PART 6 CHAPTER 5

DRILLING PLANT (DRILL)

EQUIPMENT, STRUCTURES AND SYSTEMS

FEBRUARY 1986

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INTRODUCTION

• General.
The present edition of the Rules includes additions and amendments decided by the Board as of 1st of
February 1986 and supersedes the January 1984 edition of the same chapter.
The Rule changes come into force on 1st of August 1986.
This chapter is valid until superseded by a revised chapter. Supplements will not be issued except for an
updated list of corrections presented in the introduction booklet. The introduction booklet is normally re­
vised in January and July each year.
Revised chapters will be forwarded to all subscribers to the Rules. Buyers of reprints are advised to check
the updated list of Rule chapters printed on the front page of the introduction booklet to ensure that the
chapter is current.

• Changes in the Rules.
— Sec. 4 Piping.
D. Piping Materials. Rule item 102 has been amended in accordance with the «correction sheet» enclos­
— Sec. 9 Fire Safety.
C. Fire Fighting. These Rules have been amended in accordance with the «correction sheet» enclos­
Previous D. Gas Detection/Protection, has been detected. Now covered by Rules for main·
— Sec. 10 Manufacture, Workmanship and Testing.
A 300 Quality assurance/quality control.
Amended Rules.

• Corrections and Clarifications.
Besides the above stated rule changes some detected errors have been rectified and some clarifications
have been made in the existing rule wording.

• Summary.
Every effort has been made to prepare the Rules in this chapter such that when properly adhered to, they
will be instrumental in obtaining a drilling plant (defined as: equipment, structures and systems necessary
for safe drilling operations as listed in Sec. 1 A 103) fit for the purpose and safe to use.
The Rules in this chapter have been made to comply with the following national regulations as far as de­
dsign, manufacture and installation of drilling related equipment, structures and systems are concerned, but not with regard to operational requirements:
— UK Offshore Installation (Construction and Survey) Regulations 1974
— Norwegian Petroleum Directorate: Regulations for drilling etc. for petroleum in Norwegian territorial
waters and on the Continental Shelf which is under Norwegian sovereignty 1981
— Danish Energy Agencies: Regulations for Installations for the Recovery and Processing of Natural
Gas and Condensate 1980
Two different levels of certification/classification are available. The basic class notation DRILL reflects
normal classification principles and covers the U.K. Department of Energy's requirements for «Certifi­
cate of Fitness» with regard to the drilling plant. The class notation DRILL (N) will be given when the
drilling plant is considered to comply with NPD's requirements.
All paragraphs in this chapter are to be complied with to obtain DRILL (N) (i.e. including those marked
(N)), otherwise compliance with paragraphs marked (N) is not required.
Owners who wish to have the drilling plant evaluated for compliance with other national regulations may
contact the Society for further arrangement.
The drilling related equipment, structures and systems are normally covered by Regulations given by the
National Authorities. Accordingly there may be cases of interpretation in which the Regulations will take
precedence over these Rules.
The Rules in this chapter are based on internationally recognized codes and standards as referred to, and
are made to emphasize Veritas' interpretation of these and give additional requirements where found ne­
necessary. If these interpretations and additional requirements are found to be sufficiently covered in new
revisions of the codes and standards, they will be left out in new revisions of these Rules.
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A. Application.

A 100 Scope.

101 The Rules in this chapter apply to drilling plants, including drilling related equipment, structures and systems as listed in 103 below, which are not covered by the main class nor the additional class Drilling Vessel. Reference is made to Pt. 1 to 4 and Pt. 5 Ch. 3 Sec. 2 and the «Rules for Classification of Steel Ships», Pt. 1 to 4 and Pt. 5 Ch. 7 Sec. 6.

Note:
Where references throughout this chapter are made both to other parts of these Rules and to the «Rules for Classification of Steel Ships», the latter will apply to drilling plants intended for drill ships etc. classified according to the «Rules for Classification of Steel Ships», otherwise the references to these Rules will apply.

Note:
The Rules in this chapter are based on internationally recognized codes and standards as referred to, and are made to emphasize Veritas' interpretation of these and give additional requirements where found necessary. If these interpretations and additional requirements are found to be sufficiently covered in new revisions of the codes and standards, they will be left out in new revisions of these Rules.

102 The Rules are made to cover the safety of the drilling unit/installation and those onboard. Reliability and operational aspects are not covered except where considered to be of significance for the safety.

103 The following drilling related equipment, structures and systems are covered by the Society's certification of drilling plants:
   - Structures (derrick, flarebooms)
   - Overhead drilling equipment
   - Pipe handling systems
   - Drawworks
   - Rotary table
   - Compensating and tensioning systems
   - Mud system (incl. reconditioning)
   - Kill and choke system (incl. cementing system)
   - Marine riser system
   - BOP system (incl. controls)
   - Lifting appliances for drilling operations (BOP-carriers, tuggers etc.)
   - Bulk systems
   - Well testing equipment
   - Fire safety systems
   - Emergency shutdown system
   - Electrical equipment

   - HP piping.
   - Pressure vessels

For further breakdown on equipment, see C 600.

104 All paragraphs in this chapter are to be complied with when DRILL (N) is requested (i.e. including those marked (N)), otherwise compliance with paragraphs marked (N) is not required (see 202 and 402).

A 200 Certification.

201 Upon request from a Client, a Veritas Drilling Plant Certificate may be issued for complete drilling plants which have been designed, built, equipped, marked, inspected and tested in compliance with these Rules and applicable codes, standards and regulations, which will be stated in the certificate.

202 It will be stated in the certificate if the drilling plant is found to comply with the requirements for DRILL or DRILL (N), see 104.

203 The operational limitations and basic assumptions and conditions for use will be stated in an Appendix to the Certificate (see 500 and C 200).

204 The Society's Surveyor shall be requested to inspect the installation of the plant and attend the necessary final tests.

205 Such certification as described in 201 may also be carried out for individual parts of drilling related equipment, structures and systems.

206 The Society's commission related to the certification as such is completed when the certificate with its appendix etc. is forwarded to the Client.

A 300 Classification.

301 When a drilling plant certified by the Society has been installed on a drilling vessel covered by the Society's classification, an additional class notation DRILL or DRILL (N) (see 104, 202 and 402) may be included in the unit's class, provided the vessel is built in compliance with the requirements for drilling vessels. See Pt. 5 Ch. 3 Sec. 2 or the «Rules for Classification of Steel Ships», Pt. 5 Ch. 7 Sec. 7.

302 The drilling plant will then be subjected to periodical surveys as specified in Sec. 11 and Pt. 1 Ch. 2, in order to ensure that the plant is properly maintained and in good condition for retention of class.

303 When a drilling plant certified by the Society has been installed on a mobile offshore unit not covered by the Society's classification, or on a fixed offshore installation, an arrangement similar to classification may be agreed for periodical surveys in order to ensure proper maintenance of the drilling plant, and corresponding certificates may be issued.

Such drilling plants will be entered in a special list in the Society's Register.

A 400 National regulations.

401 The Rules in this chapter have been made to comply with the following national regulations as far as design, manufacture and installation are concerned, but not with regard to operational requirements:
   - United Kingdom: Offshore Installation (Construction and Survey) Regulations 1974
   - Norwegian Petroleum Directorate: Regulations for drilling etc. for petroleum in Norwegian internal waters, in Norwegian territorial waters and on the Continental Shelf which is under Norwegian sovereignty, 1981
Mobile Offshore Units Pt.6 Ch.5 Sec.1


402 The Rules for DRILL (N) are considered to meet NPD’s regulations. To obtain DRILL (N), all paragraphs in this chapter are to be complied with. Paragraphs marked (N) are requirements laid down by NPD, and compliance with these is not required for compliance with the above mentioned British and Danish regulations.

403 There may be cases of interpretation in which the Regulations will take precedence over these Rules.

A 500 Assumptions.

501 The certification and classification are based on the assumption that the drilling plant will be properly maintained and operated by qualified personnel, and that operational and test procedures are followed, and that loads and environmental conditions will be within the design limits and operational instructions given by the manufacturer.

502 The drilling programme is further assumed to be suitable for the particular drilling plant and its limitations.

B 100 Terms.

101 Drilling plant — equipment, structures and systems necessary for safe drilling operations, but limited to those given in A 103.

102 Client — the applicant for the certificate. May be either the yard, the owner or with regard to components, the manufacturer.

B 200 Abbreviations.

201 The following abbreviations are used:

ANSI — American National Standards Institute.
API — American Petroleum Institute.
ASME — American Society of Mechanical Engineers.
BS — British Standard (issued by British Standard Institution).
CSA — Canadian Standards Association.
DIN — Deutsche Institut für Normung e.V.
ISO — International Standards Organization.
NACE — National Association of Corrosion Engineers.
NPD — Norwegian Petroleum Directorate.
NS — Norwegian Standard (issued by Norwegian Standards Association).

C 100 Quality assurance.

101 A quality assurance programme shall be established during the design, procurement, fabrication, testing and operational phase of the drilling plant. The programme shall comply with recognized standards, such as NS 5001 to 5003, BS 5750 Part 1 to 3, ANSI/ASQC Z1.15, CSA Z299.1—4, CSA N286 series, etc.

102 The quality assurance programme shall be presented for review by the Society, and audits will be performed to verify proper implementation of the programme requirements.

Guidance (N):

In general it must be emphasized that NPD’s control is based on the presumption that the Licensee/Owner has established an acceptable internal control, cf. «Guidelines for the Licensee’s Internal Controls» issued by NPD 15 May 1981. The rules in this chapter include requirements for review and audit of the internal control system (Quality Assurance Programme), see C 101 and 102 above. Compliance with these requirements will facilitate approval by NPD.

C 200 General.

201 Drilling plants shall be designed to operate safely under the maximum load conditions anticipated during operations.

202 The drilling plant shall be suitable for its intended purpose and incorporate efficient control apparatus, guards, shields and other means of protecting personnel.

