RULES

FOR THE CLASSIFICATION AND CONSTRUCTION OF SUBSEA PIPELINES

ND No. 2-020301-007-E

RULE CHANGE NOTICE

ENTERS INTO FORCE:

01.01.2025

St. Petersburg
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RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SUBSEA PIPELINES

The present Rule Change Notice to the Classification and Construction of Subsea Pipelines (hereinafter — RCN) has been approved in accordance with the established approval procedure and contains information on amendments and additions, except for editorial amendments. RCN amendments come into force on 1 January 2025.

REVISION HISTORY

Item	Applicability	Description	Remarks
Part I, para 1.1.1	Subsea pipelines	The scope of the application has been specified for the SP Rules	
Part I, para 1.1.2	Subsea pipelines Risers Standpipes Pig launchers/receivers	The scope of technical supervision by RS has been specified	
Part I, para 1.2	Subsea pipelines Standpipes Pig launchers/receivers	The definitions have been amended	
Part I, para 1.3.4	Subsea pipelines Pig launchers/receivers Risers Standpipes	Descriptive notations have been added to the character of classification for the subsea pipelines	
Part I, para 1.3.4.1 (new)	Subsea pipelines Standpipes	A new para has been introduced referring to the requirements for standpipes	
Part I, para 1.3.4.2 (new)	Subsea pipelines Pig launchers/receivers	A new para has been introduced referring to the requirements for pig launchers/receivers	
Part I, paras 4.3.1.2, 4.3.9.3, 4.3.9.6, 4.3.9.7	Subsea pipelines	A reference has been amended to the Rules for the Classification and Construction of Sea-Going Ships (the RS Rules/C)	

Item	Applicability	Description	Remarks
Part I, paras 5.1.2.2, 5.3.1, 5.3.3.2, 5.3.5.1, 5.3.7.1, 5.4.1	Subsea pipelines	A reference has been amended to the Rules for the Classification and Construction of Fixed Offshore Platforms (the FOP Rules)	
Part II, paras 1.1.1, 1.1.4, 1.2.1, 1.2.2	Risers	The definitions have been amended	
Part II, paras 1.1.1, 1.1.4, 1.2.1, 1.2.2, 1.5.3.3, 1.5.4.3, 2.1.6, 2.6, 3.1.1.2, 3.2.3, 3.3.1 — 3.3.3, 6.1.5, 6.3, 6.8, 6.11, 7.2.2.1, 7.2.2.7, 7.2.4	Risers	The designation "FPU/FSPM" has been changed to the "FPU"	
Part II, para 1.1.4	Floating offshore oil-and-gas product units	A reference has been amended to the Rules for the Classification and Construction of Fixed Offshore Platforms (the FOP Rules)	
Part II, para 1.2.1	Risers Buoyancy tank	The definition has been amended	
Appendix 2, para 4.1	Indices of risk analysis Societal risk	A reference has been amended to the Rules for the Classification and Construction of Fixed Offshore Platforms (the FOP Rules)	
Appendix 3, para 1.3, 4.2	Methods of risk analysis	A reference has been amended to the Rules for the Classification and Construction of Fixed Offshore Platforms (the FOP Rules)	

Item	Applicability	Description	Remarks
Appendix 7, Table 2.4.1	Risers	The designation "FPU/FSPM" has been changed to the "FPU"	

PART I. SUBSEA PIPELINES

1 GENERAL

Para 1.1.1 is amended as follows:

"**1.1.1** Requirements of the present Part of the Rules for the Classification and Construction of Subsea Pipelines (hereinafter referred to as "the SP Rules") cover the pipelines which are designed, constructed and operated as follows: ~~offshore, subsea crossings of sections of shore main pipelines to the isolation valves nearest to the shoreline conveying liquid, gaseous and multi-phase hydrocarbons as well as other media capable of being conveyed through the pipelines.~~

.1 between the objects of the field facilities construction: the fixed offshore platforms (FOP)[1], the floating offshore oil-and-gas product units (FPU)[2], and the subsea production system (SPS)[3];

.2 between the objects of the field facilities construction (i.e. FOP, FPU and/or SPS) and the objects of shore infrastructure;

.3 between the objects of facilities construction at two or more than two fields;

.4 subsea crossings of sections of shore main pipelines.

