Prevention Equipment Systems for Drilling Operations"
- ISO 10423 "Petroleum and Natural Gas Industry - Drilling and Production Equipment - Specification for valves, wellhead and Christmas tree equipment"

c) Diverter systems
- API RP 64 "Diverter Systems Equipment and Operations"
- API Spec 6D "Specification of Pipelines Valves"

d) Drilling equipment
- API RP 7-1 "Specification for Rotary Drilling Stem Elements"
- API Spec 5DP "Specifications for Drill Pipe"
- API Spec 7K "Drilling and Well Servicing Equipment"
- API RP 7L "Procedures for Inspection, Maintenance, Repair and Remanufacture of Drilling Equipment"
- API RP 7G / ISO 10407 "Petroleum and Natural Gas Industries - Drilling and Production Equipment - Drill stem design and operating limits"

e) Hoisting equipment
- API Spec 8A "Drilling and Production Hoisting Equipment"
- API Spec 8B / ISO 13534 "Inspection, Maintenance, Repair and Remanufacture of Hoisting Equipment"
- API Spec 8C / ISO 13535 "Drilling and Production Hoisting Equipment (PSL 1 and PSL 2)"
- API Spec 9A / ISO 10425 "Wire Rope"
- API Spec 9B "Application, Care and Use of Wire Rope for Oil Field Service"
- API Spec 2C "Offshore Cranes"
- API RP 2D "Operation and Maintenance of Offshore Cranes"

f) Marine riser
- API Spec 16F "Specification for Marine Drilling Riser Equipment"
- API Spec 16R "Marine Drilling Riser Coupling"
- API RP 16Q "Design, Selection, Operation and Maintenance of Marine Drilling Riser Systems"
- API Bul 16J "Comparison of Marine Drilling Riser Analyses"

g) Piping
- API RP 14E "Design and Installation of Offshore Production Piping Systems"
- ANSI/ASME B31.3 "Chemical Plant and Petroleum Refinery Piping"
- API RP 17B "Flexible Pipe"

h) Pressure vessels, heat exchangers
- ASME Boiler and Pressure Vessels Code
- BS 2790 "Specification for Design and Manufacture of Shell Boiler of Welded Construction"
- API Std 530 / ISO 13704 "Calculation of Heater Tube Thickness in Petroleum Rafineries"
- API Std 661 "Air Cooled Heat Exchangers for General Refinery Service"
- BS 2790 "Specification for Design and Manufacture of Shell Boilers of Welded Construction"
- Tubular Exchangers Manufacturers Association Standards (TEMA)

i) Risk assessment, hazard analysis
- API RP 14J "Recommended Practice for Design and Hazard Analysis for Offshore Production facilities"
- EN ISO 17776 "Guidelines on Tools and Techniques for Hazard Identification and Risk Assessment"

j) Electrical and electronic equipment, automation
- IEC 60092-504 "Electrical Installations in Ships"
- IEC 60529 "Degrees of Protection Provided by Enclosures"
- IEC 60533 "Electrical and Electronic Installations in Ships - Electromagnetic Compatibility"
- IEC 60945 "Maritime Navigation and Radio Communication Equipment and Systems"
- API RP 500 "Classification of Location for Electrical Installations at Petroleum Facilities"

k) Other features
- NACE MR0175 / ISO 15156 "Material for Use in H_2S Containing Environment in Oil and Gas Production"
- API RP 520 "Sizing, Selection and Installation of Pressure-Relieving Systems in Refineries"
- API RP 521 "Guide for Pressure Relieving and Depressuring Systems"
- ANSI B2.1 "Pipe Threads"
- EN 10204 "Metallic Products - Type of Inspection Documents"
- ISO 898-1 "Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs"

- ISO 898-2 “Mechanical properties of fasteners made of carbon steel and alloy steel - Part 2: Nuts with specified proof load values - Coarse thread”
- ASTM 193 “Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service”
- IP 15 “Area Classification Code of Petroleum Installations”
- API RP 14C / ISO 10418 “Petroleum and Natural Gas Industries - Offshore Production Platforms - Analysis, Design, Installation and Testing of Basic Surface Safety Systems”
- ISO 15156 / NACE MR0175 “Sulphite Stress Cracking Resistant Metallic Material”
- ISO 13628-7 “Design and Operation of Subsea Production Systems - Completion/Workover Riser Systems”.

5 New technology

5.1 General

5.1.1 Drilling equipment and systems are to be considered as new technology when based on a novel technology or an existing technology used in a new environment, for which no track record is available.

5.1.2 Prior to the design approval, the qualification of new technology is to be performed. Following the criticality levels identified by the qualification process for various equipments, the Society reserves the right to apply specific requirements for classification, based on engineering judgement and references to recognized codes and standards.

5.1.3 The qualification process is to be carried out in accordance with the methodology and principles of the guidance note NI 525 “Risk Based Qualification of New Technology - Methodological Guidelines”.

6 Symbols and definitions

6.1 General

6.1.1 Unless otherwise specified, the units, symbols, definitions and reference co-ordinates system given in Pt B, Ch 1, Sec 2 of the Ship Rules remain applicable.

6.1.2 In addition, specific definitions are given in [6.2].

6.2 Definitions

6.2.1 Ship Rules

Ship Rules means Bureau Veritas Rules for the Classification of Steel Ships (NR467). The applicable requirements are those for ships greater than 65 m in length. When reference is made to Ship Rules, the latest version of these ones is applicable.

6.2.2 Offshore Rules

Offshore Rules means Bureau Veritas Rules for the Classification of Offshore Units (NR445). When reference is made to the Offshore Rules, the latest version of these ones is applicable.

6.2.3 IMO MODU Code

MODU Code means the Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009 (2009 MODU Code) adopted by Resolution A.1023(26), and subsequent revisions.

6.2.4 BOP

BOP is the acronym of Blow-Out Preventer, which is a well control equipment used for sealing the well around a pipe (drill pipe, casing or other types of pipe, depending on the related operational phase). The sealing of the well is based on two types of equipment, which are parts of the BOP:

- annular devices
- sealing rams.

SECTION 2 DRILLING SYSTEMS AND EQUIPMENT

1 General

1.1 Application

1.1.1 This section addresses the basic principles for design and arrangement of drilling systems and equipment.

1.1.2 The requirements given in the present section apply to all drilling systems and equipment covered by the additional class notation **DRILL**, as defined in Sec 1.

1.1.3 The safety principles and requirements for arrangement and layout given in the present section and relating to global safety of the unit are applicable even when certain equipment and systems are out of scope of classification, depending on the class notation which are intended to be granted.

1.1.4 Drilling systems and equipment are to be designed, manufactured, installed and tested in compliance with the principles of the present note and recognized industry standards referenced by the present note, as relevant.

1.2 Overall safety principles

1.2.1 Drilling systems and components are to be designed to minimize risks of hazards to humans, assets and environment by application of the following principles:

a) No single failure or maloperation is to result in life threatening situations for the involved personnel, or significant damage to the asset or the environment.

b) Indicating instruments providing the necessary information for safe operation, control and emergency action, are to be provided with all equipment.

c) Systems and equipment are to be protected against loads, pressures, temperatures and speeds exceeding their design value.

d) Safety systems are to be designed such that the most probable failure will result in the safest possible situation (fail to safety).

e) Safety systems are to be effective for situations which may develop too fast to allow manual corrective actions.

f) Systems and equipment are to be design for a specific design life, not shorter than 20 years as a rule.

g) All safety systems such as emergency shutdown systems (ESD), fire and gas detection, fire-proof and explosion-proof systems, are to comply with BV Offshore Rules.

h) A risk analysis of the design and layout of the equipment is to be carried out in order to identify any potential hazard. As a result of this risk analysis:

   1) Unnecessary hazards are to be avoided whenever practicable though safe design.