203 Every item of equipment, structure and system shall be so installed and disposed, both individually and in relation to other items on the installation, as to reduce to a minimum any potential danger to the installation and its personnel.

204 Equipment, structures and systems shall be protected against excessive loads and pressures.

205 The equipment and systems are to be so designed, installed and protected that it will be considered safe with regard to the risks of fire, explosions, leakages and accidents thereof.

206 When it is essential for the safety of the drilling plant that the function of a component is maintained as long as possible in the event of fire, materials with high heat resistance are to be used.

C 300 Arrangement.

301 Areas in which work connected with the drilling operation is performed shall be designed in such a way that the working environment is fully acceptable with regard to the employees’ safety, health and welfare.

302 All equipment and parts which are to be operated or subject to inspection and maintenance on board are to be installed and arranged for easy access.

303 The drillfloor shall have at least two exits. If possible, the drillfloor shall be built on one level and be free from obstructions and protruding objects.

304 Every item of equipment shall be located to ensure safe operation and, if located in hazardous areas, shall be suitably protected for installation in such areas.

305 The systems are to be so arranged that one single maloperation will not lead to a critical situation for the drilling plant.

306 All equipment is to be equipped with indicating instruments considered necessary for safe operation.

307 All rooms, from which the drilling plant is operated and where flammable or toxic gases or vapours may accumulate, are to be provided with adequate ventilation under all conditions.

308 Potentially dangerous working places shall be provided with suitable means of protection or working cabinets.

309 Surface temperatures shall not exceed 70°C unless the surface is sufficiently protected or insulated.

310 Every item of equipment, if capable of producing heat, noise or vibration which will, or is likely to, influence the personnel’s ability to carry out their work, shall be suitably insulated.

311 Systems and tanks are to be so arranged that leakages or maloperation of valves will not directly lead to increased risk of damage to the drilling plant or personnel due to mixing of different fluids.

C 400 Environmental conditions.

401 All items covered by the class are to be designed for the environmental conditions specified by the Client, if not otherwise specified in the detail requirements for the component or system.

402 Test results or other relevant documentation confirming the components’ suitability for their intended purpose may be required.

403 Where applicable the following aspects shall be ta-
ken into consideration when establishing the environmental loads:
- the vessel's motions (i.e. heave, roll, pitch, sway, surge and yaw)
- wind forces
- air and sea temperatures
- waves
- current forces
- loads from possible snow and ice accretion.

404 Special consideration shall be given to possible operational limitations to avoid the design loads to be exceeded due to severe environmental conditions.

405 Special consideration shall be given to design of drilling plants for cold climate operation (Arctic, Sub Arctic etc.).

C 500 Loads.

501 Any part of the drilling plant shall be designed for the most unfavourable load condition, for which it is intended to be used.

502 For each loading condition, and for each item to be considered, the most unfavourable combination, position and direction of loads and forces which may act simultaneously, are to be used in the analysis.

503 All external loads which may impair the proper function of the drilling plant and have significant influence or cause a reduction of the safety, strength and durability, shall be considered.

C 600 Equipment classification.

601 Drilling equipment shall be classified for each particular installation and application, consistent with its functions and importance for the safety of the personnel, plant and environment.

602 Two classes of equipment and structures are considered, for which the degree of certification is different:

I — includes equipment for which a design review and inspection during manufacture will be performed by the Society (i.e. normal class procedure by issuing of certificates for equipment and components).

II — includes equipment which will be accepted on the basis of an appropriate report made by the manufacturer.

Inspection during manufacture performed by another competent and independent body, may be accepted as equivalent to inspection performed by the Society.

The following paragraphs (603–615) give guidance on classification of some important and typical items of equipment in various sub-systems. Equipment considered to be important for the safety, which is not listed in the following, will be classified after special consideration.

603 Blowout preventer systems:
- Ram BOP
- Annular BOP
- Connectors
- Flexible loops & piping
- Accumulators
- Failsafe valve

604 Marine riser systems:
- Ball joints
- Marine riser sections
- Kill, choke and booster lines
- Telescopic joints
- Diverter

605 Structures:
- Derrick
- Stabbing board
- Pipe handling/racking equipment
- Flare booms

606 Overhead drilling equipment system:
- Crown block incl. supporting beams
- Travelling blocks
- Wire ropes
- Heave compensators
- Hooks
- Swivels
- Links
- Elevators
- Handling tools for BOP, marine riser etc
- Deadline anchor
- Drawwork
- Rotary table

607 Tensioning systems:
- Pressure vessels
- Piping systems
- Tensioning cylinders
- Wire ropes
- Sheaves

608 HP mud systems:
- HP mud pump fluid ends
- LP mud pumps
- Pulsation dampeners
- Piping systems incl. standpipe manifold
- Rotary hoses

609 Kill and choke systems:
- Cementing pump fluid ends
- Piping system incl. kill & choke manifolds
- Flexible pipes

610 BOP control systems:
- Accumulators
- Piping systems incl. manifolds
- Flexible pipes
- Pumps

611 (N) BOP control systems:
- Acoustic control or equivalent

612 Well testing systems:
- Separators
- Heaters
- Piping systems incl. manifolds
- Pumps

613 Lifting appliances:
- BOP carrier
- Air tuggers

614 Prime movers for above equipment:
- Diesel engines
- Electric motors \( \geq 100 \text{ kW} \)
- Electric motors \( < 100 \text{ kW} \)

615 The following equipment, if not covered above:
- HP piping
- Pressure vessels
- Electrical equipment
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**B. Main Hoisting System.**

B 100 Derrick.
B 200 Overhead drilling equipment.
B 300 Drawworks.
B 400 Pipe racking.
B 500 Pipe handling equipment.
B 600 Slips and tongs.

**C. Mud System.**

C 100 Reconditioning.
C 200 (N) Mud tanks.
C 300 High pressure mud pumps.
C 400 Mud control equipment.

**D. Kill and Choke System.**

D 100 General.
D 200 Choke manifold.
D 300 (N) Emergency pump for drilling fluid circulation.

**E. Blowout Preventing System.**

E 100 General.
E 200 Blowout preventer stack.
E 300 Control system for the blowout preventers.
E 400 Diverter control system.
E 500 (N) Facilities for maintenance etc.
E 600 Kelly cocks.

**F. Auxiliary Hoisting Equipment.**

F 100 Maximum permissible working load.
F 200 Transportation of personnel.
F 300 Lifting of drill collars/drink pipe.

**G. Well Test Equipment.**

G 100 System requirements.
G 200 Flare lines.

**H. Bulk Mud and Cement Systems.**

H 100 Hydraulic/pneumatic equipment and storage tanks.

### A. General.

101 The drilling system shall be designed to operate safely under the maximum load conditions anticipated during drilling operations, and limit the risk of any danger.

102 All components in a system, and co-operating systems, are to be satisfactorily matched with regard to function, capacity and strength.

103 Consideration should be made to locate the weakest link in any system in a position where the least damage will be caused, should it ever fail.

104 Relative motion between different parts of a system are to be allowed for to necessary extent without inducing detrimental stresses.

### B. Main Hoisting System.

**B 100 Derrick.**

101 Light fixtures and other equipment installed in the derrick and above the drilling floor shall be properly secured against falling down.

102 (N) The derrick shall be equipped with a ladder/elevator arrangement ensuring safe access to the different working platforms. The ladders shall be equipped with safety cages, as well as with rest platforms at least every 6 metres, and further comply with the regulations in force for ladders. The access from a ladder to a working platform, as well as the rest and working platforms, shall be properly secured by means of a self-closing gate, railings and toeboards, etc. according to pertaining National Authority's Regulations.

103 (N) The derrick shall be equipped with an escape system installed in such a manner as to lead away from the derrick — preferably in the opposite side of the derrick to the main access.

104 If a ventline is installed in the derrick, the top of the outlet shall be at least 4 metres above the crown block, and provisions for burning of gas from the vent line shall not be installed.

105 Except for the ladder opening, no unguarded openings large enough to permit a person to fall through shall exist between the beams or main supports of the crown block.

106 A safety device shall be arranged to prevent the travelling block from being run into the crown block.

**B 200 Overhead drilling equipment.**

201 The rating of the overhead drilling equipment shall not be higher than the rating of the derrick.

202 A weight indicator shall be installed and mounted so that the display can easily be read from the driller's stand.

**B 300 Drawworks.**

301 The drum of the drawworks shall be guarded or located to prevent employees from falling into or be caught by the drum or lines.

302 The drawworks shall be equipped with shutdown devices which shall be readily identified and easily accessible in the event of an emergency.

**B 400 Pipe racking.**

401 There shall be provisions for securing of drill pipe and collars, tubing, rods and casing which may be racked in the derrick.

402 Racking foundations and storage racks shall be designed to withstand the maximum anticipated load of racked pipe, drill collars and other intended loads.

403 Storage racks shall be designed or other means taken to prevent drill collars, pipe and other tubular material from accidentally rolling/skidding off or be released from the rack.

404 When there is a possibility of an ice plug forming in the racked drill stands, then drainage of the drill stands shall be provided to minimize the possibility of ice plug formation.

405 (N) The derrick shall be equipped with a remote controlled permanently installed hydraulic/pneumatic pipe handling system.

Guidance (N): NPD does not require a remote controlled permanently installed hydraulic/pneumatic pipe handling system for drilling units which had a Norwegian safety certificate or was approved by NPD before 23rd September 1981.

**B 500 Pipe handling equipment.**

501 There shall be installed hydraulic/pneumatic devi-
ces for the suspension of drill pipe in the rotary table and making up and breaking out of drill pipe.

502 (N) The hydraulic/pneumatic equipment mentioned in 501 shall be remotely controlled.

503 Rotary equipment, including the rotary table and the kelly bushing, shall be guarded unless the design and installation prevents the catching or snagging of employees or their clothing or ropes, lines, hoses, chains and similar materials.

B 600 Slips and tongs.

601 The handles on drill pipe, casing and tubing slips shall be of sufficient length to avoid pinch points for the hands.