The SP Rules shall apply to the pipelines intended for conveying liquid, gaseous and/or multiphase hydrocarbons as well as other media capable of being conveyed through pipelines.

The requirements of the SP Rules, unless otherwise specified in accordance with 1.1.2, shall apply to the pipelines confined by shut-off valves and specified in 1.1.1.1.1 — 1.1.1.1.4.

In addition to the SP Rules, during performance of the technical supervision the Russian Maritime Register of Shipping (hereinafter referred to as "the Register") also applies the Guidelines on Technical Supervision during Construction and Operation of Subsea Pipelines (hereinafter referred to as "the SP Guidelines"), Recommendations for Design, Construction and Operation of Subsea Pipelines (hereinafter referred to as "the SP Recommendations"), the standards and rules of the national technical supervisory bodies.".

Para 1.1.2 is amended as follows:

"**1.1.2** The scope of technical supervision by the Register, for the purposes of the SP classification, may include risers and standpipes that provide transportation of media through the pipeline system in consideration, as well as the corresponding pig launchers/receivers which are installed ashore, underwater or at FOP/FPU, as part of the SPS.

In each particular case the scope of technical supervision carried out by the Register shall be stipulated by a special agreement with the pipeline owner and/or operating organization and, if necessary, agreed upon with the national technical supervisory bodies.".

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[1] see Rules for the Classification and Construction of Fixed Offshore Platforms (FOP Rules)

[2] see Rules for the Classification and Construction of Floating Offshore Oil-and-Gas Product Units (FPU Rules)

[3] see Rules for the Classification and Construction of Subsea Production Systems (SPS Rules)

Chapter 1.2. After the definition "Ice formation keel", the new definition "Pig launcher/receiver" is introduced reading as follows:

"Pig launcher/receiver is a fixed equipment designed for the launching and/or receiving of the cleaning, intelligent, separation and/or the sealing pigs in the flow of medium conveyed through a subsea pipeline.".

Chapter 1.2. The definition "Standpipe" is amended as follows:

"Standpipe means the vertical part of ~~subsea~~ the offshore pipeline system intended for conveying media and located inside the premises of FOP/FPU ~~secured on the supporting block (supporting foundation) of a fixed offshore platform~~.".

Para 1.3.4 is amended as follows:

"**1.3.4** The following descriptive notations shall be added to the character of classification:

geographical area;

type of conveyed medium;

working pressure, in MPa;

maximum temperature of conveyed medium, in °C;

nominal pipe size, ~~mm/~~number of runs, pcs.;

buried – the availability of a burial into the seabed and/or the protective layer of the seabed soil (if applicable);

concrete coating – the availability of concrete solidification (if applicable).

SDP — the availability of standpipes (if installed and in the scope of technical supervision by the Register);

R — the availability of risers (if installed and in the scope of technical supervision by the Register);

PLR — the availability of pig launchers/receivers (if installed and in the scope of technical supervision by the Register).

For example, **SP⊛L1, Baltic Sea, Crude Oil, 6 MPa, 40 °C, 325/2, buried, concrete coating, SDP, PLR.**".

New Para 1.3.4.1 is introduced reading as follows:

"**1.3.4.1** Standpipes shall comply with the applicable requirements of Part V of The Rules for the Oil-and-Gas Equipment of Floating Offshore Oil-and-Gas Product Units, Mobile Offshore Drilling Units and Fixed Offshore Platforms (hereinafter referred to as "the OGE Rules").".

New Para 1.3.4.2 is introduced reading as follows:

"**1.3.4.2** Pig launchers/receivers shall comply with the requirements of chapter 3.6, Part V of the OGE Rules, while the scope of periodical surveys thereof — with the requirements of 2.27.1 and Table 10.2.7, Part I of the OGE Rules.".

4 MATERIALS

Para 4.3.1.2 is amended as follows:

"**4.3.1.2** Depending on steel grade, strength level and test type, samples shall be taken from the rolled products in compliance with the requirements of 3.2.5, ~~3.13.5~~ 3.13.8 and 3.14.4, Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships (hereinafter referred to as "the RS Rules/C"), ~~Section 2, Part XII "Materials" of the Rules for the Classification, Construction and Equipment of MODU/FOP~~ considering provisions of this Section.".