   2) Hazard mitigation measures are to be defined whenever such hazards cannot be avoided through other means.

1.3 Arrangement

1.3.1 General

Equipment layout and work areas associated with drilling activities are to be arranged in accordance with the requirements [1.3.2] to [1.3.10].

1.3.2 Arrangement and layout of the drilling system is to be in compliance with applicable BV Offshore Rules and industry standards.

1.3.3 Prevention of ignition

a) Non hazardous areas are to be segregated from hazardous areas.

b) Ignition sources are to be segregated from flammable sources.

1.3.4 Access

All equipment necessary to drilling operations is to be arranged so that it is easily accessible for safe operation and maintenance.

1.3.5 Dropped objects

Due consideration to the potential for dropped object, especially resulting from handling operations, is to be given for the definition of the location of critical equipment.

1.3.6 Drainage

Decks and work areas are to provide efficient drainage for spillage of all kinds of fluids. Hazardous fluids are to be collected to a dedicated slop tank, segregated from non hazardous ones.

1.3.7 Visibility

The driller is to have a clear view from the driller's cabin of all activities taking place at the drillfloor and within the derrick, either directly or by the use of appropriate visual equipment.

1.3.8 Protection of critical systems

Critical systems such as:

- Electrical cables and trays
- Exhaust and intake ducting pipes
- Control and shutdown systems
- Well control equipment
- Safety systems (including fire & gas detection, fire-fighting equipment)

are to be suitably protected from damage resulting from drilling operation.

1.3.9 Escape routes

a) Escape routes are to comply with MODU Code and applicable requirements of BV Offshore Rules.

b) The drill floor is to have at least two direct exits to a safe place.

c) At least one escape route from the derrick and from the driller's cabin is to lead directly to a safe place without having to cross the drill floor area.

1.3.10 The equipment arrangement drawings are to indicate the hazardous areas throughout the facility.

1.4 Loads

1.4.1 All components of the drilling system are to be designed for the maximum foreseeable load conditions.

1.4.2 All internal and external loads acting on the drilling installation which may adversely affect its integrity are to be considered.

1.4.3 Loads categories

The following categories of loads are to be considered:

- fixed loads
- operational loads
- environmental loads
- accidental loads
- testing loads
- temporary construction loads.

1.5 Load combinations

1.5.1 Unless otherwise specified, the drilling installation is to be checked for applicable loading combinations for the following combinations:

- operation
- waiting on weather (floating installations)
- survival
- transit
- accidental heel.

2 Hoisting, lifting, rotating and pipe handling systems

2.1 Scope

2.1.1 The hoisting, lifting, rotating and pipe handling systems typically include the following equipment:

- derricks and substructures
- hoisting equipment
- lifting equipment
- BOP handling crane
- pipe handling equipment
- riser handling equipment
- rotary equipment.

2.1.2 Specific requirements are given for each equipment family in [2.2] to [2.4]. Systems or components for which requirements are not specified in this Rule Note are to be compliant with the respective standards as described in Sec 1.

2.2 Drilling structures

2.2.1 General

Requirements for drilling structures cover:

- derrick and substructures
- drill floor
- flare booms.

2.2.2 Reference

In addition to recognized standards referenced in this Rule Note, drilling structures are to comply with the requirements of Pt B, Ch 3 of the Offshore Rules, which provides structural requirements for offshore structures.

2.2.3 Derrick and substructure

The design and fabrication of drilling derrick is to comply with the requirements of API Spec 4F. In addition, the following are to be considered:

a) Fatigue calculations are mandatory; fatigue calculations are to be carried out based on the provisions of Pt B, Ch 3 of the Offshore Rules, taking into account high cycle loads and low-cycle loads. Spectral fatigue calculations are recommended, based on the requirements of NR539.

b) Loads due to ice and snow accumulation, when relevant, are to be considered based on the provisions of Part B of the Offshore Rules; other values based on local standards may be accepted on a case-by-case basis.

c) The effect of vortex shedding is to be evaluated, based on a method at the satisfaction of the Society.

d) The inertial effects of derrick structure, due to unit's movement under environmental loads are to be taken into account; relevant accelerations are to be calculated based on Part B of the Offshore Rules and other related Rule documents of the Society.

e) The height of a continuous ladder inside the derrick is not to be above 9 m; rest platforms are to be arranged in a suitable position for climbing heights above 9 m.

f) Passages within the derrick are to be secured with a railing not less than 1 m and with a toe board of at least 100 mm in height.

g) Equipment and components installed on the derrick are to be secured to prevent falling down.

h) Equipment and components requiring frequent maintenance, such as lubrication, are to be provided with safe and easy access.

2.2.4 Drilling floor

The drill floor structure is to be designed to withstand the following loads:

- hook loads
- work winches
- setback area
- rotary loads
- installed equipment and components
- relevant environmental loads
- tensioner loads.

The drill floor structure is to be designed to withstand the impact load from a falling relevant drill collar from a height of 1,5 m without exceeding the material yield strength.

The setback area is to be covered with a material preventing tool joint damages.

The main working area on the drill floor is to be weather protected.

2.2.5 Flare booms

An operating procedure of flare booms is to be submitted to the Society. The operation and storage of flare booms, when relevant, is to be at the satisfaction of the Society.

The structure of flare booms is to comply with the criteria of Pt B, Ch 3 of the Offshore Rules, or other recognized standard, taking into account the following loads:

- weight of the structure, equipment and outfitting
- relevant wind loads
- heat loads and pulse loads due to burning
- inertial effects due to unit's motion under environmental loads.

A particular attention is to be given to the attachment of flare booms and to the effect of heating on these attachments.

Vortex shedding effects are to be evaluated, based on a method at the satisfaction of the Society.

2.3 Hoisting and rotating systems

2.3.1 General requirements

The major components of hoisting systems typically include:

- drawwork and winches
- crown block
- travelling block
- deadline anchor
- drilling hook

The major components of rotating systems typically include:

- rotary swivel
- top drive
- rotary table.

The maximum allowable working load is to be determined by taking into account the working load of the weakest part of the interrelated system.

2.3.2 Drawworks

The braking capacity of drawworks is to comply with the following requirements:

- the calculation of braking capacity and the selection of friction coefficient are to take into account the worst conditions of mechanical parts
- brakes relying on mechanical frictional brakes are to be shielded against possible dirt which may unfavourable affect the performance of the brake
- the capacity of brakes relying on mechanical friction is to be as follows:
  - 200% SWL, for systems where loads are not lowered by powered descent
  - 110% of the sum static braking moment and the maximum obtainable static moment of the engine, for systems where loads are lowered by powered descent
- for electromagnetic brakes, the cooling water system is to be provided with alarm and flow and temperature control
- simple cylindrical drums are to be designed such that the hoop stress will not exceed 0,85 of material yield strength; the hoop stress is to be calculated based on a method at the satisfaction of the Society
- the mechanical coupling between the electromagnetic brake and drawwork drum is to be provided with a device preventing unintentional disengagement.

2.3.3 Rotary swivels and top drives

Rotary swivel is to keep normal operation and to provide high pressure sealed channel for drilling fluid, when hanging the drilling stem.

In addition, top drive is to ensure driving and to provide torsional moment on the drilling stem.

2.3.4 Safety devices and instrumentation

Means are to be provided to prevent the traveling block or top drive from running into the crown block.

The hoisting operation is to be stopped automatically when an anti-collision system is fitted and a possible collision is detected.

The automatic hoisting operation is to initiate alarm and automatically return to fail-safe mode in case of any system failure.

In case of failure of brake activation system, the hoisting operation is to be stopped automatically.