602 All tongs shall be securely attached to the derrick, mast or a back-up post and anchored by a wire rope line or stiff arm having a minimum breaking strength greater than the breaking strength of the pulling cable or chain.

603 Tong safety lines (snub lines) shall be short enough so that the tongs cannot rotate far enough to hit employees working on the side opposite the safety line and shall have a minimum breaking strength greater than the force of the make-up torque.

604 All fittings and connections shall have at least the minimum breaking strength of the cable, wire rope or stiff arm they are attached to, and knots shall not be used to fasten cable or wire rope lines.

605 Power tong pressure systems shall be equipped with a safety relief valve and the operating pressure of the safety relief valve shall never be higher than the maximum working pressure for which the tong pressure system is designed.

606 All safety cables attached to the kelly hose, tongs, weight indicator or other suspended equipment shall be properly secured.

C. Mud System.

C 100 Reconditioning.

101 (N) The drilling fluid (mud) reconditioning equipment shall be installed and assembled in such a manner that the entire system can be run in series, i.e. in the following sequence: degasser, desander and desilter.

102 Degasser and mud/gas separator shall be vented in a safe manner. If vented through a vent line in the derrick, the outlet shall be at least 4 metres above the crown block.

C 200 (N) Mud tanks.

201 (N) The total tank volume for drilling fluid shall be greater than 200 m³.

C 300 High pressure mud pumps.

301 High pressure mud pumps shall be fitted with pulsation dampeners and safety relief valves that can not be set higher than maximum allowable pressure of the system.

302 Mud relief line from the safety valve shall be self draining.

C 400 Mud control equipment.

401 There shall be provisions for registration of mud pump pressure and mud temperature.

402 (N) The following control equipment for the drilling fluid system (403-405), including indicators installed on the drill floor, shall be installed for use during drilling operations:

403 (N) Pit level indicator, registering increase or reduction in the drilling fluid volume. The pit level indicator shall be connected to an audio visual alarm.

404 (N) Trip tank.

405 (N) Drilling fluid return indicator (flowmeter), also registering the difference in volume between the drilling fluid discharged and returned to the platform. The indicator shall, if possible, be capable of compensating for rig movement.

406 (N) Provisions for registration of at least the following shall be installed for use during exploration drilling and drilling of the first four wells from production installations:

- mud pump rate
- weight of the drilling fluid entering and emerging from the borehole
- pit volume
- volume rate of the drilling fluid entering and emerging from the borehole
- penetration rate and drilling depth
- weight of the drillstring
- gas content in the drilling fluid.

D. Kill and Choke System.

D 100 General.

101 Kill and choke lines shall be provided from the blowout preventer stack and be connected to a choke manifold.

102 Kill and choke lines with connections, valves, etc. and the high pressure side of the choke manifold, shall have at least the same working pressure as the rated working pressure of the blowout preventer stack.

D 200 Choke manifold.

201 The cementing unit and the drilling fluid manifold (stand pipe manifold) shall be connected to the choke manifold.

202 It shall be possible to lead the returns from the choke manifold through an installed mud/gas separator.

203 The discharge from the choke manifold shall be connected to permanently installed burner booms.

204 The choke manifold shall be equipped with the following:

- At least 3 chokes, of which one shall allow for remote control, and one for manual adjustment. It shall be possible to isolate and change each choke, if necessary, while the manifold is in use. Instrumentation for indication of the drill pipe pressure, the choke manifold pressure and the drilling fluid pump rate shall be easily visible to the operator of the remotely controlled choke(s). At the place of operation of the manually adjustable choke, the drill pipe pressure as well as the choke manifold pressure shall be displayed.

- One valve for each of the outlet/inlet lines, so that lines to and from the manifold can be isolated. Where high pressure/low pressure zones meet in the manifold system, 2 valves arranged in series shall be used. Manifolds for 345 bar or higher pressures shall be equipped with minimum 2 valves before each of the chokes. The working pressure of the valves shall refer to the maximum working pressure of the choke manifold.

D 300 (N) Emergency pump for drilling fluid circulation.

301 (N) The drilling unit shall be equipped with:

302 (N) One diesel driven pump with a working pressure of at least 207 bar and with a capacity of at least 800 l/min. for circulation of drilling fluid in emergency situations, or
E. Blowout Preventing System.

E 100 General.

1. The blowout prevention system shall consist of at least the following:

2. A diverter with a securing element for closing around the drilling equipment in the hole. Further, 2 diverter lines, each with a diameter of at least 305 mm. The lines shall preferably lead to opposite sides of the drilling vessel/platform.

3. One bag-type/annular preventer.

4. One blind/shear ram preventer equipped with mechanical locking device.

5. Two pipe ram preventers equipped with mechanical locking devices.

6. Necessary control equipment as stated in 300 and 400 below.

E 200 Blowout preventer stack.

201. The blowout preventer stack shall be designed so that fluid and gas can be conducted out of the system, and so that fluid can be pumped in.

202. 2 valves shall be installed close to the blowout preventer stack for each of the kill and choke lines. These valves shall allow for remote control. The valves shall be located such that they are protected against damage from falling equipment etc. Where blowout preventers are installed on the sea-bed these valves shall be of the fail-safe type. When the blowout preventer stack is installed on the rig or platform and easy of access, one of the said valves can be manually operated and without remote control.

E 300 Control system for the blowout preventers.

301. The blowout preventers shall be connected to a control panel operated from a place near the driller's stand. Its location shall be within easy access to the driller.

302. The control panel shall give clear indication whether the blowout preventers are open or closed. Furthermore, the panel shall indicate pressure and volume for the various functions/operations.

303. The control panel shall be fitted with alarms for low accumulator pressure, for loss of energy supply, as well as for low levels in the control fluid storage tanks.

304. The blowout preventers shall be connected to an operations panel, in addition to the above mentioned control panel, which can be operated independently from the panel on the drillfloor.

305. The operation panel shall be located at a suitable distance from the driller's stand, and shall be within easy access, also when the control panel at the driller's stand is not functioning or is out of reach.

306. The control panel and the operations panel shall be connected directly to the main unit of the control system, and not be connected in series.

307. The main unit of the control system, including the pilot valves, shall be situated such that it is shielded from the drillfloor/cellar deck. It shall, however, be easily accessible from the drillfloor. In addition, it shall be possible to reach the unit from the outside without having to go via the drillfloor or the cellar deck.

308. The accumulator capacity shall be sufficient for closing, opening and closing of all installed blowout preventers +25% of one closing function of the said blowout preventers.

309. The control system of the blowout preventers shall be designed in such a way that each of the blowout preventers except the annular preventer(s) can be closed within 30 seconds. The annular preventer(s) shall be able to close within 45 seconds.

310. (N) When drilling with the blowout preventer system installed on the sea-bed, at least two pipe ram preventers, one blind/shear ram preventer, as well as the riser connector shall allow for activation by means of acoustics or other equivalent method. One additional operations unit from this system shall be portable and within easy reach in the event of evacuation from the platform. The accumulator capacity of the chosen system shall at least be sufficient for one activation of the above-mentioned functions + 50%.

311. Back-up is to be provided for BOP control lines from the main control unit to the BOP stack by means of two independent pods.

312. Surface hydraulic control lines shall be able to withstand a fire for a period of time sufficient for necessary closing operation of the BOP's.

E 400 Diverter control system.

401. The diverter system shall be connected to a control panel which can be operated manually from a place near the driller's stand. It shall be within easy access to the driller.

402. The diverter control system shall be equipped with an interlock so that the valve in the diverter pipe which leads out to the leeward side is opened before the diverter closes around the drilling equipment.

E 500 (N) Facilities for maintenance etc.

501. (N) A suitable working platform with adequate access shall be installed for use when carrying out work operations connected with the blowout preventers.

E 600 Kelly cocks.

601. An upper kelly cock shall be installed below the swivel, and a lower kelly cock at the bottom. The lower cock shall be of such a design that it can be run through the blowout preventer stack where the blowout preventers are not installed on the sea-bed.

602. The kelly cocks shall be capable of withstanding the same well surface pressures as the blowout preventers that are used.

603. The kelly cocks shall be maintained in a serviceable condition and shall be tested concurrently with the blowout preventers.

604. The wrench or other tool used to close the kelly cock shall be kept in a readily accessible place, and its purpose and use made known to all employees who may be expected to use it.

605. An open/close drill string safety valve shall be located in open position on the drillfloor for immediate use. The valves shall be of proper size, rating and thread configuration to fit the pipe in use at the time.
F. Auxiliary Hoisting Equipment.

F 100 Maximum permissible working load.

101 All air winches in the derrick, on drill floor, cellar deck and catwalk shall be guarded and marked with the maximum permissible working load (SWL).

102 Individual components such as sheaves, hooks, shackles, wire slings, permanent attachments, etc. shall be marked with the maximum permissible working load (SWL).

103 The maximum permissible working load for a system of interdependent equipment shall refer to the weakest component of the system, e.g. winches, wire, hooks, pulleys, etc.

104 The maximum permissible working load shall not exceed 1/5 of the breaking load.

105 The air supply to air-powered winches shall not exceed the pressure which is sufficient to reach SWL.

F 200 Transportation of personnel.

201 Air winches to be used for the transportation of personnel shall be equipped with an automatic brake.

F 300 Lifting of drill collars/drill pipe.

301 Lifting substitutes, lifting protectors, or other equipment shall be installed or available for lifting drill collars/drill pipe from the catwalk/vee-door to the drill floor.

G. Well Test Equipment.

G 100 System requirements.

101 Two active barriers are to be fitted in possible by-passes of pressure reducing devices (as for example chokes).

102 Means are to be provided to prevent hydrocarbons from entering the boilers with the condensate return from steam operated heat exchangers (see Pt. 5 Ch. 3 Sec. 21206).

103 A non-return valve is to be fitted at the steam inlet of the heat exchanger.

104 Heat exchanger is to be equipped with adequate relief capacity. 100% backup capacity is to be provided.

105 The swivel and kelly hose (rotary hose) shall not be a part of the test line.

G 200 Flare lines.

