



Rules for the Classification of Offshore Loading and Offloading Buoys

May 2006

**Rule Note
NR 494 DT R02 E**

17 bis, Place des Reflets – La Défense 2 – 92400 Courbevoie
Postal Address : 92077 Paris La Défense Cedex
Tel. 33 (0) 1 42 91 52 91 – Fax. 33 (0) 1 42 91 53 20
Email : veristarinfo@bureauveritas.com
Web : <http://www.veristar.com>



MARINE DIVISION

GENERAL CONDITIONS

ARTICLE 1

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

The Society:

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

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

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

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

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

ARTICLE 2

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

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

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

2.4. - The Client is to give to the Society all access and information necessary for the performance of the requested Services.

ARTICLE 3

3.1. - The Rules, procedures and instructions of the Society take into account at the date of their preparation the state of currently available and proven technical knowledge of the Industry. They are not a code of construction neither a guide for maintenance or a safety handbook.

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

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

3.3. - The Services of the Society are carried out by professional Surveyors according to the Code of Ethics of the Members of the International Association of Classification Societies (IACS).

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

ARTICLE 4

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

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

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

ARTICLE 5

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

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

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

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

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

ARTICLE 6

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

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

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

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

ARTICLE 7

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

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

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

ARTICLE 8

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

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

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

ARTICLE 9

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

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

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

ARTICLE 10

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

ARTICLE 11

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

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

ARTICLE 12

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

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

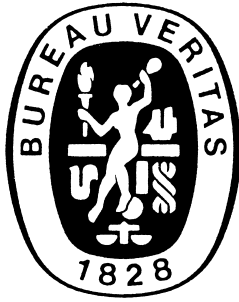
12.3. - **Other disputes over the present General Conditions or over the Services of the Society are exclusively submitted to arbitration, by three arbitrators, in London according to the Arbitration Act 1996 or any statutory modification or re-enactment thereof. The contract between the Society and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

ARTICLE 13

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

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

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



RULE NOTE NR 494

Rules for the Classification of Offshore Loading and Offloading Buoys

SECTION 1	GENERAL
SECTION 2	MAINTENANCE OF CLASS
SECTION 3	GENERAL ARRANGEMENT AND STABILITY
SECTION 4	STRUCTURE AND LOAD BEARING COMPONENTS
SECTION 5	PIPING SYSTEMS
SECTION 6	EQUIPMENT AND SAFETY
SECTION 7	ELECTRICAL AND AUTOMATION
SECTION 8	SWIVELS AND FLUID TRANSFER LINES
APPENDIX 1	THICKNESS MEASUREMENTS: ACCEPTANCE CRITERIA, LOCATIONS

NR 494 Rules for the Classification of Offshore Loading and Offloading Buoys

Section 1 General

1	General	7
1.1		
1.2	Definitions	
1.3	Structural type and service notation	
1.4	Site notation	
1.5	Additional class notation	
1.6	Additional service feature	
2	Design conditions	8
2.1	General	
2.2	Site data	
2.3	Operating conditions and loads	
3	Documentation to be submitted	8
3.1		

Section 2 Maintenance of Class

1	General principles of surveys	10
1.1	General	
1.2	Survey types	
2	Annual survey	10
2.1	General	
2.2	Survey of structure and related equipment	
2.3	Piping and pressure containing equipment	
2.4	Safety equipment	
2.5	Electrical equipment	
2.6	Hazardous areas	
2.7	Mooring system	
3	Intermediate survey	11
3.1	General	
3.2	Ballast tank / surge tank surveys	
4	Class renewal survey	12
4.1	General	
4.2	Class renewal survey of structure and related equipment	
4.3	Piping and pressure containing equipment	
4.4	Safety equipment	
4.5	Electrical equipment	
4.6	Hazardous areas	

Section 3 General Arrangement and Stability

1	General arrangement	15
1.1	Floating structure	
1.2	Rotating part	
1.3	Protection	
1.4	Access	
1.5	Inspection	
2	Stability	15
2.1	Intact stability	
2.2	Damage stability	

Section 4 Structure and Load Bearing Components

1	General	17
1.1	General requirements	
1.2	Corrosion protection	
1.3	Materials	
1.4	Loads	
1.5	Structural design	
1.6	Fatigue	
1.7	Finite element analysis	
2	Buoy body	18
2.1	Definitions	
2.2	Plating	
2.3	Ordinary stiffeners	
2.4	Primary supporting members	
3	Buoy particular structural areas	20
3.1	General	
3.2	Bearings supports	
3.3	Hawser line attachment structure	
3.4	Mooring line attachment structure	
4	Bearings	21
4.1	Design of bearings	
4.2	Roller bearings	
4.3	Plain bearings and pads	
5	Vessel mooring system (Hawsers)	21
5.1	Definitions	
5.2	Arrangement	
5.3	Design load and strength	
5.4	Manufacturing and testing	
6	Buoy mooring system	23
6.1		
7	Subsea tanks	23
7.1	Definition	
7.2	General arrangement	
7.3	Structure	