The hoisting system is to be equipped with an accessible emergency stop, independent from the control system. The emergency stop is also to ensure the safely lowering of the load.

The drilling console is to be provided with monitoring devices and alarm for abnormal situations that may lead to critical failures. The followings are to be indicated on the drilling console:

- vertical position of hoisting device
- weight of drilling string
- drilling depth and mechanical drilling speed
- revolving speed and torsional moment.

2.4 BOP and pipe handling systems

2.4.1 General requirements

Typical lifting equipment covered are cranes (of all types), personnel handling devices, specialized automated handling equipment that are used for pipe handling, riser handling, LMRP handling, BOP handling, and for other lifting activity associated with drilling.

2.4.2 Cranes

Cranes are to comply with relevant requirements of NR526, applicable for cranes operating in offshore environment. Alternative technical standards may be accepted on a case-by-case basis.

2.4.3 BOP handling

The design of BOP carrier or skid and its securing device is to be consistent with the maximum loads in operation and survival conditions.

For subsea BOP, consideration is to be given to the effect of wave slamming and sea current forces on the guideline system.

Unless duly justified, it is to be possible to complete emergency manoeuvring within 10 min from the start of the emergency.

2.4.4 Personnel lifting equipment having a height of fall above 3 m

Load bearing parts of personnel lifting system are to be designed with an overall safety factor of two times that for the same parts of material lifting devices.

The design is to take into account all relevant environmental loads.

The maximum acceleration of normal or emergency braking is not to injure or harm the personnel.

Operation control panels are to be situated at convenient locations. The control handle or equivalent is to return automatically to stop position when not activated. Control panels are to be provided with means against inadvertent operations.

Load limits are to be clearly marked and are to respect the SWL taken into account for design.

The breaking strength of ropes is to be at least 10 times SWL.

The operation outside safe operating limits is to be automatically stopped.

The lowering and hoisting speed is not to exceed 1m/s.

Unless duly justified, it is to be possible to complete emergency manoeuvring within 10 min from the start of the emergency.

2.4.5 Pipe handling equipment - general

Reliable measures are to be provided to prevent unintentional loss of the holding function of grippers and magnets.

Unless duly justified, it is to be possible to complete emergency manoeuvring within 10 min from the start of the emergency.

The minimum braking strength of all fittings and connections is to be at least the same as that of the cable, wire rope or stiff arm to which they are attached. Knots are not to be used on cable or wire ropes lines.

2.4.6 Tongs

Tongs are to be securely fastened to the derrick or a back-up post and anchored with wire ropes or stiff arms having a minimum breaking strength above that of the pulling cable or chain.

Tongs are to be arranged with safety lines of an adequate breaking strength.

The breaking strength of all fittings and connections is not to be less than the minimum breaking strength of the connected cables, wire ropes or stiff arms.

The pressure system on tongs is to be equipped with a safety relief valve.

A failure of the torsional sensor is not to lead to a critical situation.

2.4.7 Grippers

Grippers where frictional forces are required are to be designed to hold 200% SWL by frictional forces in the worst operational direction. The holding power is to be validated by testing.

The failure of power is not to lead to the lost of gripper function. For hydraulic operated grippers, the function is to be maintained in the event of hose rupture.

2.4.8 Lifting magnets

Lifting magnets are to be designed to hold 300%SWL at normal operating conditions.

Lifting magnets are to be provided with means for proper contact with the pipe.

Where standby power is necessary, alarm is to be given in case of standby power failure.

2.4.9 Horizontal handling of pipes

The design of horizontal handling equipment is to take into account all loads including inertial loads due to unit's movements.

During handling, means are to be provided to restrict the access to the operating area by warnings.

2.4.10 Vertical handling of pipes

Suitable devices are to be provided to secure pipes, collars, tubing and casing possibly placed on derrick.

Storage racks are to be designed of fitted with suitable devices to prevent accidental release of piping or tubing.

Measures are to be provided to have sufficient clearance in order to avoid accidental collisions during operations.

3 Bulk storage, circulation and transfer systems

3.1 Scope

3.1.1 The present item gives the applicable requirements for bulk storage, drilling fluids circulation, mixing, cementing and transfer systems.

3.1.2 Such systems generally consist of the following equipment:

- dry bulk storage tanks and associated piping
- bulk transfer system
- mud mixing and circulation facilities
- cementing equipment.

3.2 Bulk storage

3.2.1 Bulk storage tanks are to be equipped with safety valves or rupture disks. The use of rupture disks is to be limited to bulk storage tanks in open areas.

3.2.2 Safety valves ventilated to open areas are to be used in the case of bulk storage tanks in enclosed areas.

Due consideration should be given to inspectability of such valves.

3.2.3 Enclosed bulk storage areas are to be sufficiently ventilated to avoid pressure buildup in the event to break or leak in the air supply system.

3.2.4 All bulk tanks are to be fitted with high level alarms.

3.3 Cementing equipment

3.3.1 A cementing system typically includes the following equipment:

- cementing pumps
- pulsation dampeners
- safety valves
- centrifugal pumps
- associated piping.

3.3.2 When the cementing pump is used as means of emergency situation, facilities for transferring mud to the cementing system are to be provided.

In this case, the mud supply pump is to be capable of being supplied by an emergency power.

3.4 Mud mixing and storage

3.4.1 The mud tank volume is to be sufficient to replace 100% of the hole volume, including the riser if applicable, in all operational modes.

3.4.2 All tanks are to be fitted with suitable agitators so as to prevent settling of mud.

3.4.3 The mud tanks are to be entirely covered and ventilated. Hatches for inspection are to be provided.

3.4.4 The total volume of drilling fluids tanks is to satisfy the requirements of the intended drilling program.

3.5 Mud circulation

3.5.1 Drilling fluids circulation system generally comprises the following equipment:

- high pressure mud pumps
- discharge manifolds, lines and valves
- pulsation dampeners
- charge pumps
- control and monitoring.

3.5.2 The high pressure muds pumping system is to be capable of delivering all drilling fluids in normal use at the pressures and volumes specified by the intended drilling program.

3.5.3 High pressure mud pumps are to be fitted with pulsation dampeners and safety relief valves set at not more than the maximum allowable working pressure of the systems.

Mud relief lines from safety valves are to be self-draining.

3.6 Mud treatment

3.6.1 The mud treatment system generally includes the following equipment:

- shale shakers
- degassers
- desanders
- desilters
- piping.

3.6.2 Degassers and mud-gas separators are to be vented to a safe location.

3.6.3 Spaces containing shale shakers, drilling fluids tanks, fluids/gas separators are to be secured in order to avoid exposure of the personnel to toxic substances.

3.7 Monitoring of drilling parameters

3.7.1 Monitoring of the system as per [3.7.2] is to be provided in order to detect abnormal conditions potentially leading to critical failures.

3.7.2 The following parameters are to be monitored at the drilling console, as applicable:

- mud pump discharge pressure and rate
- weight of mud entering and leaving the borehole
- gas content in the mud
- difference in volume between the drilling fluid discharged and returned to the unit, corrected for platform movements as applicable.

3.7.3 Alarms are to be triggered in case of abnormal conditions.

4 Motion compensation system

4.1 General

4.1.1 Article [4] is applicable to drilling plants on floating Offshore Units.

4.1.2 The overall requirements for motion compensation equipment for floating drilling units are given in [4.2] and [4.3].

4.1.3 The motion compensation equipment generally comprises the following items:

- drill string compensation equipment, active or passive
- drilling riser tensioning equipment
- air pressure vessels
- control and monitoring.

4.1.4 Air control panels and accumulators are to be fitted with safety valves and the corresponding air relief lines from safety valves are to be self-draining.