201 At least two complete flare lines or other devices through which any flow from the well may be directed to either of two different sides of the drilling unit is required (see D 203).

202 Any flare line or any other line downstream of the choke manifold shall have an inside diameter not less than the inside diameter of the largest line in the choke manifold.

203 Possibilities for cooling of flare burners should be available.

H. Bulk Mud and Cement System.

H 100 Hydraulic/pneumatic equipment and storage tanks.

101 Hydraulic/pneumatic equipment shall be fitted with safety valves in order to prevent that the maximum permissible working pressure of the equipment is exceeded.

102 All bulk storage tanks shall be equipped with safety valves/rupture discs so as to prevent excess working pressure. Rupture discs can only be used for bulk storage tanks in open areas or if fitted with a relief line to an open area.

103 Safety valves shall be fitted as to avoid collection of dust, bulk mud etc. which may render them inoperable.

104 For bulk storage tanks in enclosed areas testable safety valves shall be used, which can be vented out of the area. Such enclosed areas shall be ventilated such that a pressure build-up will not occur in the event of a break or a leak in the air supply system.
SECTION 3  
EQUIPMENT

A. General.

A 100 Principles.

101 Equipment being used during drilling operations or otherwise related to safety in conjunction with drilling, shall be designed, manufactured, installed and tested in accordance with these Rules and recognized codes, standards or guidelines.

102 Equipment is to be considered in respect of its relationship to the safety of the installation and the safety and health of those on board.

103 All equipment shall be suitable for its intended purpose. Where relevant, equipment shall be designed with regard to its intended use with or near other equipment and for its safe use under all known operating conditions, including overload if anticipated. Where relevant, equipment should have efficient control systems, guards, fences and shields to ensure that the personnel is not exposed to hazards which could affect their ability to properly carry out their work.

104 Each item of equipment shall be installed properly. Particular consideration shall be given to the effectiveness of mountings for fixed lifting appliances and derricks (including any drilling derrick); to the safe fixing of air intakes and exhausts of engines and compressors; to the safe placing of equipment in relation to the electrical system; to the segregation of piping systems, particularly pressure systems; to the inclusion of master controls for stopping machinery, for shutting off fuel supplies and for closing combustion spaces.

105 During design of the equipment due consideration should be given to mechanical integrity, installation, functionality, access for in-service inspection and maintenance, etc.

106 Equipment that needs to be lifted for maintenance, etc. is to have properly designed lifting lugs.

B. Recognized Codes and Standards.

B 100 General.

101 The following paragraphs give references to some generally recognized codes and standards frequently specified for drilling equipment. These codes, standards, specifications etc. will be used as a basis for certification. In some cases, however, these codes and standards do not cover completely all the matters related to this equipment. The additional requirements given in these Rules shall also apply, and these Rules will overrule the codes and standards wherever conflicts occur.

102 Other national or international codes or standards may be used after special consideration by the Society.

B 200 Blowout preventers.

201 API Spec 6A. Wellhead Equipment.


B 300 Marine risers.

301 API RP 2K. Care and Use of Marine Drilling Risers.


303 API Bull 2J. Comparison of Marine Drilling Riser Analysis.

B 400 Drilling equipment.

401 API 7. Specification for Rotary Drilling Equipment.

402 API 8A. Drilling and Production Hoisting Equipment.

403 API 9A. Specification for Wire Rope.

404 API 9B. Recommended Practice on Application, Care and Use of Wire Rope for Oil Field Service.

B 500 Pressure vessels.

501 BS 5500. Unfired Fusion Welded Pressure Vessels.

502 ASME Section VIII, Div. 1 and 2. Rules for Construction of Pressure Vessels.

B 600 Pumps and compressors.


602 API Std. 615. Sound Control of Mechanical Equipment for Refinery Services.

603 API Std. 617. Centrifugal Compressors for General Refinery Services.

604 API Std. 618. Reciprocating Compressors for General Refinery Services.

The above mentioned standards will be used as far as reasonably applicable.

B 700 Lifting appliances.

701 Veritas' Rules for Certification of Lifting Appliances.
B 800 Other codes and standards.

801 During design, construction and testing due consideration should be paid to the following codes and standards:

- API RP 14H. Use of Surface Valves and Underwater Safety Valves Offshore.

C 100 Environment.

101 All external phenomena which may impair the proper function of the equipment, have significant influence on or cause a reduction of the safety, strength and durability, shall be considered.

C 200 Loads.

201 Any part of the equipment shall be designed for the most unfavourable load condition. For each loading condition, and for each component or cross section to be considered, the most unfavourable combination, position and direction of loads and forces which may act simultaneously are to be used in the analysis.

202 An operational envelope of environmental parameters and loads shall be specified, and these shall be compatible with the places of operation.

203 The operational limits for the equipment, which will also be used in the analysis to determine the fitness for use of the equipment, shall be specified.

204 Environmental loads are mainly loads due to waves, current, temperature, ice and earthquake.

205 Operational limits include, for example, pressure, temperature, tension and bending.

206 Accidental loads due to human activities independent of the operation and treatment of the equipment are also to be considered, e.g. fire, impact from dropped objects etc.

207 Test loads are loads occurring during hydrostatic tests, functional tests, performance tests, etc.

C 300 Design pressure and temperature.

301 Due to internal or external conditions the lowest and highest design temperature for which the component may be allowed to operate with the corresponding design pressure must be specified with adequate margins to cover uncertainties in the prediction.

302 The consideration shall include start-up, shutdown and those abnormal conditions which are considered likely to occur.

303 When deemed necessary, studies, calculations, etc. to establish particular operational limitations not readily available, e.g. low temperature in choke and well test systems, etc. shall be presented.

304 If equipment is to be used at temperatures below the minimum design temperature, the calculated membrane stress including thermal stress at this lower temperature is to be less than the design stress permitted by BS 5500, Appendix D.21, for the part under consideration.

C 400 Well fluid composition.

401 If the components are sensible to well fluid composition with regard to phenomena as corrosion, stress corrosion cracking, erosion, fouling, etc. relevant limitations to the composition are to be specified in the Operations Manual.

C 500 Design safety factors.

501 The safety factors to be used in determination of an acceptable stress level for the various load conditions shall be established by the designer, and included in the design documentation.

502 Safety factors shall be in accordance with relevant code, standard or recommended practice for each particular component.

503 Safety factors with respect to local stress, fatigue, ultimate carrying capacity and buckling will be considered in each case, as applicable.

C 600 Noise and vibration.

601 Noise levels should be limited throughout the rig in order to:

a) minimise the risk of hearing damage to personnel in work areas;
b) ensure that warning signals are audible;
c) allow adequate speech, telephone and radio communication;
d) maintain working efficiency;
e) provide an acceptable sleep and recreation environment in accommodation areas.

602 In a similar manner vibration levels should be limited in order to:

a) prevent a health hazard to personnel;
b) maintain proficiency of personnel in performing designated tasks;
c) provide an acceptable sleep and recreation environment in accommodation areas.

D. Materials.

D 100 General.

101 Materials for equipment are in general to comply with Section 6.

E. Manufacture, Workmanship and Testing.

E 100 General.

101 Manufacture, workmanship and testing shall in general comply with Section 10.

102 Manufacturers shall contact the Society as soon as possible after receiving a purchase order in order to establish survey hold-points.

E 200 Non-destructive testing.

201 100% non-destructive testing is normally to be carried out on welds in major pressure retaining parts of metallic materials. Either radiography or ultrasonic should be employed.

202 100% non-destructive testing is to be carried out on welds on major load carrying parts.

203 In addition a 100% magnetic particle examination shall be carried out on highly stressed parts made of ferritic steels, while austenitic steels shall be 100% checked by dye penetrant.

204 Radiography or ultrasonic examination may also be required for highly stressed parts or local areas.

205 Acceptance criteria shall be according to relevant codes, standards or specifications.

E 300 Performance testing.

301 Blowout preventers shall be performance tested before taken into use. Shear rams shall be tested to show they will be capable of shearing the heaviest and toughest drill pipe to be used.
F. Documentation.

F 100 Design documentation.

101 The following design documentation shall be submitted to the Society for all Class I equipment (see Sec. 1 C 600) for review and approval (drawings) in due time prior to start of fabrication:

- Design specifications, including specifications of fluid data for which it will be used, pressures, min/max temperature, corrosion control, environmental and external loads, etc.
- Drawings, including sufficient details and dimensions to evaluate the design.
- Strength calculations.
- Bill of material including material specifications as necessary.
- Fabrication specifications including welding, heat treatment, type and extent of NDT, testing, fabrication documents to be provided, etc.

102 Design documentation will be reviewed for compliance with these Rules, applicable codes, standards, etc. as relevant.

103 Design documentation need not be resubmitted for equipment holding Type Approval Certificate issued by the Society valid for the intended use.

104 Possible aspects or details needing special considerations or examination and procedures for possible necessary pressure testing to be carried out at periodical surveys and after repairs, modifications, overhauls, etc. shall be submitted to the Society.

F 200 Final documentation.

201 Upon completion of assembly and final testing of items of equipment and components a manufacturing report (e.g. a data book) including relevant fabrication and testing records shall be compiled. The report shall be in English language.

202 For class I equipment the manufacturing report shall be presented to the Society's local surveyor for review. Following acceptance of the documentation the surveyor will sign a statement of manufacture and inspection and stamp the nameplate and the equipment or otherwise as agreed. The following are normally to be included:

- Manufacturer's statement of compliance.
- Material certificates, and indications where the various materials have been used.
- Welding procedure specifications and qualification records.
- Report on heat treatment and non-destructive testing, including pressure testing, stating where tests were performed.

203 For class II equipment the manufacturing report including the manufacturer's statement of compliance shall be submitted to the Society.

204 (N) Equipment recognized to be of great importance for the safety of personnel and drilling unit/installation shall be documented with a data book. This concerns among others the following equipment:

- Derrick
- Hoisting equipment in derrick such as crown block, travelling block, hook and swivel
- Blowout preventers
- Marine riser
- Wellhead arrangement
- Pressure vessels
- High pressure piping system.