Section 5 Piping Systems

1	General	24
	1.1 Application	
	1.2 Other provisions	
2	Bilge - Drainage systems	24
	2.1 Bilge arrangement	
	2.2 Scupper arrangement	
3	Sounding system	24
	3.1	
4	Venting system	24
	4.1 General	
	4.2 Arrangement of air vent pipes	
5	Crude oil pipes	24
	5.1 General	
	5.2 Materials	
	5.3 Arrangement	
6	Hydraulic power station	25
	6.1 General	
	6.2 Arrangement	
	6.3 Design	
	6.4 Construction and testing	

Section 6 Equipment and Safety

1	General	27
	1.1 Application	
2	Fire fighting	27
	2.1 General	
3	Hazardous areas	27
	3.1 General	
	3.2 Definitions	
	3.3 Classification of hazardous area due to oil transfer	

Section 7 Electrical and Automation

1	General	29
	1.1 Application	
2	Source of power	29
	2.1 Main source of electrical power	
	2.2 Services to be supplied	
	2.3 Emergency source of electrical power	
3	Navigation aids	29
	3.1 Signal lights	

3.2	Sound signal	
3.3	Radar deflector	
4	Equipment	29
4.1	General	
4.2	Photo-voltaic system	
4.3	Eolic system	
5	Control of installations	30
5.1	General requirements	
5.2	Control and monitoring functions	

Section 8 Swivels and Fluid Transfer Lines

1	Swivels	32
1.1	Pressure swivels	
1.2	Electrical swivels	
1.3	Test of pressure swivels	
1.4	Tests of electrical swivels	
2	Fluid transfer lines	32
2.1	General	
2.2	Floating hoses	
2.3	Underbuoy pipes	

Appendix 1 Thickness Measurements: Acceptance Criteria, Locations

1	Acceptance criteria for thickness measurements	34
1.1	General	
1.2	Criteria	
1.3	Local strength criteria	
1.4	Buckling strength criterion	
1.5	Pitting	
2	Location of measurements	36
2.1	General	
2.2	Bottom and deck	
2.3	Side shell	
2.4	Radial bulkhead	
2.5	Stiffener	

SECTION 1

GENERAL

1 General

1.1

1.1.1 Application

The requirements of the present Rule Note apply to oil loading and offloading buoys, as defined in [1.2].

An offshore buoy with service notation “oil-loading” or “oil-offloading” is considered as a permanent installation as defined in Part A, Chapter 1, Sec 1 [4.5] of the Rules for the Classification of Offshore Units.

Particular provisions of the present Rule Note are complementary to provisions of the following Rules and Rules Note, which remain applicable, except where otherwise specified:

- Parts A, B and C of the “Rules for the Classification of Offshore Units”
- NR 216 “Material and Welding”
- NR 426 “Construction Survey of Steel Structures of Offshore Units and Installations”.

Buoys used as a permanent mooring system will be given special consideration based on the present document.

1.1.2 National Authorities Requirements

Attention is drawn to special legal provisions enacted by National Authorities which units may have to comply with according to their flag, structural type, size, operational site and intended service, as well as other particulars and details.

1.1.3 Classification and National requirements

Compliance with statutory requirements mentioned in [1.1.2] is not included in classification scope but, in case of conflict between the Rules and these requirements, the latter ones are to take precedence over the requirements of the Rules, as stated in Part A, Chapter 1, Sec 1 of the Rules for the Classification of Offshore Units.

1.2 Definitions

1.2.1 Buoy

A buoy is a floating body, not normally manned, generally of a cylindrical shape and fitted with mooring equipment as necessary to perform the mooring of a vessel and ensuring fluid transfer between production and/or storage unit or onshore installation and the moored vessel.

It is composed of the following main parts:

- a hull providing buoyancy and stability
- a rotating part to which the vessel is moored and allowing weathervaning

- a fixed part to which the mooring lines and underbuoy pipes are connected.

Note 1: The hull may be either the rotating part or the fixed part.