4.1.5 Compressed air may only be used with non-combustible hydraulic fluids.

4.1.6 Condition of the system is to be monitored at the drilling console in order to detect abnormal conditions potentially leading to critical failures.

Alarm is to be initiated for abnormal conditions.

As a rule, the following parameters should be monitored:

- position of cylinder pistons
- fluid level of leakage tank
- leakage level.

4.2 Heave compensation

4.2.1 Function

The heave compensation system is to be designed to eliminate the heave motion of the drill string on a floating unit for the purpose of keeping drilling well pressure constant and/or smoothly landing blowout preventer stack or casing.

4.2.2 Equipment list

The heave compensation system mainly consists of the following items:

- air compressors
- air dryers
- air cylinders
- pneumatic and hydraulic accumulators
- hydraulic cylinders and telescopic arms
- control panels
- wire ropes and sheaves.

4.2.3 A single component failure in passive heave compensation system shall not result in the complete failure of the system.

4.2.4 For combined active and passive compensation system, the failure of the active part is not to result in the overall failure of the system.

4.2.5 Power failure should not lead to critical failure.

4.2.6 Special attention is to be given to fully active systems, where a single component failure may lead to complete failure of the system. In such cases, additional safety measures have to be defined.

4.2.7 Hydraulic cylinders are to be designed both for internal pressure loads and for loads resulting from their use as structural members.

4.2.8 Flow restriction means in both directions are to be provided on the compensators in order to protect against high velocity of pressurised fluid in case of hose rupture.

4.3 Tensioning equipment

4.3.1 Function

The primary function of the riser tensioning system is to apply vertical force to the top of the marine riser to control its stresses and displacements, and maintain a nearly constant axial tension to the riser during vertical and horizontal motions of the floating unit.

4.3.2 Equipment list

A riser tensioning system typically includes:

- air compressors
- air dryers
- control panels
- air vessels
- pneumatic/hydraulic accumulators
- hydraulic cylinders
- sheaves
- wire ropes.

4.3.3 Unless otherwise specified in this Rule Note, tensioning equipment is to comply with the applicable requirements of API RP 16Q.

4.3.4 The setting of the minimum tension of the system is to guaranty the structural stability of the riser.

4.3.5 The tensioning system is to be designed such that, in case of unavailability of one tensioner subsequent to unexpected failure or maintenance, the remaining tensioners are capable of providing the required minimum tension to the riser.

4.3.6 Flow restriction device is to be fitted on the line between fluid port of each tensioner and its respective air/oil interface bottle.

4.3.7 For deepwater drilling and./or dynamic positioned units, the system is to prevent recoil of the drilling riser in case of emergency disconnection.

5 Marine riser system

5.1 Function

5.1.1 The marine riser system connects the BOP stack to the drilling unit.

The main function of the marine riser system are to:

- provide a channel for fluid flow between the floating drilling unit and the wellhead
- support the kill, choke and auxiliarylines
- guide the entry of drilling tools into well and service for deployment
- serve as running and retrieving string for blowout preventers.

5.1.2 All equipment listed in [5.1.1] is to comply with applicable sections of API Spec 16F, API RP 16Q and API Spec 16R.

5.2 Equipment list

5.2.1 It generally comprises the following components:

- tensioner system
- diverter system
- telescopic joint (slip joint)
- riser joints
- couplings
- flexible/ball joints
- choke, kill and auxiliary lines
- lower marine riser package (LMRP)
- buoyancy equipment
- riser running equipment
- specialty equipment.

5.3 Technical requirements

5.3.1 General

Except otherwise specified in this Rule Note, the marine riser system is to be designed and constructed in accordance with the following standards:

- API RP 16Q
- API Spec 16R

The marine riser system is to be designed such that:

- the maximum stress intensity for all operating modes is not exceeded
- the maximum stress, fatigue resistance, deflection and buckling are considered in the design
- the lateral deflection during normal drilling operations does not interfere with the passage of downhole tools.

5.3.2 Tensioner system

The applicable requirements for tensioner system are given in [4.3].

5.3.3 Diverter system

The applicable requirements for diverter system are given in [6.4].

5.3.4 Telescopic joint (slip joint)

The telescopic joint is to have a stroke of sufficient length to compensate the combined expected heave, vessel offset, tidal change, and maximum anticipated vessel excursion in the event of stationkeeping failure.

5.3.5 Riser joints and couplings

Riser joints are large diameter, high strength pipes, with couplings welded to each end, which are coupled together on the drill floor and lowered into the water.

The string of riser joints is the main component of the riser system and is used to perform the functions described in [5.1.1].

Inside diameter is to be compatible with the intended casing program.

Strength is to be assessed and documented as per [5.4].

5.3.6 Flex/ball joint

Flexible/ball joints allow angular misalignment between riser and BOP stack and/or between riser and floating unit, thereby limiting the bending moment applied to the riser.

The following parameters are to be considered for the selection or the design of a flexible/ball joint:

- position on the riser
- maximum angular rotation and maximum rotational stiffness
- maximum tensile load and maximum torque
- pressure rating.

5.3.7 Choke, kill, and auxiliary lines

These lines carry fluids along the riser and most of the time are integral part of riser joints.

Such lines include:

- choke/kill lines
- mud boost lines
- hydraulic supply lines
- air inject lines (in case of use of buoyancy cans).

The following parameters are to be considered for the design of these lines:

- Type of fluid to be carried. Care is to be taken to avoid galvanic interaction with riser joint steel components when corrosion resistant materials are used for hydraulic lines.
- Operating pressures:
  - for hydraulic supply lines, the working pressure rating is to be compatible with that of the BOP control system
  - for mud boost lines, the pressure rating is to be suitable for the intended service
  - for choke/kill lines, the pressure rating is to be the same as that of the BOP stack.

5.3.8 Lower marine riser package (LMRP)

The requirements for Lower Marine riser Package (LMRP) are given in [6.2].

5.3.9 Buoyancy equipment

Buoyancy equipment may be attached to the riser joints in order to reduce the riser top tension requirements.

Such equipment should not compromise bending of the riser and storage of the riser joints.

Due consideration is to be given to maintainability of such devices, which is to be carried out onboard.

5.3.10 Riser running equipment

Riser running equipment mainly consists of handling tools for hoisting and lowering the riser and BOP stack and riser spider supporting the riser and BOP stack while being run or retrieved.

The design of such equipment is to take due consideration of the following parameters:

- maximum static loading
- dynamic loads induced by vessel motions and environment
- bending loads during riser running operations
- impact loads.

5.4 Design and operating limits

5.4.1 Operating modes

The following three operating modes are to be considered for riser design:

a) drilling mode

b) connected nondrilling mode

c) disconnected mode.

5.4.2 Operating envelope

An operating envelope covering the operating modes defined in [5.4.1] is to be established. This envelope is to include as a minimum:

- the limitations in terms of vessel offset and/or ball/flex joint angles, vessel motions, lateral deflection of the riser or any combination thereof, or any other limitation on the system, which, if exceeded, will necessitate suspending operations and disconnecting the marine riser from the blowout preventer stack
- the effects of various combinations of tension, mud density, water depth and environmental loads, or any combination thereof, and any other variable affecting riser performance, and the optimum tension which should be used for the various factors affecting the riser performance under various operating scenarios.

5.4.3 Monitoring

The marine riser system is to be suitably instrumented and monitored to ensure safe and reliable performance.

Riser monitoring instrumentation typically includes:

- riser angle indicators
- hole position indicators
- tensioner pressure gauges
- video cameras.

5.4.4 Disconnecting

Apart from normal disconnecting, emergency disconnecting equipment is to be fitted to the riser for quick release in uncontrollable unit displacement so as to avoid damage to the unit and risers.