The data book for this equipment shall, additional to what is required above, be suitably indexed and contain the following:

- Name of equipment
- Part no.
- Name of manufacturer and supplier
- Description of design and manufacture, indicating safety factors used
- Statement of manufacture and inspection signed by the surveyor
- Confirmation of design/strength approval by the Society.
SECTION 4  
PIPING

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A. General.
A 100  Application.
101  Drilling related piping is to comply with the requirements in this Section.
102  Piping includes pipes, flexible piping such as expansion elements and flexible hoses, other parts such as valves and fittings, piping connections such as welded connections, bolted flanges, clamps, couplings, gaskets etc. and hangers and support brackets.

A 200  Basis for certification.
201  The piping shall be designed, fabricated, installed, inspected, tested and approved according to these Rules and to recognized codes and standards such as:
- ANSI B 31.3  Chemical Plant and Petroleum Refinery Piping
- BS 3351  Piping Systems for Petroleum Refineries and Petrochemical Plants
- API RP 14E  Design and Installation of Offshore Production Platform Piping Systems
- API Spec 7  Rotary Drilling Equipment

Other relevant codes and standards may be used if specially noted and agreed upon.

B. Design Documentation.
B 100  General.
101  The design documentation which is to be submitted for review and approval (drawings) shall include all relevant items necessary for the evaluation of each piping class with respect to design and fabrication.

B 200  Design specification.
201  The piping design specification is to include the following information covering all piping systems and parts:
- design code and dimensional standards
- application
- medium (indicate whether sweet or sour service)
- design temperature (max and min)
- design pressure and pressure rating
- materials to be applied for pipes, hoses, fittings, branches, unions, plugs, flanges, bolts, nuts, gaskets, etc.
- materials to be applied for valve bodies, bonnets, stems, seat seals, springs, actuators, etc.
- corrosion allowances
- wall thickness listed for each applicable line size
- rating and type of flanges, valves, fittings, branches, unions, gaskets, etc.
- list of special components, if any.
202  Drawings and stress calculations or certified proof test reports for particular non-standard piping components.
203  Flowsheets or piping and instrumentation diagrams (P/ID) with reference to the appropriate piping class designation.

B 300  Fabrication specification.
301  Requirements to the following fabrication processes are to be included in the fabrication specification as applicable:
- pipe bending
- welding
- heat treatment
- non-destructive testing
- pressure testing
- piping installation
- identification and marking.

C. Piping Design.
C 100  General.
101  Piping is to be constructed to withstand the maximum stress which may arise from the most severe combination of pressure, temperature etc.
102  Each piping class shall be designed entirely to one accepted piping code or specification. Deviations from the code must be specially noted and approved.
103  For piping not covered by the applied recognized codes or standards a combined stress calculation may be used.
Thus the equivalent combined stress according to von Mises' Theory is in no point of the piping wall to exceed 60% of the minimum specified yield strength of the piping material.
Applicable allowances are to be added to the strength thickness to compensate for thickness reductions.
104  Layout with respect to segregation, access and maintenance shall be considered.
105  All piping runs shall be clearly identified by colour codes or other acceptable means.
106  Relevant factors and combination of factors are to be taken into account during design when evaluating possible failure modes such as, but not limited to:
- corrosion/erosion types
- vibration, hydraulic hammer
Mobile Offshore Unis Pt.6 Ch.5 Sec.4

C 200 Pipe design.

201 Pipe calculations are to ensure that the pipes have the necessary strength (i.e. strength thickness) during their life of operation.

202 In order to fulfil the requirements in 201, the following allowances shall be added to the strength thickness as applicable:

- manufacturing allowances
- bending allowances
- allowances for threads
- corrosion/erosion allowances.

C 300 Flexible piping.

301 The location of flexible piping elements are to be clearly shown in the design documentation.

302 Flexible piping parts approved for their intended use may be installed in locations where hard piping is unsuitable.

303 Flexible piping elements are to be accessible for inspection.

304 Meets are to be provided to isolate flexible piping if used in systems where uncontrolled outflow of medium is critical.

305 The bursting pressure for flexible hoses is to be at least 4 times the maximum working pressure. Lower bursting pressures may be specially considered for hoses with a working pressure above 300 bar.

306 The fire resistance of flexible hoses shall be adequate for the specified purpose and location.

307 Piping in which expansion joints or bellows are fitted shall be adequately adjusted, aligned and clamped. Protection against mechanical damage may be required if found necessary.

308 End fittings are to be designed and fabricated according to recognized codes/standards.

C 400 Valves and special items.

401 Piping parts not covered by the recognized design codes and standards are to be approved for their intended use. Drawings are to be submitted for approval, and shall be supported by stress calculations specifying application, type of medium, design parameters, materials and allowances.

402 Design approval may as an alternative to the requirements in 401 be based upon certified proof test reports or equal in order to prove the suitability for the intended use.

403 Temperatures arising from welding and heat treatment of valve connections should be considered when designing welding necks, e.g. for sealing purposes.

C 500 Piping connections.

501 All piping connections are to be in accordance with the applied code or standard. Non-standard connections shall be specially noted and adequate documentation is to be forwarded for design approval.

502 Non-detachable connections shall normally be butt welded.

503 Piping with an outer diameter of 51 mm (2 inches) or less may be socket welded if not intended for corrosive fluids.

504 Screwed connections not covered by the applied codes and standards may be accepted if shown to be suitable for the intended use. The following aspects shall be considered:

- Static and dynamic forces (pressure, pulsation, vibration etc.)
- Type of medium (corrosion, fire and other risks caused by uncontrolled outflow of the medium, etc.)
- Pipe dimensions (outer diameter, thread allowance etc.).

505 If the piping system is rated for 207 bar (3000 psi) or more, ordinary threaded connections shall not be used.

506 Connections made up with bolts shall maintain complete integrity should one bolt fail.

D. Piping Materials.

D 100 General.

101 The materials selected shall be suitable for the purpose and have adequate properties of strength and ductility. In addition, they shall have good weldability properties for manufacture and installation. Piping shall be corrosion resistant or protected against corrosion where this is deemed necessary.

102 If necessitated by the relation between reference thickness and minimum design temperature, impact testing should be carried out for piping of the following types of steels: 3,5% Ni-steels or 5% Ni-steels, C, C-Mn fine grain, C-Mo and C-Mo steels.

Guidance:
Impact testing is recommended for reference thickness above 6 mm if the MDT is below minus 10°C. Impact testing will normally be required for reference thickness above 26 mm (approx. one inch) if the MDT is below 10°C.

D 200 Material certificates.

201 Material certificates or reports are required for all piping in order to ensure that the installed materials are in accordance with the approved specifications.

202 Materials for the following piping parts are to be furnished with a Test Report (see Pt. 2 Ch. 1 Sec. 1 B 203) such as DIN 50049 2.1 (Werkbescheinigung), 2.2 (Werkzeugnis) or equal:

- Main pressure retaining parts of standard valves (including safety valves) which have flanged or screwed ends.
- Screwed fittings (for all services) and bolts.
- All other parts with a design temperature below 180° and a design pressure below 20 bar.

203 Materials for the following piping parts not covered by 202 or 204 are to be provided with a Works Certificate (see Pt. 2 Ch. 1 Sec. 1 B 202) such as DIN 50049 2.3 (Werkprüzeugnis), B3.1B (Abnahmeprüzeugnis) or equal:

- Main pressure retaining parts of valves which have welded ends or main components joined by welding if used in systems with design temperatures/pressures equal to or above 180°C/20 bar.
- All other piping parts.

204 High strength materials as described in C 103 shall be provided with a test certificate (see Pt. 2 Ch. 1 Sec. 1 B 201) equal to DIN 50049 C3.1C (Abnahmeprüzeugnis) or C3.2C (Abnahmeprüprotokoll).

E. Manufacture and Workmanship.

E 100 General.

101 The fabrication is to be carried out according to the approved piping specifications.

E 200 Pipe bending.

201 The bending procedure is to be such that the flat-
tensioning of the pipe cross section and wall thinning are within acceptable tolerances.

202 The heat treatment procedure in connection with pipe bending is to be approved by the Society if not covered by the applied code or standard.

E 300 Welding.

301 Only approved welders shall be engaged in the fabrication.

302 Welding procedures and welders shall be qualified on welding positions compatible to what will be used in the actual production.

303 Preheating and/or postweld heat treatment is to be used when necessitated by the dimensions and material composition of the piping parts.

304 The heat treatment procedure in connection with welding is to be approved by the Society if not covered by the applied code or standard.

305 Butt welded joints are to be of the full penetration type.

306 If supports and similar non-pressure parts are welded directly to pressure retaining parts, the welding requirements for the pressure retaining parts are to be adhered to.

F. Inspection and Testing.

F 100 General.

101 Inspection and general shall be carried out according to the approved piping specifications and quality assurance/control documentation.

102 The Society's Surveyor shall be requested to carry out inspection during fabrication and erection of piping spools to ensure that the predetermined quality is obtained.

103 Valves of welded construction of ANSI 600 lbs rating and above shall be subject to inspection by the Society during manufacture.

Guidance:
It is advisable that a baseline survey (thickness measurements) of important piping is made prior to start of operation.

F 200 Non-destructive testing.

201 Non-destructive testing (NDT) shall be carried out by qualified operators only and in accordance with approved NDT procedures.

202 The weld qualities shall be examined to satisfy the requirements given in the applied design code, alternatively a piping specification approved by the Society.

203 Recommended extent of visual and other non-destructive testing of circumferential butt welds is listed in the following (F 204—210).

204 Visual examination shall always be performed to the extent necessary to satisfy the Surveyor that components, materials, and workmanship conform with the requirements of the design code and the piping specification.