Para 4.3.9.3 is amended as follows:

"**4.3.9.3** Determination of metal crack resistance properties CTOD (the crack tip opening displacement).

The samples shall be taken from 1/4 ± 1/8 of the plate width and from a position located at an angle of 90 ° to the pipe weld seam.

At the RS discretion, the number of pipes, plates taken from the cast to be tested and their thickness, as well as the test temperatures may be changed proceeding from the intended use of steel or conditions of the order.

Definitions, general requirements to sampling, ~~and~~ specimen manufacture~~,~~ and the testing equipment are ~~set forth~~ specified in ~~Section 2, Part XII "Materials" of the Rules for the Classification, Construction and Equipment of MODU/FOP~~ 2.2.10.5, Part XIII "Materials" of the RS Rules/C.

The CTOD testing procedure is specified in Section 2 of Appendix 4.

As a rule, the tests are carried out on the metal of the rolled product and pipes during the initial survey of **L1** – **L3** and **G1** – **G3** pipelines manufacture.".

Para 4.3.9.6 is amended as follows:

"**4.3.9.6** Tests for determination of ductile-brittle transition temperature *Tkb*. The samples shall be taken from 1/4 of the plate width having a least 14 mm of thickness. The Register may require to conduct tests during the initial survey of manufacture of rolled product for **L3** and **G1** – **G3** pipelines to verify the sufficient brittle fracture resistance of material.

Definitions, general requirements to the test procedure, specimen manufacture and the testing equipment are specified in ~~Section 2, Part XII "Materials" of the Rules for the Classification, Construction and Equipment of MODU/FOP~~ 2.2.10.2, Part XIII "Materials" of the RS Rules/C.".

Para 4.3.9.7 is amended as follows:

"**4.3.9.7** Tests for determination of nil-ductility temperature NDT.

The samples shall be cut out from 1/4 ± 1/8 of the plate width having at least 16 mm thickness and from a position located at the angle of 90 ° to the pipe weld seam for the pipes of 530 mm in diameter and above and the wall thickness at least 20 mm. The Register may require to conduct tests during the initial survey of the manufacture of rolled product and pipes for **L3** and **G1** – **G3** pipelines.

Definitions, general requirements to the test procedure, specimen manufacture and the testing equipment are specified in ~~Section 2, Part XII "Materials" of the Rules for the~~

~~Classification, Construction and Equipment of MODU/FOP~~ 2.2.6, Part XIII "Materials" of the RS Rules/C.".

5 WELDING

Para 5.1.2.2 is amended as follows:

"**5.1.2.2** During manufacture of welded pipes and welding of pipelines and products for subsea transportation systems, the requirements of Part XIV "Welding" of ~~the Rules for the Classification and Construction of Sea-Going Ships~~ the RS Rules/C and Part XIII "Welding" of ~~the Rules for the Classification, Construction and Equipment of MODU/FOP~~ the FOP Rules shall be met to the extent applicable with regard to the requirements of this Section.".

Para 5.3.1 is amended as follows:

"**5.3.1 General.**

This Section covers welding operations performed in workshop conditions, during laying or installation. Welding of carbon, low-alloy and clad steels shall be considered. The latter shall be used with the cladding inside for **L2** and **G2** pipelines (refer to 4.1.3) media transportation where the base metal – carbon or low-alloy steels – does not comply with the corrosion requirements.

General welding recommendations shall comply with Section 2, Part XIV "Welding" of ~~the Rules for the Classification and Construction of Sea-Going Ships~~ the RS Rules/C as well as Section 2, Part XIII "Welding" of ~~the Rules for the Classification, Construction and Equipment of MODU/FOP~~ the FOP Rules.".

Para 5.3.3.2 is amended as follows:

"**5.3.3.2** The Register shall approve/certificate the welding consumables and issue the Certificate of Approval for Welding Consumables (COCM) upon the customer's request. General provisions for approval of welding consumables shall be established in compliance with Section 4, Part XIV "Welding" of ~~the Rules for the Classification and Construction of Sea-Going Ships~~ the RS Rules/C as well as with 2.5, Part XIII "Welding" of ~~the Rules for the Classification, Construction and Equipment of MODU/FOP~~ the FOP Rules.