5.4.5 Riser global analysis

Marine drilling riser system is to be verified through global riser analysis.

5.4.6 Riser operating manual

The operating envelope for the marine riser system described in [5.4.2] is to be indicated in the operating manual of the marine riser system, which is to include at least:

- riser system components manufacturer's drawings indicating critical parameters such as size and weight
- load rating of critical components, as stated by the manufacturer
- rated internal and collapse pressures of the riser and integral lines
- inspection and maintenance procedure for each component
- procedure for running and retrieving the riser
- procedure for establishing maximum and minimum tension settings
- operating limits and emergency procedures
- a accurate log of operating history
- list of recommended spare parts
- criteria for cutting an slipping tensioner lines.

6 Well control systems

6.1 General

6.1.1 Well control systems generally consist of the following equipment:

- Blow-out preventer (BOP)
- Choke and kill system
- Diverter system
- Marine riser system.

6.2 Blowout preventer (BOP)

6.2.1 General

The working-pressure rating of each BOP component must exceed maximum anticipated surface pressures.

Stack configurations should generally be in accordance with API RP 53.

The BOP stack is to be designed so as to allow fluids and gases to be conducted out of the system and fluids pumped into the system.

6.2.2 Surface BOP

When drilling with a surface BOP stack, the BOP system is to be installed before drilling below surface casing.

The surface BOP stack is to include at least the following four components:

- one annular preventer
- two BOP's equipped with pipe rams with mechanical locking device
- one BOP equipped with blind shear rams, capable of shearing the drillpipe in the hole.

6.2.3 Subsea BOP

Subsea BOP stack is to include at least the items defined in [6.2.2]. Additional requirements relating to the redundancy of the protection may be defined on a case-by-case basis, taking into account the specificities of the installation.

6.2.4 Control and monitoring

a) As a rule, the control systems and components are to comply with API Spec 16D and the additional requirements b) to f).

b) At least two independent control systems are to be provided:
   - one station must be located at the driller floor
   - the second system is to be located away from the drill floor in a readily accessible location.

c) The control panels are to include controls for at least the following functions:
   - diverter
   - close or open all rams, annular preventers and choke and kill valves at BOP
   - emergency disconnection of riser connector for DP units.

d) The control panels should clearly indicate by appropriate means the status of each BOP (open or closed). In addition, indication of the available hydraulic pressure is to be given.

e) Visual and/or audible alarms are to be fitted for the following:
   - low accumulator pressure
   - loss of power supply
   - low levels of control fluid in the storage tanks.

f) The control systems are to be protected from the drill floor or cellar deck, and are to be accessible from the drill floor and from the outside.

6.3 Choke and kill system

6.3.1 Function

a) The main function of choke manifolds is to discharge pressure in well bore at controllable rate or fully stop flow of fluid.

b) The main function of kill lines is to pump drilling fluids into the well or annular space when BOP rams are closed during well control operations.

6.3.2 Description

Choke and kill system typically includes the following components:

- choke and kill manifolds, including
  - chokes
  - flanges and valves
  - spools
- choke and kill lines
- connectors and flexible lines
  - jumper lines at LMRP
  - drape hoses at moonpool area
- BOP stack valves
- connecting piping
- buffer tanks
- control systems.

6.3.3 Choke and kill systems, manifolds, arrangements and associated components are to be in compliance with the following standards, in addition to the requirements of the present Rule Note:

- API Spec 6A
- API Spec 16C
- API Spec 16F
- API Spec 16D
- API RP 53.

6.3.4 Design principles

In addition to the standards mentioned in [6.3.3], choke manifolds and choke and kill lines are to be designed in accordance with good engineering practice with due consideration for:

- maximum and minimum anticipated pressures,
- the abrasive nature of well fluids,
- the dynamic forces caused by the flow of well fluids,
- any other phenomena caused by the flow of well fluids including vibrational stresses, pressure pulsation and temperature variations.

6.3.5 Choke and kill manifold

a) Design pressure: The design pressure of the high pressure side of the choke and kill manifold is to be at least the same as the design pressure of the BOP stack.

b) The maximum and minimum design temperatures of the choke and kill manifold are to be specified. Due consideration to Joule-Thomson effects is to be given when determining design temperatures of choke and kill manifold and downstream piping and components.

c) The choke and kill manifold assembly is to include the following:

   1) a minimum of 3 chokes, with at least one of which remotely controlled and one manual. It is to be possible to isolate and change any choke while the manifold is in use

   2) one valve for each of the outlet and inlet lines, so that lines to and from the manifold can be isolated

   3) where high pressure and low pressure interfaces, in the manifold system, two valves in series are to be installed.

d) The choke and kill manifold is to be configured so that drilling fluid may be pumped into the well through either the choke or the kill line and simultaneously circulated out of the well through the other choke or kill line.

e) The choke and kill manifold is to be capable of directing the flow from any choke:

   1) through mud-gas separation equipment and subsequently to the mud pits

   2) through a fixed piping arrangement leading directly overboard (overboard lines, port and starboard).

6.3.6 Choke and kill lines

a) Design pressure: The design pressure of choke and kill lines including connections, valves, etc, is to be at least the same as the design pressure of the BOP stack.

b) Choke and kill piping is to be designed to avoid erosion-caused by the flow of well fluids. Changes in direction are to be avoided as much as possible. When such changes cannot be avoided, targeted tees or elbows and/or long radius elbows (20 times or more the pipe diameter) should be used.

c) Each choke and kill line from the BOP stack to the choke manifold is to be fitted with two valves installed on the BOP stack.

   1) For subsea BOP stack, these two valves are to be arranged for remote hydraulic operation.

   2) For surface BOP stack, only one of the valves is to be arranged for remote hydraulic operation.

6.3.7 Control and monitoring

a) The choke control station, whether at the choke manifold or remote from the rig floor, is to be easily accessible and is to include all monitors necessary to provide an overview of the well control situation.

b) All valves are to be provided with "open" and "close" indicators.

c) Any remotely operated valve or choke is the be equipped with an emergency backup power source.

6.4 Diverter system

6.4.1 General

Diverter system and equipment typically includes:

- annular sealing device
- vent outlets
- valves
- power unit and piping
- control system.

6.4.2 The diverter system is to comply with the requirements of API RP 64, API RP 53, API Spec 16D and the requirements below.

6.4.3 A diverter with a securing element for closing around the drill string in the hole is to be provided to divert wellbore fluids away from the rigfloor in case of shallow gas event.

6.4.4 The diverter system is to be capable of withstanding the maximum anticipated combination loads both static and dynamic, resulting from the flow of gas and liquid.

6.4.5 Diverter piping

The overboard diverter lines are to:

a) be installed to permit fluid flow to be directed to at least two opposite sides of the installation

b) be installed as straight as possible and be securely tied down

c) have a nominal diameter of not less than 10in (254mm)

d) be designed to allow for the erosive effect of solids entrained in the fluid flow, when changes in direction cannot be avoided

e) terminate to the atmosphere beyond the structure of the installation

f) have a downward slope from the diverter valves.

6.4.6 Diverter valves

The diverter valves are to be of full opening and full bore type.

6.4.7 Control system

a) The diverter control system and components is to comply with the applicable requirements of API RP 64, API RP 53 and API Spec 16D.

b) The diverter control system is to be of a hydraulic type and is to be arranged such that all operations to close the diverter and the shale shaker discharge line and open the diverter vent line are accomplished by activating a single function on the diverter control panel.

c) The diverter system is to be controlled from two locations: one being located near the driller's console and the other at a readily accessible location away from the well activity area and reasonably protected from mechanical damage due to drilling activities on the drill floor.

d) Any remotely operated valve is to be equipped with an emergency backup power source.