1.2.2 Fluid transfer lines

To ensure fluid transfer, a buoy is connected to the following types of fluid transfer lines:

- floating hoses
- underbuoy pipes.

A floating hose is a fluid transfer line connected between the moored vessel and the buoy.

An underbuoy pipe may be:

- a riser: a fluid transfer line located between the sea bottom (e. g. from a pipe line end manifold) and the buoy,
- an export line: a fluid transfer line located between the production and/or storage unit and the buoy.

1.2.3 Loading

For the purpose of the present Rule Note, loading means facilities, in a near-shore location, for fluid transfer (either ways) between a moored vessel and on-shore facilities for processing, storage or distribution.

1.2.4 Offloading

For the purpose of the present Rule Note, offloading means facilities to transfer hydrocarbons from an offshore installation to the moored vessel.

1.2.5 Loading and offloading buoy

Loading and offloading buoys are installations that include:

- the buoy
- the equipment for vessel mooring to the buoy
- the equipment for fluid transfer
- related handling/storage equipment.

1.2.6 Splash zone

The splash zone is the zone of the buoy which is alternatively in and out of water due to wind, wave, tide and motions. Surfaces which are wetted only during major storms are excluded from the splash zone.

1.3 Structural type and service notation

1.3.1 In accordance with Part A, Chapter 1, Sec 2 [4.2] of the Rules for The Classification of Offshore Units, the units covered by the present Rule Note will receive, according to their type and service, one structural type and one service notation among the following:

- **Offshore Buoy / oil loading**
- **Offshore Buoy / oil offloading.**

1.4 Site notation

1.4.1 Site notation is granted in accordance with provisions of Part A, Chapter 1, Sec 2 [5.3] of the Rules for the Classification of Offshore Units.

Note 1: A navigation notation is generally not applicable.

1.5 Additional class notation

1.5.1 RIPRO

RIPRO additional class notation may be assigned to buoys fitted with underbuoy pipes meeting the corresponding requirements of Sec 8, [2].

1.6 Additional service feature

1.6.1 POSA

The additional service feature **POSA** is to be assigned for permanent offshore buoys installation.

The anchoring system of the buoy is to comply with the requirements of NI 493 "Classification of Mooring Systems for Permanent Offshore Units" applicable for granting the additional class notation **POSA**, in addition to those of the present Rule Note.

Note 1: See also Sec 4, [6].

2 Design conditions

2.1 General

2.1.1 In accordance with the provisions of Part A, Chapter 1 and Part B, Chapter 2 of the "Rules for the Classification of Offshore Units", the party applying for classification is to provide the Society with the classification data and assumptions.

Relevant information will be entered in the Design Criteria Statement (refer to Part A, Chapter 1, Sec 1 [1.6] of the "Rules for the Classification of Offshore Units").

2.2 Site data

2.2.1 As specified for permanent installations in Part A, Chapter 1 and Part B, Chapter 2 of the "Rules for the Classification of Offshore Units", the party applying for classification is to specify the site at which the unit will operate and is to provide relevant design data and background information.

2.3 Operating conditions and loads

2.3.1 The data on unit operation are to include the information required in [2.3.2] to [2.3.5].

2.3.2 General information

The characteristics of hydrocarbons intended to be loaded and offloaded are to be specified.

2.3.3 Environmental conditions

The following environmental conditions are to be considered:

- extreme environmental conditions with no moored vessel (survival condition)
- most severe environmental conditions during loading and offloading conditions with a moored vessel
- limiting conditions before the disconnection of the moored vessel.

2.3.4 Moored vessel

The range of vessel sizes is to be specified. The range of loading conditions of these vessels is to be also specified.

2.3.5 Loads

The following loads are to be considered, in all relevant conditions detailed in [2.3.3]:

- mooring loads
- hawser line loads
- underbuoy pipe loads
- wave static head loads
- loads induced by other equipment
- loads in bearings.

3 Documentation to be submitted

3.1

3.1.1 Submitted documentation is to include the following information, in addition to what is specified in Part A, Chapter 1 of the "Rules for the Classification of Offshore Units":

- Design criteria and data, as defined in [2]
- General drawings:
 - arrangement of watertight subdivision, including the location, type and disposition of watertight and weathertight closures
 - structural arrangement showing shell, bottom and deck platings and bulkheads
 - location of equipment
 - general arrangement of underbuoy pipes, underbuoy pipes supports and transfer lines (including the swivel)
 - general arrangement of the mooring system
 - general arrangement of hazardous areas
 - arrangement of the rotating structure
 - general arrangement of boat landing area.
- Structural drawings, specifications and supporting documents:
 - mooring systems foundations (fairleads, stoppers, winches, bollards, etc.) as applicable
 - rotating part and fixed part structural and mechanical drawings
 - buoyancy part structural drawings
 - underbuoy pipes supports