Application and approval of welding consumables shall comply with 2.5, Part XIII "Welding" of the Rules for the Classification, Construction and Equipment of MODU/FOP considering the requirements of this Section.".

Para 5.3.5.1 is amended as follows:

"**5.3.5.1** All welding operations for structures of subsea transportation systems subject to the RS technical supervision shall be performed by the qualified welders only duly certified and having valid Welder Approval Test Certificate issued by the Register in compliance with Section 5, Part XIV "Welding" of ~~the Rules for the Classification and Construction of Sea-Going Ships~~ the RS Rules/C.

General requirements for the qualification of personnel shall comply with Section 2, Part XIII "Welding" of ~~the Rules for the Classification, Construction and Equipment of MODU/FOP~~ the FOP Rules taking into account the requirements of this Section.".

Para 5.3.7.1 is amended as follows:

"**5.3.7.1** General requirements for welding of pipelines with internal cladding layer shall comply with 2.8, Part XIV "Welding" of ~~the Rules for the Classification and Construction of Sea-Going Ships~~ the RS Rules/C and 2.9, Part XIII "Welding" of ~~the Rules for the Classification, Construction and Equipment of MODU/FOP considering~~ the FOP Rules taking into account the requirements of this Section.".

Para 5.4.1 is amended as follows:

"**5.4.1 General.**

The requirements of this Chapter, unless otherwise specified below, cover the quality inspection for butt (field) girth welds made during construction (laying/installation) of subsea pipelines by means of pipe-laying vessels.

General requirements for the inspection of the welded joints for the subsea pipeline structures shall comply with Section 3, Part XIII "Welding" of ~~the Rules for the Classification, Construction and Equipment of MODU/FOP~~ the FOP Rules taking into account the requirements of this Section.".

PART II. GENERAL

1 GENERAL

Para 1.1.1 is amended as follows:

"**1.1.1** The requirements of this Part cover the production and export flexible risers of any type and configuration, which connect the subsea pipelines (SP) and/or subsea production systems (SPS) and the floating offshore oil-and-gas ~~production~~ product units~~/ floating single point mooring~~ (FPU~~/FSPM~~) or the fixed offshore platforms (FOP) into an integrated subsea pipeline convey system.".

Para 1.1.4 is amended as follows:

"**1.1.4** FPU~~/FSPM~~ and their turrets shall meet the requirements of the Rules for the Classification, Construction and Equipment of Floating Offshore Oil-and-Gas ~~Production~~ Product Units (the FPU Rules), while FOP shall meet the requirements of the ~~Rules for the Classification, Construction and Equipment of Mobile Offshore Drilling Units and Fixed Offshore Platforms (MODU/FOP Rules)~~ the Rules for the Classification, Construction and Equipment of Fixed Offshore Platforms (hereinafter referred to as "the FOP Rules").".

Para 1.2.1. Definition "Production riser" is amended as follows:

"P r o d u c t i o n r i s e r means a vertical part of the subsea piping system, which connects subsea pipelines (SP) and/or subsea production systems (SPS) with the well fluid gathering/treatment/storage systems on the floating offshore oil-and-gas ~~production~~ product units~~/floating single point mooring~~ (FPU~~/FSPM~~) or the fixed offshore platforms (FOP).".

Definition "Riser tensioner system/Vertical motion compensator" is amended as follows:

"Riser tensioner system/Vertical motion compensator means a riser tensioner and rolling compensation system for floating offshore oil-and-gas ~~production~~ product units~~/floating single point mooring~~ (FPU~~/FSPM~~) and the riser.".

After the definition "Swamp weight", **the new definition "Riser"** is introduced reading as follows:

"Riser means a structurally separated vertical part of the offshore pipeline system intended for conveying media, which is exposed to the marine environment.".

Definition "Static elastic line of the riser" is amended as follows:

"Static elastic line of the riser means a riser axial equilibrium line under the sole effect of gravity, buoyancy and static reaction forces from FPU/~~FSPM/~~FOP.".