7 Pressure Containing Equipment

7.1 General

7.1.1 Pressure containing equipment is to comply with the requirements of Pt C, Ch 1, Sec 3 of the Offshore Rules. Alternatively or for systems not covered by the Offshore Rules, the following standards are to be used:

- ASME Boiler and Pressure Vessels Code
- BS 2790 "Specification for Design and Manufacture of Shell Boiler of Welded Construction"
- API Std 530 / ISO 13704 "Calculation of Heater Tube Thickness in Petroleum Rafineries"
- API Std 661 "Air Cooled Heat Exchangers for General Refinery Service"
- BS 2790 "Specification for Design and Manufacture of Shell Boilers of Welded Construction"
- Tubular Exchangers Manufacturers Association Standards (TEMA).

8 Piping

8.1 General

8.1.1 Piping is to comply with the requirements of Pt C, Ch 1, Sec 7 of the Offshore Rules. Alternatively or for piping not covered by the Offshore Rules, the following standards are to be used:

- API RP 14E "Design and Installation of Offshore Production Piping Systems"
- ANSI/ASME B31.3 "Chemical Plant and Petroleum Refinery Piping"
- API RP 17B "Flexible Pipe".

9 Electrical Systems

9.1 General

9.1.1 Electrical equipment is to comply with the requirements of Pt C, Ch 2 and Ch 3 of the Offshore Rules. Alternatively or for equipment not covered by the Offshore Rules, the following standards are to be used:

- IEC 60092-504 "Electrical Installations in Ships"
- IEC 60529 "Degrees of Protection Provided by Enclosures"
- IEC 60533 "Electrical and Electronic Installations in Ships - Electromagnetic Compatibility"
- IEC 60945 "Maritime Navigation and Radio Communication Equipment and Systems"
- API RP 500 "Classification of Location for Electrical Installations at Petroleum Facilities".

SECTION 3 SURVEY AND CERTIFICATION

1 General

1.1 Application

1.1.1 The present Section provides specific requirements for the survey and certification of drilling equipment. The requirements of the present section are complementary to the requirements of NR266 "Survey of Materials and Equipment at Works for the Classification of Ships and Offshore Units", that the principles apply for the purpose of the present Rule Note.

1.1.2 For obtaining certificates issued by the Society and undertaken for classification purpose, the manufacturer of the equipment is to submit relevant documentation required in the present Rule Note. Relevant documentation for design review, consistent with the requirements of Sec 2, is to be included.

1.1.3 When the manufacurer holds a valid product design approval certificate issued by the Society, full or partial exemptions of the design review required by the present Rule Note may be foreseen for classification.

1.1.4 The Society reserves the right to modify the requirements of the present Rule Note, to formulate new ones or to change their application in order to take into account the particulars of a given construction, as well as local circumstances.

1.2 Survey ratings

1.2.1 Survey ratings definition

Three survey ratings are defined for the purpose of the present Rule Note. Their meaning and scope of survey are given in Tab 1.

Table 1 : Survey ratings

Survey rating	Definition	Scope of survey	Requested certificates
A1	Equipment and components rated A1 are to be certified as having been designed, built and supplied in accordance with the applicable Rules, standards and design specifications. The A1 certification includes: • design review • survey during construction • completion inspections and tests • examination of manufacture records.	• design approval (review of drawings, specifications and calculation notes) **(1)** • traceability of materials and review of mill certificates • review of welders and NDT operators qualifications • forming, heat treating, welding, NDT and other fabrication or testing qualifications • survey of the fabrication and witnessing of NDT at random • witnessing of tests (such as hydraulic tests) • assessment of manufacturer's QA/QC dossier **(2)** • endorsement of a final inspection report for each different item	• product certificates of the Society • manufacturer's product certificates
A2	The certification of A2 rated components includes: • design review • completion inspections and tests.	• design approval or independent design checks • review of vendor's test reports and certificates • witness of tests.	• product certificates of the Society • manufacturer's product certificates
A3	A3 rated equipment is accepted on the basis of valid product certificates	• review of manufacturer product certificates • review of type approval certificates, when relevant • review of documentation issued by independent inspection body, when relevant.	• manufacturer's product certificates

(1) For type approved components, the certificate is to be submitted; specifications are to be sent for information

(2) The actual level of survey at the construction works will be agreed on a case-by-case basis, taking into account the level of relevant QA involvement and inspection.

1.3 Symbols

1.3.1 Symbols defined in the present Section are consistent with the definitions of NR266, Sec 1. The following symbols are used for certification:

- "C" indicates that a product certificate of the Society is required, with invitation of the Surveyor to attend the tests unless otherwise agreed, in addition to the manufacturer's document stating the result of the test performed and/or compliance with the approved type, as applicable

Note 1: An alternative survey scheme (mode I) may be agreed by the Society with the manufacturer whereby the attendance of the Surveyor will not be required as indicated above. Accordingly, the product is covered by a Certificate for Alternative Survey ("CA") delivered by the Society. The appropriate required documents and information are detailed in the procedures stated in the agreement for admission to the alternative survey scheme.

- "W" indicates that a manufacturer certificate is required, stating the results of performed tests and/or compliance with the approved type, as applicable.

2 Requirements for survey and certification

2.1 General references

2.1.1 The requirements for survey and certification of drilling equipment, taking into account the defined survey ratings, are given in Tab 2.

2.1.2 Additional requirements for pressure vessels and piping and their components are given in Tab 3 and Tab 4. These requirements are to be used with respect to NR266, when relevant.

Table 2 : Survey and certification of drilling equipment

Drilling equipment		Survey rating			Certificate type
		A1	A2	A3	
Derrick and hoisting equipment in derrick	Derrick	X			C and W
	Drilling hook		X		C and W
	Drawworks and their foundation		X		C and W
	Crane in derrick		X		C and W
	Casing stabbing arrangement		X		C and W
	Air winches		X		C and W
	Dead line anchor		X		C and W
	Traveling block		X		C and W
	Crown block including supports		X		C and W
	Sheaves		X		C and W
	Guide track and dolly		X		C and W
	Swivel		X		C and W
	Elevators			X	W
	Drilling line, sand line			X	W
	Links			X	W
Heave compensation system	Compensator		X		C and W
	Piping and hoses		X		C and W
	Air cylinders		X		C and W
	Hydro-pneumatic accumulator		X		C and W
	Compressors			X	W
	Air dryers			X	W
	Sheaves			X	W
	Control panel			X	W
	Wire ropes			X	W

Drilling equipment		Survey rating			Certificate type
		A1	A2	A3	
Mud/drilling fluids circulation and transfer system	Drilling fluid pump		X		C and W
	Pulsation dampers		X		C and W
	In-well piping for mud		X		C and W
	Kelly cocks		X		C and W
	Strandpipe manifold		X		C and W
	Rotary hose and end connection		X		C and W
	Mixing pumps		X		C and W
	Non-return valves - ball valves - for drilling string		X		C and W
	Safety valves		X		C and W
	Gas separator for drilling fluid		X		C and W
	Degasser and piping for burners or vents		X		C and W
	Centrifugal mixing pumps			X	W
	Piping for mixing drilling fluid			X	W
	Suction line to drilling fluid pumps			X	W
	Mud return pipe			X	W
	Circulation head			X	W
	Desander and desilter			X	W
	Chemical mixers			X	W
	Agitators			X	W
	Shale shakers			X	W
	Mud/drilling fluids tanks (independent)			X	W
	Drilling fluid supply tank			X	W
	Trip tanks			X	W
Cementing system	Cement pump		X		C and W
	Cement manifold		X		C and W
	Cementing pump discharge piping		X		C and W
	Pulsation dampers		X		C and W
	Safety valves		X		C and W
	Piping for mixing cement			X	W
	Suction lines to cement pumps			X	W
Marine riser and its control system	Support ring for riser tensioner		X		C and W
	Marine riser connectors		X		C and W
	Telescopic joints		X		C and W
	Riser sections including joints		X		C and W
	Flexible joint and ball joint		X		C and W
	Accumulators		X		C and W
	Control panel			X	W