- specification of coatings and drawings of cathodic protection, including outside hull and inside of tanks, with drawings of anode securing devices.
- d) Piping drawings:
- diagrammatic drawings of vent systems
 - connections to underbuoy pipes
 - diagrammatic drawings of crude oil and/or gas piping systems
 - specification of pumps, valves, expansion joints and other crude oil and/or gas piping fittings
 - bilge and drainage systems
 - remote control of crude oil and/or gas transfer system (if any)
 - drawings of product swivels
 - drawings of electrical swivels (if any)
 - emergency shut down system (if any)
- e) Safety plans:
- drawing and specification of fire and gas detection systems (if any)
 - fire extinguishing equipment layout and specifications.
- f) Electrical drawings:
- instrumentation
 - energy supply system
 - controls systems
 - navigation aid systems.
- g) Others:
- documents relevant to contemplated additional notations, as specified in the Rules.

SECTION 2

MAINTENANCE OF CLASS

1 General principles of surveys

1.1 General

1.1.1 The general principles of surveys are given in Part A, Chapter 2, Sec 1 of the "Rules for the Classification of Offshore Units".

1.2 Survey types

1.2.1 Classed buoys are submitted to surveys for the maintenance of class. These surveys include the class renewal survey, intermediate and annual survey. Such surveys are carried out under the conditions laid down in the present Section. In addition to the above periodical surveys, buoys are to be submitted to occasional surveys whenever deemed appropriate by the Society.

2 Annual survey

2.1 General

2.1.1 At every annual survey, the buoy is to be generally examined afloat. The survey will include visual examination and tests to show that the buoy is in satisfactory conditions.

Note 1: It is reminded that, according to Part A, Chapter 2, Sec 1 [5.5] of the "Rules for the Classification of Offshore Units", every modification of the unit or its equipment, affecting the classification are to be brought to the knowledge of the Society.

2.1.2 The extent of the survey depends also on the condition of the buoy and its equipment. If any doubt arises as to the maintenance or condition of the buoy or its equipment, then further examination and testing may be conducted as considered necessary by the Surveyor.

2.1.3 Any specific equipment or arrangement covered by service notation or an additional class notation for which annual survey is not detailed in the present Rules or in another publication of the Society is to be submitted to a programme of survey determined with the agreement of the Society.

2.1.4 The Owner or his representative is to declare to the attending Surveyor that no changes have been made to the buoy that may affect the classification.

2.2 Survey of structure and related equipment

2.2.1 The survey includes the following:

- Examination of the buoy structure and its closing appliances so far as can be seen:
 - side shell plating above the waterline, with special attention to plating damages due to wave slam or bumping and/or due to boat impacts

- buoy body deck
- internal parts of buoy body (with particular attention to the watertight bulkheads and bulkhead penetrations, bottom structure and centre well)
- structure in the vicinity of main bearing, hawser supports and other major load carrying structures
- structure in the vicinity of major openings or discontinuities
- turret or turntable as applicable
- hatches, hatch coamings and closing appliances
- bulwarks, guard rails and freeing ports
- air pipes, overflow pipes and closing arrangements
- Examination of anchoring and mooring equipment covered by class, as far as practicable, including housing, supporting equipment and connections to the buoy's structure.
- Structural areas of the buoy exposed to corrosion, including spaces used for water ballast (if any) and spaces used as surge tanks (if any), as accessible. If deemed necessary, thickness measurements may be required.
- Examination of the corrosion protection system (as applicable: condition of the sacrificial anodes, protective coating ...).
- Confirmation that the main bearing is maintained according to Manufacturer's program. Results of grease analysis may be required.

Note 1: When considered necessary by the Surveyor, thickness measurement is to be carried out and if the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased at his satisfaction.

Note 2: Extent of surveys of hatches, hatch coamings and their closing appliances, if any, is specified in the "Rules for the Classification of Steel Ships".

2.2.2 Other areas:

- Verification of protection of personnel (guard rails, access ladders, boat landing).
- Verification of loading guidance and stability data as applicable including verification of draft and trim of the buoy.

2.3 Piping and pressure containing equipment

2.3.1 For piping and pressure containing equipment, the survey includes the following:

- Bilge pumping system.
- Cargo/product lines with their equipment and apparatus (including supports, seals, remote control and shut down devices, instrumentation).
- Swivel and seals.