



Construction Survey of Steel Structures of Offshore Units and Installations

May 2006

**Rule Note
NR 426 DT R01 E**

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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.

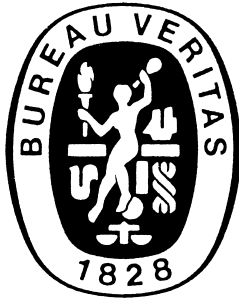
12.3. - **Other disputes over the present General Conditions or over the Services of the Society are exclusively submitted to arbitration, by three arbitrators, in London according to the Arbitration Act 1996 or any statutory modification or re-enactment thereof. The contract between the Society and 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 426

Construction Survey of Steel Structures of Offshore Units and Installations

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SECTION 1

GENERAL

1 Scope - Classification requirements

1.1

1.1.1 The present Rule Note applies to the construction of steel structures of mobile offshore units and fixed offshore installations intended to be classed under survey of, or certified by, the Society.

Note 1: The attention of the Builder is drawn upon the fact that the present Rule Note is intended to be used as specified by the applicable Rules for the Classification or by an agreed certification scope, these documents being liable to contain or refer to specific requirements not included in the present Rule Note.

1.1.2 As soon as the Builder's contract for a structure meeting the scope of [1.1.1] has been awarded, the Builder is to contact the Surveyor of the Society and give him all information needed to perform survey of the construction.

In case of subcontract of a part of the structure, the Builder is to prescribe the requirements of the present Rule Note to his subcontractor.

1.1.3 As a general rule, the fabrication documents, such as:

- quality control plans
- fabrication drawings
- fabrication procedures, such as:
 - Shipyard fabrication standards
 - welding procedure specifications and existing qualifications
 - welding sequences
 - welders existing qualifications
 - procedures for consumable handling and storage
 - forming procedures and existing qualifications
 - straightening procedures
 - heat treatment procedures
- testing procedures, such as:
 - NDT procedures
 - hydraulic testing procedures
 - functional testing procedures
- material certificates,

are to be provided to the Surveyor for review before the construction starts.

1.1.4 As a general rule, construction and all necessary inspections, tests and qualification tests are to be made under the Surveyor's survey and to his satisfaction. They include:

- additional qualifications of steel welders and operators
- additional welding procedure qualifications
- additional forming procedure qualifications
- inspections during fabrication

- material inspections
- final tests and trials.

Note 1: In this requirement, "Surveyor's survey" is to be understood as "surveillance by means of at-random inspections and examinations".

1.1.5 The requirements of the present Rule Note are formulated for structures the design and construction of which are of normal practice; where appropriate, the Surveyor may adapt them or call for additional requirements to meet the intent of the Rules.

1.1.6 The requirements of the present Rule Note may, at the discretion of the Society, be alleviated in the case of successive units or installations built under the Society's survey which are of one design or undergo only minor alterations. In this case, the party applying for classification is to give all necessary information about these alterations of design or construction conditions in due time.

1.1.7 The present Rule Note specifies requirements for construction in C-Mn steel.

1.1.8 The requirements of NR216 "Rules on Materials and Welding for the Classification of Marine Units" are applicable to materials used for the construction like steel plates, sections, welded and seamless pipes, forgings, castings, welding consumables etc.

2 Symbols and abbreviations

2.1

2.1.1 Symbols

In addition to the symbols defined in the text, the following symbols are used throughout the present Rule Note:

- | | |
|----------|--|
| a | : Throat thickness, in mm, of a fillet weld |
| D_e | : External diameter of a pipe |
| e | : Plate or pipe thickness, in mm; for butt welds of elements having different thicknesses, e stands for the thickness of the thinner one |
| R_{eG} | : Minimum specified yield strength, in MPa |
| R_r | : Ultimate tensile strength, in MPa |
| S | : Weld root spacing between the edges to be welded, in mm. |

2.1.2 Abbreviations

The following abbreviations are used in the present Rule Note and/or certificates, survey reports and other related documents:

- | | |
|------|----------------------------------|
| CTOD | : Crack tip opening displacement |
| CVN | : Charpy V-notch |
| DPI | : Dye-penetrant inspection |