Drilling equipment		Survey rating			Certificate type
		A1	A2	A3	
Rotary equipment	Rotary table, skid adaptor and driving unit		X		C and W
	Top drive		X		C and W
	Kelly			X	W
	Master bushing			X	W
	Kelly bushing			X	W
Pipe handling equipment	Pipe handling crane		X		C and W
	Manoeuvring arm		X		C and W
	Racking arm with lifting head		X		C and W
	Horizontal to vertical equipment		X		C and W
	Finger board			X	W
	Catwalk			X	W
	Mousehole			X	W
Riser tensioning system	Riser tensioner		X		C and W
	Hydro-pneumatic accumulator		X		C and W
	Air cylinders		X		C and W
	Telescopic arms for tension lines		X		C and W
	Guidelines, podline tensioners		X		C and W
	Piping		X		C and W
	Air dryers			X	W
	Air compressors			X	W
	Wire ropes			X	W
	Sheaves for riser tension lines			X	W
	Sheaves for guideline and podline			X	W
	Control panel			X	W
Electrical equipment	Transformers		X		C and W
	Electrical engines above 50 kW		X		C and W
	VFD, SRC and MCC systems		X		C and W
Bulk storage and transfer equipment	Pressurized storage tanks		X		C and W
	Piping for pressurized bulk products		X		C and W
	Valves for pressurized piping		X		C and W
Choke and kill system	Choke manifold	X			C and W
	Choke manifold piping		X		C and W
	Piping for choke, kill and booster lines		X		C and W
	Flexible hoses for choke, kill and booster lines		X		C and W
	Valves for choke, kill and booster lines		X		C and W
	Union and swivel joints		X		C and W
	Emergency circulation pumps		X		C and W

Drilling equipment		Survey rating			Certificate type
		A1	A2	A3	
Diverter	Diverter body with annular valve		X		C and W
	Diverter piping		X		C and W
	Valves in diverter piping		X		C and W
	Diverter control panel			X	W
Blow-Out Preventer (BOP)	Annular preventer		X		C and W
	Ram preventer		X		C and W
	Hydraulic connector for wellhead		X		C and W
	Accumulators for subsea stack		X		C and W
	Subsea fail-safe valves in choke and kill lines		X		C and W
	Clamp		X		C and W
	Test stump		X		C and W
BOP control equipment - Koomey unit	Acoustic BOP control equipment		X		C and W
	Accumulators in control system		X		C and W
	Hydraulic power unit (HPU)		X		C and W
	Welded pipes and manifolds		X		C and W
	Unwelded hydraulic piping			X	W
	Flexible hoses			X	W
	Hose reel			X	W
	Control pods			X	W
	Control panels			X	W
BOP handling equipment	BOP handling crane		X		C and W
	BOP carriage equipment		X		C and W
	Guide frames		X		C and W
	Wire ropes			X	W
Miscellaneous equipment	Flare boom	X			C and W
	Burner		X		C and W
	Kelly spiner			X	W
	Power slips			X	W
	Power tong for pipe handling			X	W
	Single joint elevator			X	W

Table 3 : Survey and certification of pressure vessels other than mentioned in Tab 2

Pressure vessels		Survey rating A1	Survey rating A2	Survey rating A3	Certificate type
Pressure vessels for liquids and gases other than mentioned in Tab 2	Vessels for noxious liquids		X		C and W
	Vessels for liquids with temperature above 220°C		X		C and W
	Vessels for compressed gases		X		C and W
	Vessels for liquids with a flashpoint below 100°C		X		C and W
Other pressure vessels				X	W

Table 4 : Survey and certification of piping and valves other than mentioned in Tab 2

Piping, valves and flanges		Survey rating A1	Survey rating A2	Survey rating A3	Certificate type
Piping	Design temperature above 400°C		X		C and W
	Thickness above 25 mm		X		C and W
	Pipes associated with A1 or A2 rated equipment		X		C and W
	Other			X	W
Flanges	Non-standard flanges for A1 or A2 rated equipment		X		C and W
	Other			X	W
Valves	Valves of welded construction with ANSi rating more than 600 lbs		X		C and W
	Other valves complying with recognized standards			X	W

3 Inspections at works and during installation

3.1 Inspections at works

3.1.1 General

Inspections at works include inspections during manufacture and inspections and tests before delivery.

3.1.2 Checklist

Inspections at works include, but are not limited to, the following items:

- confirmation that the process used at the fabrication of drilling equipment and components has and maintain an effective quality control plan covering the design, procurement, manufacturing and testing
- welders qualification is to be verified or confirmed by the surveyor
- welding procedure specification and corresponding weld procedure qualification records are to be reviewed
- material certificates and relevant documentation are to be verified
- check of fit-up prior to major weldments
- check of final weldments
- review of records of post-weld heat treatments, in particular for piping subject to pressurized sour service and to the requirements of NACE MR0175/ISO 15156
- witnessing of non-destructive examinations of welds and review of records of non-destructive examinations
- verification of final geometry and dimensions, to be in accordance with the approved drawings
- verification of compliance with specified tolerances
- verification of alignment of mating surface, to be in compliance with specified requirements or standards
- witnessing of pressure or proof-load tests
- witnessing of final testing and functional testing of sub-assemblies and completed units
- check that all pressurized systems, consoles and control panels are in accordance with the approved design
- additional inspections as agreed between parties.

3.2 Inspections during installation

3.2.1 Inspections during installation include, but are not limited to, the following items:

- examination of drawings and test programme of drilling equipment
- visual examination of piping

- witnessing of non-destructive examinations and tests, when relevant
- test of pressure relief arrangements and safety valves
- pressure test of choke and kill system at rated working pressure
- low pressure test of choke and kill system at 300 psi and performance test
- operation test of drilling pump
- performance test of drawworks and associated equipment
- load-test of lifting appliances
- test of mobile framework of the derrick and check of locking devices
- test of control systems and shutdowns
- check of continuity and proper workmanship of electrical wires and connections
- check of available measurement records.

4 Materials and welding

4.1 General

4.1.1 Material and welding is to be in accordance with the requirements of NR216 “Material and welding”.

4.1.2 Specific provisions relating to material and welding from standards specified for the certification of drilling equipment are to be taken into account.

SECTION 4 IN-SERVICE SURVEY

1 General

1.1 Application

1.1.1 The present section provides requirements for in-service surveys relating to equipment covered by the additional class notation **DRILL**, as defined in Sec 1.

1.1.2 In general, in-service surveys are based on the provisions of Pt A, Ch 2 of the Offshore Rules.

Note 1: A specific section for in-service surveys of drilling units is given in Pt A, Ch 2, Sec 5 of the Offshore Rules, which refer to the requirements of the present section in case of additional class notation **DRILL**.

1.2 Periodicity

1.2.1 General

Drilling equipment are to be subjected to the following types of in-service surveys:

- annual surveys
- class renewal surveys
- occasional surveys for damage, repairs, reactivation and alterations.

Detailed requirements about general principles of survey and about survey types, their extension and general procedure, are given in Pt A, Ch 2, Sec 1 of the Offshore Rules.

1.3 Normal survey system

1.3.1 Requirements for class renewal survey under normal survey system (SS) are given in Pt A, Ch 2, Sec 1, [3.2] of the Offshore Rules.