Definition "Export riser" is amended as follows:

"Export riser means a vertical part of the subsea piping system, which connects the well fluid offloading systems on floating offshore oil-and-gas ~~production~~ product units~~/floating single point mooring~~ (FPU~~/FSPM~~) or fixed offshore platforms (FOP) with the subsea piping systems (SP).".

Definition "Buoyancy element" is amended as follows:

"~~Buoyancy element~~ Buoyancy tank is a riser component having positive buoyancy which is fixed to the riser for creating tensile forces.".

Para 1.2.2 is amended as follows:

"**1.2.2 Abbreviations.**
FOP – fixed offshore platform.
SP – subsea pipeline.
SPS – subsea production system.
FPU – floating offshore oil-and-gas ~~production~~ product unit.
~~FSPM – floating single point mooring.~~"

Para 1.5.3.3 is amended as follows:

"**.3** drawings of the riser pipe connectors and the riser/riser pipe connection to FPU/~~FSPM/~~FOP and SPS;".

Para 1.5.4.3 is amended as follows:

"**.3** calculation of the riser dynamics under the effect of current, waves and FPU~~/FSPM~~ displacements, as well as interaction with SPS or seabed soil;".

2 DESIGN LOADS

Para 2.1.6 is amended as follows:

"**.6** reactions in the riser connection to FPU~~/FSPM~~ induced by ~~their~~ the deviation thereof from the equilibrium condition due to the combined effects of waves, wind, surface sea current and operation of tensile legs and dynamic positioning and mooring systems;".

Para 2.6 is amended as follows:

"**2.6** Reactions of members in way of the riser connections to FPU/~~/FSPM~~ and SPS (seabed soil) are determined for the FPU~~/FSPM~~ deviations from the equilibrium condition due to the combined effects of waves, wind, surface sea current with 10^{-2} 1/year probability and effectively functioning positioning system.".

3 REQUIREMENTS FOR DETERMINING RISER DYNAMIC RESPONSE TO ENVIRONMENTAL CONDITIONS AND LOADS

Para 3.1.1.2 is amended as follows:

"**.2** determining the production riser dynamic response to the effect of current, waves, as well as the effects of interaction with SPS (or seabed soil) or FPU~~/FSPM~~, when displaced;".

Para 3.2.3 is amended as follows:

"**3.2.3** The riser elastic static line shall be calculated with due account for the following impact loads:

gravity;

buoyancy;

temperature loads;

reactions in the riser connection to SPS or interaction with the seabed soil;

reactions of the riser connection to FPU~~/FSPM~~/FOP in still water.".

Para 3.3.1 is amended as follows:

"**3.3.1** Dynamic response of the riser shall be determined according to the methodology approved by the Register using numeric methods. Elastic static line of the riser shall be taken as the riser initial position. The following environmental loads shall be taken into account in dynamic calculation:

gravity (similar to the elastic static line calculation) and added masses of water;

buoyancy (similar to the elastic static line calculation);

temperature (similar to the elastic static line calculation);

hydrodynamic due to the current, including vortex-induced vibration;

hydrodynamic due to the water wave motion;

reactions to the riser connection to SPS or interaction with seabed soil;

reactions in the riser connection to FPU~~/FSPM~~ induced by ~~their~~ the deviation thereof from the equilibrium condition due to the combined effects of waves, wind, surface sea current and operation of tensile legs and dynamic positioning and mooring systems.".

Para 3.3.2 is amended as follows:

"**3.3.2** When considering the riser-to-FPU/~~FSPM~~/FOP interaction availability of the riser tensioner system and/or vertical motion compensators shall be taken into account, as well as the mode of movement of the conveyed medium through the riser pipe.".

Para 3.3.3 is amended as follows:

"**3.3.3** It is recommended to use a method of 3-D mathematical simulation of the riser- to-FPU/~~FSPM~~/FOP joint dynamics that shall result in the total maximum values of internal forces in the riser, namely: axial force, bending and torsional moments.".

6 RISER CONSTRUCTION, INSTALLATION AND TESTING

Para 6.1.5 is amended as follows:

"**.5** requirements to the riser/riser system installation and connection to the FPU/~~FSPM~~/FOP or SPS systems and facilities.".

Para 6.3 is amended as follows:

"**6.3** The riser pipe shall be provided with shut-off valves both on the respective SPS component and on FPU/~~FSPM~~/FOP.".