205 Joints for random radiography and ultrasonic testing shall be selected by the Surveyor.

206 A minimum of 5% of the piping joints shall be fully examined by radiography if:
- the medium is non-flammable and non-toxic, and
- the wall thickness does not exceed 19 mm, and
- the design pressure does not exceed 10 bar and the design temperature does not exceed 180°C.

207 If good workmanship is proved during initial phase of production, the examination in F 206 may be reduced to visual examination and spot radiographic checks at the discretion of the Surveyor.

208 A minimum of 10% of the piping joints shall be fully examined by radiography or ultrasonic testing if the requirements in 206 are not fulfilled and:
- the wall thickness does not exceed 19 mm, and
- the design pressure does not exceed 50 bar and the design temperature does not exceed 340°C.

209 All welds shall be 100% examined by radiography or ultrasonic testing if not covered by the requirements in 206-208.

210 If the carbon equivalent CE = C + Mn/6 exceeds 0.45 for the actual material, magnetic particle testing shall be carried out during initial phase of production to prove absence of surface cracks.

G 100 General.

101 During fabrication, inspection and testing the documentation which proves that the requirements have been complied with, is to be made available for the Surveyor.

102 The following is to be presented by the fabricator as applicable:
- Welding procedure specifications with qualification test records
- Material certificates
- Records of post weld heat treatment
- Records of non-destructive examination
- Records of pressure testing
- Isometric drawings marked with weld number and reference to mentioned items as applicable
- Baseline survey records as applicable.
SECTION 5
STRUCTURES

Contents.

A. General.
A 100 Application.
A 200 System requirements.

B. Drilling Derrick.
B 100 General.
B 200 Scope.
B 300 Documentation.
B 400 Structural design and strength.
B 500 Design load.
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C. Flare Boom.
C 100 General.
C 200 Scope.
C 300 Documentation.
C 400 Structural design and strength.
C 500 Design load.
C 600 Strength evaluation.
C 700 Manufacturing and construction.
C 800 Testing.
C 900 In-service inspection.

A. General.

A 100 Application.
101 The Rules in this section apply to derricks and flarebooms.

102 For stabbing board and pipe handling/racking equipment the requirements in this section regarding structural strength are to be complied with as far as applicable.

Guidance:
Designers are advised to observe also possible national authorities' regulations applicable.

A 200 System requirements.
201 The system requirements in Sec. 2 B and G are to be complied with.

202 Piping mountings in derricks and flarebooms shall be according to Sec. 4.

B. Drilling Derrick.

B 100 General.

101 As an alternative to the general design requirements of this section, the requirements of recognized code, i.e. API Spec. 4E, may be applied. However, with regard to the additional forces which may act on the derrick on board mobile vessels, as well as grade of materials used, where relevant the requirements of this section are to be complied with.

B 200 Scope.

201 The following matters are covered:
— All load carrying structural members and components of the derrick.
— Guide rails and supports.
— Handrails, ladders and platform structure.

B 300 Documentation.
301 Plans and other documents giving the required particulars for the matters listed below are to be submitted for approval in triplicate:
— Plans showing sizes and general dimensions of the drilling derrick, maximum forces to be stated.
— Structural drawings of main structural elements of drilling derrick.
— Material specifications of profiles, plates, and bolts (if bolted design).
— Welding procedure specifications.
— Fabrication specifications.

302 Plans and particulars for the matter listed below are to be submitted for information together with the documents for approval required by 301:
— Name and address of:
  Derrick manufacturer.
  Vendors.
— Name of installation.
— General arrangement of the derrick.
— Intended location of the derrick on the installation.
— Ratings of the derrick.
— Limitations of use and design ambient temperature and operational conditions of the derrick.
— Codes and standards etc. applied for the derrick structure, system and details.
— Pertinent calculations.

303 For requirements for fabrication documentation, see Sec. 3 F 200 and Sec. 10 D.

B. 400 Structural design and strength.

401 The grades of material of all structural parts are to comply with «Rules for Certification of Lifting Appliances» Sec. 2.

402 Structural steels are divided in the two categories «primary structural and secondary structural steel», depending on the impact test temperatures as specified in «Rules for Certification of Lifting Appliances» Sec. 2 Table B4 and Table D2.

403 Main load carrying members and components subjected to high stresses are to be of primary structural steel.

Typical examples of main load carrying members are:
— Main legs of derrick (incl. connecting plates, bolts etc.).
— Crown support beams.
— Base plates and foundation bolts.

B. 500 Design load.

501 The loads to be considered in the analyses of structures are divided into:
— Principal loads.
— Loads due to motion of the vessel on which the derrick is to be installed.
— Loads due to wind loads.
— Miscellaneous loads.

502 The principal loads are:
— The loads due to dead weight of the steel and of all equipment and material fastened thereto and supported thereon.
— Static hook load, which is the weight applied at the hook for the designated location of the deadweight anchor and in absence of any pipe setback, sucker rod or wind loadings. The rated static hook load includes the weight of the travelling block and hook.
— The loads due to the setback load, which is the deadweight of the maximum amount of drill pipe with tool joints and drill collar setback on the structure.
— Guy line loads, which are those imposed from attached guy lines.
Buckling.

B 494 The weight supported by the rotary table support beams.

B 495 The loads due to prestressing (if bolted design).

Accumulated snow and ice on the derrick structure are to be taken into account in the deadweight, if the derrick is intended to operate under such conditions. The assumed quantity of snow and ice will be specially considered. Except for prestressing, all the principal loads are due to weight, which always acts vertically (in the normal sense). This means that if the derrick is mounted on a foundation that can heel or trim, the principal loads may have horizontal components when referred to a practical coordinate system of the derrick. These components are to be taken into account and are to be considered as principal loads, also if the angles are due to motions, such as rolling and pitching of a vessel. Note that the simultaneous inertial forces are not considered as principal loads.

503 The loads due to motion of the vessel on which the derrick is to be mounted are inertial forces calculated in accordance with Pt.3 Ch.2 Sec.4 and Pt.3 Ch.2 Sec.2 and 3 or the «Rules for Classification of Steel Ships» Pt.3 Ch.1 Sec.4 B «Ship Motions and Accelerations».

504 Wind loads are loads due to wind calculated in accordance with «Rules for Certification of Lifting Appliances» or a recognized code or standard, i.e. API Spec. 4E.

505 Miscellaneous loads are access gangways and platforms designed to carry the following concentrated loads in arbitrary (most unfavourable) position:

- 300 daN for maintenance gangways and platforms where materials may be placed.
- 150 daN for gangways and platforms intended only for access of personnel.
- 30 daN as the horizontal lateral force which may act outwards or inwards on handrails and toeboards.

The loads given need not be taken into account in the strength evaluation of the main structural system of the derrick, except as far as necessary for the connection between this system and the structures mentioned. The deadweight of the latter structures, however, is to be included in the principal loads in 502.

B 600 Strength evaluation.

601 It is to be documented that components and structures will have the required safety against the following types of failure:

- Excessive yielding.
- Buckling.
- Fatigue (as far as deemed relevant).

602 Strength calculations are to comply with «Rules for Certification of Lifting Appliances» Sec. 3 C or recognized codes or standards based on accepted principles of statics and strength of materials. Safety factors are to be taken as specified for case I (without wind) or case II (with wind) in above mentioned rules.

603 The following load cases according to API Spec. 4E are to be considered:

- Operating condition with partial (3/5) setback.
- Waiting on weather with rated setback.
- Survival with no setback load.
- Moving (if applicable) with mast in lowered position.

For dynamic derrick and dynamic portable mast loading (used on floating rigs) the users must specify their requirements for required working hook load, roll, pitch, heave and period for each of the conditions of loading.

B 700 Manufacturing and construction.

701 The workmanship is to be in accordance with good practice and to the satisfaction of the Surveyor. Welding and NDT-inspection are to be in accordance with relevant requirements in «Rules for Certification of Lifting Appliances» Sec. 2 G.

702 As far as practicable the derrick design is to minimize corrosion of the derrick in service. Profiles and other structural members are to be arranged in such a way that rain and moisture will not accumulate and so that the structure can be properly maintained. Rapid drainage of rain and sea-spray is to be ensured.

B 800 In-service inspection.

801 Annual and special periodical survey for drilling derricks onboard mobile offshore units are to be carried out as stated in Pt. 1 Ch.2 Sec. 3 H.

C. Flare Boom.

C 100 General.

101 As an alternative to the general design requirements of this section, the requirements of recognized code or standard may be applied. However, with regard to the additional forces which may act on the boom on board mobile vessels, as well as grade of materials used, where relevant the requirements of this section are to be complied with.

C 200 Scope.

201 The following matters are covered:

- All load carrying structural members and components of the boom.
- Handrails, ladders and platforms structure.

C 300 Documentation.

301 Plans and other documents giving the required particulars for the matters listed below are to be submitted for approval in triplicate:

- Plans showing sizes and general dimensions of the boom.
- Structural drawings of main structural elements of boom.
- Material specifications of profiles, plates and bolts.
- Welding procedure specifications.

302 Plans and particulars for the matter listed below are to be submitted for information together with the documents for approval required by 301:

- Name and address of:
  - Boom manufacturer.
  - Vendors.
  - Name of installation.
  - General arrangement of the boom.
  - Intended location of the boom on the installation.
  - Ratings of the boom.
  - Limitations of use and design ambient temperature and operational conditions of the boom.
  - Codes and standards etc., applied for the boom structure, system and details.
  - Pertinent calculations including statement of maximum loads.

303 For requirements for fabrication documentation, see Sec. 3 F 200 and Sec. 10 D.

C 400 Structural design and strength.

401 The grades of material of all structural parts are to comply with «Rules for Certification of Lifting Appliances».

402 Structural steels are divided in the two categories «primary structural steel and secondary structural steel» depending on the impact test temperatures as specified in «Rules for Certification of Lifting Appliances» Sec. 2.
403 Main load carrying members and components subjected to high stresses are to be of primary structural steel.

Typical examples of main load carrying members are:
- Main cords of boom (incl. connecting plates etc.).
- Bearings (incl. brackets, axles etc.).

C 500 Design load.