1.4 Continuous survey system (CS)

1.4.1 The request of the Owner for admission to the continuous survey system will be considered by the Society and agreement depends on the type and age of concerned equipment. This system may apply to class renewal survey of drilling plant (CSD).

1.4.2 A list of items to be inspected under continuous survey system is to be provided. This list will be attached to the Certificate of Classification.

1.4.3 For items inspected under continuous survey system, the following requirements generally apply:

- the interval between two consecutive surveys of each item is not to exceed five years
- the items are to be surveyed in rotation, so far as practicable, ensuring that approximately equivalent portions are examined each year
- the Society may credit for continuous survey results of inspections carried out before the admission to the continuous survey scheme
- each item is to be surveyed at one time, as far as practicable; the Society may, however, allow possible repair work to be carried out within a certain period.

1.4.4 The continuous survey system does not supersede the annual surveys and other occasional surveys.

1.4.5 The continuous survey system may be discontinued at any time at the discretion of the Society, or at the request of the Owner.

1.5 Risk Based Inspection Plan

1.5.1 A proper Risk Based Inspection/Maintenance may be accepted by the Society as an equivalent of continuous survey system. The plan is to be submitted to, reviewed and accepted by the Society.

2 Surveys of drilling systems

2.1 Onshore surveys, modifications and repairs

2.1.1 The Owner is to inform the Society about any equipment or part of equipment which is returned onshore for modifications, repair or maintenance.

2.1.2 After modifications, repair or maintenance, the equipment is to be tested onshore in accordance with relevant specified standards. A surveyor of the Society will attend function tests, load tests or pressure tests carried out on drilling equipment prior to their release for offshore.

2.1.3 A release statement will be issued upon satisfactory completion of tests and visual examination, subject to satisfactory installation onboard the drilling unit and examination during the forthcoming class survey. The release statement is to be maintained onboard the drilling unit for verification during classification surveys.

2.2 Annual surveys

2.2.1 The requirements of the present sub-article are to be considered as a minimum for annual surveys. Additional examination and/or testing may be required at the satisfaction of the attending surveyor.

2.2.2 The review of Owner's maintenance manual and relevant logs and records is to be carried out. The purpose is to ensure that:

- periodical testing of the equipment has been carried out in accordance with relevant standards
- eventual repair, maintenance or replacement of equipment or components are done in accordance with applicable standards
- overall, a suitable maintenance program has been followed.

2.2.3 The review of release statements since the previous class survey is to be carried out. Concerned equipment is to be inspected at the satisfaction of the surveyor.

2.2.4 General external examination of drilling systems is to be carried out, as far as accessible, in order to identify eventual damages, excessive corrosion, fracturing of malfunctions.

2.2.5 Visual inspections of external surfaces of derrick, flare booms, pipe racks, and their foundations to the hull are to be carried out. The following items are to be considered:

- investigation of structural elements condition with identification of missing, bent or abraded parts and lost of corrosion protection
- investigation of general condition of wire ropes and fittings, following the provisions of API RP 2D.

2.2.6 At the drill floor and well testing area, the following items are to be examinated:

- fire extinguishing/deluge systems
- alarms and warnings
- release arrangements.

It is to be verified that all items are at their location and in the correct number, and their condition is to be inspected.

2.2.7 The availability of eye wash station and emergency showers in the proximity of the mud mixing area is to be checked.

2.2.8 Alarm activation in manned control rooms due to loss of pressurization of high pressure equipment is to be checked, as far as practicable.

2.2.9 General visual examination of pressure vessels and their appurtenances is to be carried out. The examination is to include:

- safety devices
- foundations
- piping systems and flexible lines
- insulation and gauges.

Eventual damages and excessive corrosion are to be identified.

2.2.10 A review of records of inspection and testing of safety valves and safety shutdown devices is to be carried out. Examination of these items is to be performed.

2.2.11 The condition of hot surfaces insulation is to be checked.

2.2.12 Visual examination is to be performed for derrick hoisting equipment, and in particular for:

- sheaves
- crown block and support beams
- travelling block including guide track and dolly
- drilling hook and links.

2.2.13 Visual examination of base-mounted winches and drawworks structure including foundation is to be performed. Magnetic Particle Inspection (MPI) may be requested by the surveyor.

2.2.14 In general, the investigation of general condition of wire ropes and fittings of hoisting equipment is to be performed based on the provisions of API RP 2D.

2.2.15 Visual examination of mud system si to be performed. This examination is to include:

- mud tanks
- mud related piping
- mud pumps
- shale shakers
- safety valves
- degasser including piping to burners or to ventilators.

Internal examination of mud system components is to be carried out as far as practicable.

2.2.16 Visual examination of dry products storage tanks or silos and related piping is to be carried out. Internal examination is to be performed as far as practicable.

2.2.17 Heave compensation system, including its components, is to be visually examinated. The following components are to be included:

- compensators
- accumulators
- air compressor and air dryer
- other pressure equipment
- wire ropes
- sheaves
- control panels.

2.2.18 Marine riser tensioning system, including its components, is to be visually examinated.

2.2.19 Visual examination of cementing equipment is to be performed. This examination is to include:

- pumps
- prime movers
- relevant piping
- safety valves.

Internal examination of equipment is to be performed as far as accessible.

The record of maintenance and testing relating to cement manifold and safety valves is to be provided during the visit and checked by the surveyor.

2.2.20 Well test equipment and relevant piping are to be visually examinated. Internal examination is to be performed as far as practicable.

Oil tanks used for well testing purpose are to be internally inspected, based on the relevant provisions of Pt A, Ch 2 of the Offshore Rules.

Visual examination of flare boom and burners is also to be performed.

2.2.21 The structure of pipe racks and the pipe handling equipment are to be visually examinated. A particular attention is to be given to the connections of the equipment to the hull.

2.2.22 Blow-Out Preventer (BOP) test log and maintenance records are to be provided at the visit and examinated by the Surveyor. The review is to be done in accordance with relevant requirements of API RP 53.

2.2.23 Visual examination of BOP is to be performed. The examination is to include:

- BOP main structure
- rams
- annular
- clamps and test stump
- connectors with LMRP and wellhead
- accumulators for subsea stack
- control panels and other control devices.

Internal examination of components is to be performed as far as practicable.

2.2.24 Visual examination of BOP control unit (Koomey unit) is to be performed.

2.2.25 Visual examination of BOP handling system is to be performed. The examination is to include the power unit and its controls, lifting devices, flexible hoses and piping, accumulators.

2.2.26 Records of tests and inspections of choke and kill equipment are to be examined. Visual examinations of manifolds, choke and kill lines and valves are to be carried out.

2.2.27 Visual examination of diverter system is to be performed. the examination is to include the house, annular valve, pipings and their valves and the control panel.

2.2.28 Testing of well control system including the BOP is to be performed in accordance with the requirements of API RP 53. The following items are to be included:

- pressure and functional testing
- control system testing
- pressure testing in the case of each shear ram activation.

2.3 Class renewal surveys

2.3.1 Class renewal surveys are to include all examination and testings specified in [2.2] for annual surveys. In addition, the following is to be carried out at the satisfaction of the surveyor:

- hydrostatic testing of pressure vessels and other pressure retaining components to their working pressure
- hydrostatic testing of piping and flexible hoses at their working pressure
- complete performance test of the BOP, as per API RP 53
- functional testing of derrick gear
- functional testing of drilling hoisting equipment and lifting devices
- close inspection of welded joints on the derrick and racks, with eventual non-destructive testing of any suspect area, at the satisfaction of the surveyor
- functional test of the emergency power equipment of the drilling plant
- internal examination and thickness gauging of pressure vessels and pressure retaining components, at the satisfaction of the surveyor
- testing of relief valves when considered necessary by the surveyor.