Para 6.8 is amended as follows:

"**6.8** The riser shall be pressure tested after its complete installation and connection to the FPU/~~FSPM~~/FOP and SPS systems and facilities. During the riser pipe manufacture at the pre-manufacture stage the riser pipe hydraulic strength testing prior to the riser installation is allowed as agreed by the Register.".

Para 6.11 is amended as follows:

"**6.11** The riser steel pipe shall be hydraulic-strength tested by test pressure equal to at least 1,25 times design pressure. When testing the riser pipe after installation the maximum permissible environmental loads acting on the riser during the tests (waves, current, displacements of the riser connections to FPU/~~FSPM~~ or SPS) shall be agreed upon with the Register. The test pressure holding time shall be not less than 12 h.".

7 RISER MAINTENANCE AND REPAIR

Para 7.2.2.1 is amended as follows:

"**.1** survey of underwater and above water (if there are riser sections above water) parts of risers, including monitoring of:

general condition of structures, systems, equipment and facilities of the riser/riser system;

riser pipes and umbilicals;

riser connections to the SPS and FPU~~/FSPM~~/FOP components, including tension system, angular and vertical motion compensators, on turrets or submerged buoys;

condition of corrosion-protection coating and cathodic protection/galvanic anode system;

condition of buoyancy elements/swamp weights and their connectors;".

Para 7.2.2.7 is amended as follows:

"**.7** surveys of valves (may be performed during the surveys of SPS and FPU~~/FSPM~~/FOP, when installing fittings on these items).".

Para 7.2.4 is amended as follows:

"**7.2.4** Survey of the riser connections to the SPS or FPU~~/FSPM~~/FOP components on agreement with the Register may be performed during periodical surveys of the FPU~~/FSPM~~/FOP (including turrets and submerged buoys), and SPS (including riser foundations and connections to the SPS components).".

APPENDIX 2

INDICES OF RISK ANALYSIS

Para 4.1 is amended as follows:

"**4.1** Societal risk characterizes the scale of possible accidents and catastrophes and is determined as a function called *FN*-curve. Depending on the purpose of the analysis, *N* may mean either the total number of people affected or the number of fatalities or another indicator of severity of consequences. *F* means the frequency of events with a severity of consequences exceeding the given value *N*. The example of plotting *FN*-curves is given in ~~the Rules for the Classification and Equipment of MODU/FOP~~ Part XV "Safety Assessment" of the FOP Rules.".

APPENDIX 3

METHODS OF RISK ANALYSIS

Para 1.3 is amended as follows:

"**1.3** The result of the checklist method is a list of questions and answers regarding compliance of the subsea pipeline with safety requirements. An example of drawing up of the checklist for the analysis of accident situation is given in ~~the Rules for the Classification and Equipment of MODU/FOP~~ the FOP Rules.".

Para 4.2 is amended as follows:

"**4.2** Fault tree analysis (FTA) permits to detect combinations and sequence of equipment and component failures, personnel errors and external (technogenic, natural) effects causing the main event, i.e. an accident. The FTA method is used for analysis of likely

causes of accident occurrence and calculation of frequency based on the knowledge of initial event frequencies. Examples of construction and application of the fault tree for analysis of accidents is given in ~~the Rules for the Classification and Equipment of MODU/FOP~~ Part XV "Safety Assessment" of the FOP Rules.".

APPENDIX 7

STRENGTH AND STABILITY OF RISER PIPES MADE OF COMPOSITE MATERIALS[1]

Table 2.4.1 is amended as follows:

"Table 2.4.1

Load effect factors

Type of load	γ_F
External hydrostatic pressure Internal fluid pressure: hydrostatic and dynamic Water levels	1,2
Weight and buoyancy of a riser, coating, fouling, anodes, buoyancy modules, contents and outfit Internal fluid weight Riser tension Applied displacements and loads induced by the active FPU~~/FSPM~~ positioning Thermal stresses Interaction with soil	1,1
Waves Internal waves and other effects due to the water density difference Currents Earthquakes Offsets of FPU~~/FSPM~~ due to the wind, waves and currents: mean offset due to the steady wave drift forces, wind forces and currents; vibrations; low-frequency oscillations	1,3

".

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