501 The loads to be considered in the analyses of structures are divided into:
- Principle loads.
- Loads due to motion of the vessel on which the boom is to be installed.
- Loads due to wind loads.
- Thermal loads.
- Miscellaneous loads.

502 The principle loads are:
- The loads due to deadweight of the steel structure and material fastened thereto and supported thereon.
- The loads due to deadweight of burner and spreader.
- Wire line loads imposed from «turn» handling of boom during operations (if applicable).
- Loads imposed by equipment, material and personnel on floor.
- The loads due to deadweight of pipework in the boom (if not part of the boom structure).

Accumulated snow and ice on the boom structure are to be taken into account in the deadweight, if the boom is intended to operate under such conditions. The assumed quantity of snow and ice will be specially considered.

All of the principal loads due to weight are assumed to act vertically (in the normal sense). This means that if the boom is mounted on a foundation that can «heel» or trim, the principal loads may have «horizontal» components when referred to a practical coordinate system of the boom. These components are to be taken into account and are to be considered, as principal loads, also if the angles are due to motions, such as rolling and pitching of a vessel. Note that the simultaneous inertia forces are not considered as principal loads.

503 The loads due to motion of the vessel on which the boom is to be mounted are inertia forces calculated in accordance with Pt.3 Ch.1 Sec.4 and Pt.3 Ch.2 Sec.2 and 3 or the «Rules for Classification of Steel Ships, Pt.3 Ch.1 Sec.4 «Ship Motions and Accelerations».

504 Wind loads are loads due to wind calculated in accordance with «Rules for Certification of Lifting Appliances» or a recognized relevant code or standard.

505 Miscellaneous loads are loads on access gangways and platforms designed to carry the following concentrated loads in arbitrary (most unfavourable) position:
- 300 daN for maintenance gangways and platforms where materials may be placed.
- 150 daN for gangways and platforms intended only for access of personnel.

— 30 daN as the horizontal lateral force which may act outwards or inwards on handrails and toebords.

The given loads need not be taken into account in the strength evaluation of the main structural system of the boom, except as far as necessary for the connection between this system and the structures mentioned. The deadweight of the latter structures, however, is to be included in the principal loads in 502.

506 Due consideration shall be paid to thermal loads due to flaring (see also Sec. 2 G 203).

C 600 Strength evaluation.

601 It is to be documented that components and structures will have the required safety against the following types of failure:
- Excessive yielding.
- Buckling.

602 Strength calculations are to comply with Pt.3 Ch.1 Sec. 5 D 200. Usage factor to be 0.6. Recognized codes or standards based on accepted principles of statics and strength of materials may be applied.

603 The following load cases are to be considered:
- Operating condition.
- Stowed condition (in transit position).

For flare boom loading (used on floating vessels) the users shall specify their requirements for required weight of burner and spreader, roll, pitch, heave and period for each of the conditions.

C 700 Manufacturing and construction.

701 As far as practicable the boom design is to minimize corrosion of the boom in service. Profiles and other structural members are to be arranged in such a way that rain and moisture will not accumulate and so that the structure can be properly maintained. Rapid drainage of rain and sea-spray is to be ensured.

702 The workmanship is to be in accordance with good practice and to the satisfaction of the Surveyor. Welding and NDT-inspection are to be in accordance with relevant requirements in «Rules for Certification of Lifting Appliances» Sec. 2 G.

C 800 Testing.

801 After completed installation on board the boom is to be tested with an overload of 25% related to the required weight of burner and spreader.

With the specified overload it is to be demonstrated that the boom is capable of carrying out the motions such as slewing, hoisting etc. (as relevant).

C 900 In-service inspection.

901 Annual and special periodical surveys to be carried out as required in Sec. 11 B 102.
A. General.

A 100 Principles.

B. Specific Requirements.

B 100 Metallic materials for critical parts.
B 200 Structural steel.
B 300 Bolting material.
B 400 Sealing materials.

C. Corrosion.

C 100 General.

D. Documentation and Identification.

D 100 General.

B. Specific Requirements.

B 100 Metallic materials for critical parts.

101 Selection of material is to be based on the type of loading, temperatures, the corrosive conditions and consequences of a failure associated with installation, operation, retrieval and maintenance of the equipment, etc.

102 The materials selected shall be suitable for the purpose and have adequate properties of strength and ductility. Materials incorporated in any portion of the installation designated critical to the integrity and safety of the installation should have an appropriate standard of notch toughness. In addition, they shall have good weldability properties for manufacture and installation. Materials shall be corrosion resistant or protected against corrosion where this is deemed necessary.

103 For selection of acceptable materials for sour service reference is made to NACE Standard MR-01-75.

104 Non-combustible materials shall be used except where any required property or use of a material precludes non-combustibility.

B 200 Structural steel.

201 Steel for structural parts, such as derricks, flarebooms, etc., are to comply with Veritas' Rules for Certification of Lifting Appliances (1980) and other recognized codes and standards as agreed.

B 300 Bolting material.

301 Major pressure retaining bolts and nuts shall be manufactured of low alloy or alloyed steel and supplied in quenched and tempered condition, unless otherwise agreed upon.

302 For general service the specified tensile properties shall not exceed ISO R 898 property class 10.9, when the installation is in an atmospheric environment. For submerged installations the tensile properties shall not exceed property class 8.8, ASTM A193 B7 or equivalent.

303 For bolted joints to be part of equipment designed for sulphide stress cracking service, lower tensile properties than for 8.8 class may be necessary to comply with NACE MR-01-75.

B 400 Sealing materials.

401 The materials to be used shall be suitable for the intended service and shall be capable of sustaining the specified operating pressure and temperature of the particular unit. The suitability of the material shall be proved through tests as specified in the applicable API specification. Relevant test fluids shall be used.
C. Corrosion.

101 All materials shall have appropriate resistance to corrosion and shall be chosen to avoid corrosion problems. Alternatively materials shall be adequately protected from the effects of corrosion or suitable extra material shall be provided to allow for its effects.

102 Corrosion control and corrosion monitoring measures shall be established. A calculated corrosion allowance may be used if the actual corrosion rate can be predicted. Where excessive metal loss due to erosion/corrosion is suspected, a corrosion monitoring system and frequency of inspection shall be established.

103 External steel surfaces liable to corrode shall be protected by a suitable coating.

D. Documentation and Identification.

101 All materials for pressure retaining and major components are to be furnished with documentation, stating process of manufacture and heat treatment (metallic materials) together with results of relevant properties obtained through appropriate tests carried out in accordance with recognized standards.
A. General.

A 100 Principles.

101 The requirements in Pt. 4 Ch. 4 and Pt. 5 Ch. 3 Sec. 2 H are to be complied with, as far as applicable. More specific requirements regarding electrical equipment may be given after special consideration in each particular case.
SECTION 8
INSTRUMENTATION AND AUTOMATION

A. General.

A 100 Principles.

101 The requirements in Pt. 4 Ch. 1 Sec. 3 D and 7 are to be complied with, as far as applicable. More specific requirements regarding instrumentation and automation may be given after special consideration in each particular case.
SECTION 9
FIRE SAFETY

Contents.

A. General.
A 100 Principles.

B. Documentation.
B 100 General.

C. Fire Fighting.
C 100 General.

A. General.

A 100 Principles.
101 The requirements for fire protection, detection and extinction are in general to be as required in Pt. 4 Ch. 1 Sec. 8.

B. Documentation.

B 100 General.
101 A fire fighting plan showing the location, number and capacity of the fire fighting systems and equipment is to be submitted for approval.

C. Fire Fighting.

C 100 General.
101 In addition to the fire pump capacity required according to Pt. 4 Ch. 1 Sec. 8 there shall be sufficient fire pump capacity to supply water for the following.
102 A water protection system is to be installed to cover the following areas and equipment at a minimum rate of 12,2 l/min m²:

- Drill floor/workover areas.
- Areas containing equipment (including piping) through which petroleum is followed during well test operations.
- Wellhead areas (for production installation).
- Processing areas (for production installations).
103 (N) The following requirements in 104 (N) to 105 (N) do only apply to production installations.
104 (N) The water protection system mentioned below and in 102 above shall be automatically operated. For wellhead areas the capacity is to be at least 20 l/min m². In addition to the areas mentioned in 102, the following areas shall be covered, with minimum capacity of 10 l/min m²:
- Areas for circulation and treatment of drilling fluid.
- Surface of pressure vessels and tanks containing combustibles.
105 (N) At least two water monitors are to be installed to cover the drilling and processing areas. These monitors shall each have a minimum capacity of 100 m³/hr at a discharge pressure of 3.5 bar. They shall have a fixed arrangement making it possible, by a simple hand-grip, to disperse the water jet. The location of the water monitors is to be in easily accessible places and not on the same side of the area they shall cover. The monitors shall be made for easy and quick operation.
106 (N) At least four 12 kg dry powder extinguishers, shall be distributed in the drill floor/workover areas.
107 If the water protection system, which is to be designed, manufactured, installed and tested to the satisfaction of the Society, may be automatically operated, the system shall be provided with a manual override function.
108 All fire fighting equipment must be protected against freezing to the extent necessary.
SECTION 10
MANUFACTURE, WORKMANSHIP AND TESTING

Contents.
A. General.
  A 100 Application.
  A 200 Objective.
  A 300 Quality assurance/quality control.
B. Manufacture.
  B 100 General.
  B 200 Approval of welders.
  B 300 Welding.
  B 400 Heat treatment.
  B 500 Identification and marking.
C. Examination and Testing.
  C 100 General.
  C 200 Non-destructive testing.
  C 300 Destructive (mechanical) testing.
  C 400 Load and pressure testing.
D. Documentation.
  D 100 General.
  D 200 Records of completion.

A. General.
A 100 Application.
  All manufacture, examination and testing of drilling-rig items should comply with the requirements in this section unless covered elsewhere in this chapter.

A 200 Objective.
  All phases of the fabrication, i.e. manufacture, examination and testing of drilling-rig items, should be planned and carried out in a way that ensures safe operation after installation.

A 300 Quality assurance/quality control.
  The supplier shall, for Class I equipment, prior to start of fabrication, demonstrate that he has all the necessary production facilities, qualifications, procedures and personnel which will ensure that the product will be manufactured to the specified requirements.

B. Manufacture.
B 100 General.
  Equipment, structures and systems are to be fabricated in accordance with the details in the approved design documentation. Reference is made to API Spec. 6A, 14A and 14D for types and methods of marking.

B 200 Approval of welders.
  Approved welders only shall be engaged in fabrication of important drilling rig items. Approval of welders shall normally be carried out according to the applied design code and preferably in presence of the Surveyor.

B 300 Welding.
  Welders already approved to another code than the design code may be accepted as outlined below.

B 400 Heat treatment.
  The actual metal temperature shall be properly recorded during heat treatment.

B 500 Identification and marking.
  All important parts are to be adequately marked to allow for unambiguous reference to the applicable fabrication documentation.

B 204 The manufacturer shall supply each welder with an identification number or symbol to enable identification of the work carried out by each particular welder.

B 205 Welders should be qualified on welding positions compatible with what will be used in the actual production.

B 300 Welding.
  The heat treatment procedure in connection with welding is to be approved by the Society if not covered by the applied code or standard.

B 302 Welding procedures shall be qualified on welding procedures compatible to what will be used in the actual production.

B 303 Procedure qualification welding may be checked at the discretion of the Society.

B 400 Heat treatment.
  Post weld heat treatment (PWHT) is normally to be performed in a fully enclosed furnace. Local PWHT may be performed on simple joints when following an approved procedure.

B 401 The products shall be heat treated after forming and/or welding if necessary to maintain adequate notch ductility or to avoid hydrogen induced cracking.

B 402 The actual metal temperature shall be properly recorded during heat treatment.

B 403 A normalizing heat treatment is required for hot-formed parts, unless the process of hot forming has been carried out within the appropriate temperature range, duration and cooling rate.

B 404 The heat treatment for cold-worked materials shall be selected with respect to the degree of plastic deformation in the material.

B 405 Preheating and/or post weld heat treatment is to be used when necessitated by the dimensions and material composition.

B 500 Identification and marking.
  All important parts are to be adequately marked to allow for unambiguous reference to the applicable fabrication documentation.
  Reference is made to API Spec. 6A, 14A and 14D for types and methods of marking.

B 502 Low stress stamping may be required for certain materials. Paint markings may be accepted, but care must be exercised during handling and storage to preserve the identification.
C. Examination and Testing.

C 100 General.

101 Equipment, structures and systems are to be surveyed during manufacture in order to ensure that the item is in accordance with the approved design documentation.

C 200 Non-destructive testing.

201 Non-destructive testing (NDT) shall be carried out by qualified operators and only in accordance with approved NDT procedures.

202 The final NDT shall be made after the final heat treatment, but before any possible process which would make the required NDT impossible or would have erroneous results as a consequence (e.g. coating of surfaces).

203 The NDT methods shall be suitable for the type of expected defects. Methods such as Radiographic, Ultrasonic, Magnetic Particle or Liquid Penetrant testing may be used as applicable.

204 Visual examination should always be performed to the extent necessary to show that components, materials and workmanship conform with the requirements of the design code and the approved design documentation.

205 If the required NDT reveals a defect requiring repair, additional NDT shall be carried out in agreement with the Society.

C 300 Destructive (mechanical) testing.

301 Mechanical testing shall be carried out by competent personnel and only in accordance with recognized procedures such as stipulated in Pt. 2 Ch. 3.

302 Testing of materials shall be in accordance with Sec. 6 B.

303 The yield strength of the test specimen shall be recorded when testing tensile strength of welding procedure qualification sample or production tests.

C 400 Load and pressure testing.

401 Pressure containing items shall be subjected to a pressure test which is realistic when considering the intended service condition including media, temperature and corrosion effects according to an approved or recognized testing procedure.

402 The holding time for a hydrostatic test shall generally last minimum 15 minutes after the pressure is stabilized, at least sufficiently long to allow for thorough visual examination.

403 A functional test under working conditions may be required for important items.

D. Documentation.

D 100 General.

101 Specifications of the manufacture examination testing and survey shall be included in the design documentation so that these can be evaluated with respect to A 201 «Objective», refer to relevant sections of these Rules.

Examples on relevant information:
- Fabrication code or standard.
- Acceptance criteria for the different examination and testing methods.

102 Description of the quality assurance system, procedures etc., shall be available for review by the Surveyor.

D 200 Records of completion.

201 Records of all important phases of manufacture, examination and testing shall be made available for review in order to prove that the fabrication has been carried out according to the approved design documentation. Examples on relevant information are:
- A set of «as-built» drawings.
- Material certificates.
- Welding procedure specifications with qualification test records.
- Records of mechanical testing.
- Records of non-destructive examination.
- Records of load and pressure testing.
- Records of functional testing.
- Records of measurements.
SECTION 11
IN-SERVICE INSPECTION

Contents.

A. General.
A 100 Principles.

B. Derrick, Pipe Racking System and Flare Booms.
B 100 Survey extent.

C. Overhead Drilling Equipment.
C 100 Annual survey.
C 200 Special periodical survey.

D. Tensioning Systems.
D 100 Survey extent.

E. Pressure Vessels.
E 100 Annual survey.
E 200 Special periodical survey.

F. Piping Systems (incl. related equipment).
F 100 Survey extent.

G. Flexible Pipes.
G 100 Survey extent.

H. Mud and Cement Pumps Fluid Ends.
H 100 Survey extent.

I. Marine Riser.
I 100 Survey extent.

J. Blowout Preventers.
J 100 Annual survey.
J 200 Special periodical survey.

K. Lifting Appliances and Hoisting Equipment.
K 100 Survey extent.

A. General.

A 100 Principles.

101 The general requirements for surveys in Pt. 1 Ch. 2 are to be complied with as far as applicable.

102 Where nothing else is mentioned, the requirements are to be understood as requirements for both annual and special periodical surveys.

103 Unless specially agreed upon, all tests, examinations and surveys required are to be performed or witnessed by the Society's Surveyor.

B. Derrick, Pipe Racking System and Flare Booms.

B 100 Survey extent.

101 The derrick is to be surveyed as required in Pt. 1 Ch. 2 Sec. 3 H.

102 Pipe racking system and flare booms are subject to survey according to E, F and G below and Pt. 1 Ch. 2 Sec. 3 F and H as far as applicable.

C. Overhead Drilling Equipment.

C 100 Annual survey.

101 An overall survey is to be carried out with particular emphasis on structural integrity.

102 Examination and functional testing as found necessary by the Surveyor (f.e.x. safety devices and emergency stop function).

103 It is to be verified that the marking and components certificates are available and acceptable.

C 200 Special periodical survey.

201 In addition to the extent of survey required in 101—103, the additional survey according to 202 and 203 is to be carried out.

202 Thickness measurements of structural parts as far as deemed necessary.

203 Main load carrying parts are to be checked by MPI (magnetic particle inspection).

D. Tensioning Systems.

D 100 Survey extent.

101 Wire ropes (incl. end attachments) and sheaves are to be examined. If deemed necessary by the Surveyor, checking by MPI shall be carried out.

102 Piping and pressure vessels are to be surveyed according to E and F below.

E. Pressure Vessels.

E 100 Annual survey.

101 Pressure vessels are to be externally surveyed. The general condition of the pressure vessel including mountings, piping and possible insulation is to be ascertained.

102 The Surveyor may require opening/internal survey or thickness measurements and/or crack detection test if found necessary.

103 Pressure tests are to be carried out. All vessels are to be tested within 5 years.

104 Safety valves, instrumentation and automation systems are to be surveyed and tested in operating condition when found necessary by the Surveyor.

105 Liquid level controls on tanks/separators are to be tested.

E 200 Special periodical survey.

201 As for annual survey with the following additions:

202 Internal surveys, or if this is not practical, thickness measurements are to be carried out.

203 Examination of related equipment, such as valves, pipes etc. is to be carried out.

204 Examination of correct setting of safety valves including remote operation of same is to be carried out.

F. Piping Systems (incl. related equipment).

F 100 Survey extent.

101 Piping systems are to be surveyed.

102 Pressure tests are to be carried out.

103 Thickness measurements are to be carried out as deemed necessary by the Surveyor.

104 Safety valves are to be surveyed and tested as deemed necessary by the Surveyor.
G. Flexible Pipes.

G 100 Survey extent.
101 Flexible hoses shall be examined for critical wear.
102 Pressure tests are to be carried out.

H. Mud and Cement Pumps Fluid Ends.

H 100 Survey extent.
101 Mud and cement pumps fluid ends shall be surveyed and checked for cracks in critical areas.

I. Marine Riser.

I 100 Survey extent.
101 Marine riser joints shall be visually surveyed and inspected for corrosion, cracks and wear.
102 Liquid penetrants or MPI methods shall be used to investigate critical areas for cracks.

J. Blowout Preventers.

J 100 Annual survey.
101 The blowout preventers shall be surveyed and pressure tested to working pressure.
102 NDT is to be carried out to extent deemed necessary by the Surveyor.

J 200 Special periodical survey.
201 The blowout preventers shall be subjected to complete overhaul and tests in accordance with API Spec. 6A and API RP 53.

K. Lifting Appliances and Hoisting Equipment.

K 100 Survey extent.
101 Lifting appliances and hoisting equipment are to be surveyed according to the requirements for cranes (see Pt. 1 Ch. 2 Sec. 3 F) as far as applicable.
SECTION 12
SPARE PARTS

A. General.

A 100 Principles.

101 Spare parts necessary for maintaining the safety and limit the risk of damage and personal injury in any condition shall be provided.

102 Special attention shall be paid to:

- Fire protection.
- Gas detection and protection.
- Emergency shut-down system.
- Kill and choke system.
- Blowout preventing system.

103 Spare parts shall be subject to equal certification as the original parts.