FCAW	: Flux-cored arc welding
FL	: Fusion line
FL+2	: Fusion line + 2 mm
GMAW	: Gas metal arc welding
GTAW	: Gas tungsten arc welding
HAZ	: Heat affected zone
KVL	: Minimum value of impact energy of the steel (in joules) in longitudinal direction
KVT	: Minimum value of impact energy of the steel (in joules) in transverse direction
MPI	: Magnetic particle inspection
NDT	: Non-destructive testing
SAW	: Submerged arc welding
SMAW	: Shielded metal arc welding
PQR	: Procedure qualification record
PWHT	: Postweld heat treatment
pWPS	: Preliminary welding procedure specification.
TKV	: Temperature of CVN test
UT	: Ultrasonic testing
WPQ	: Welding procedure qualification
WPS	: Welding procedure specification.

3 Structural categories

3.1 General

3.1.1 Structural elements in welded steel constructions are classed into three categories: second, first and special categories.

3.1.2 Second category elements are structural elements of minor importance, the failure of which might induce only localized effects.

3.1.3 First category elements are main load carrying elements essential to the overall structural integrity of the unit or installation.

3.1.4 Special category elements are parts of first category elements located in way or at the vicinity of critical load transmission areas and of stress concentration locations.

3.1.5 The Society may, where deemed necessary, upgrade any structural element to account for particular considerations such as novel design features or restrictions regarding access for quality control and in-service inspections.

3.1.6 Structural categories are to be indicated on the drawings submitted to the Society for approval.

3.2 Self-elevating units

3.2.1 The indications given are for guidance only. The actual categories are to be determined in accordance with [3.1], taking into account the actual design of the unit.

3.2.2 The following elements are normally to be classed in the special category:

- connection of legs with mat structure for mat type self-elevating units
- nodes in chord of truss legs
- nodes in truss or jackhouses of complex design
- cast steel nodes
- padeyes or bearing members for jacking and leg-locking.

3.2.3 The following elements are normally to be classed in the first category:

- deck plating, bottom plating, side shell and bulkhead platings belonging to main structure of the upper hull
- external platings of cylindrical legs
- chords and main bracings of truss legs, except part classed in the special category
- shell plates of boxed jackhouses and main girders of truss jackhouses
- platings and bulkheads in spudcans
- deck plating, shell plating and bulkheads in mat structure.

3.2.4 Second category elements are structural elements which are classed neither in the special nor in the first categories.

3.3 Column stabilized units

3.3.1 The indications given are for guidance only. The actual categories are to be determined in accordance with [3.1], taking into account the actual design of the unit.

Particular attention is to be given to areas of difficult access and to elements exposed to external damages.

3.3.2 The following structural elements are normally to be classed in the special category:

- deck, bottom, side and bulkhead platings of upper hull at locations of major concentrated loads
- shell at connections between columns and upper hull or lower pontoons
- load-transferring elements at connections of main structural elements (bracings, columns, upper hull, lower pontoons)
- bracings in the vicinity of connections to upper hull, columns, lower pontoons and major bracing intersections.

3.3.3 The following structural elements are normally to be classed in the first category, except parts classed in the special category:

- bracings
- deck, bottom, side or bulkhead platings belonging to main structure of the upper hull
- external shell of columns
- deck, bottom, side and bulkhead platings of lower pontoons
- bulkheads, flats, frames and local reinforcements transferring loads at major intersections.

3.3.4 Second category elements are structural elements which are classed neither in the special nor in the first categories.

3.4 Surface units

3.4.1 The following indications are given for guidance only and apply to typical units (refer also to [3.4.5]).

For units with unusual distribution of weights or particular loadings the categories are to be determined in accordance with the intent of [3.1].

3.4.2 Particular locations falling within definition of [3.1.4] are normally to be classed in the special category.

3.4.3 The following structural elements are normally to be classed in the first category:

- bilge, sheerstrake and stringer plates within the whole length of the unit
- deck plating in way of superstructure ends
- deck and bottom platings in midships region or a larger region if necessary on account of unusual weights or loads distribution
- upper and lower strakes of longitudinal bulkheads in midships region or a larger region if necessary on account of unusual weights or loads distribution
- other locations falling within definition of [3.1.3].

3.4.4 Second category elements are structural elements which are classed neither in the special nor in the first categories.

3.4.5 For surface units with structural type and service notation as defined in Part D, Chapter 1, Sec 4, [1.2] of the "Rules for the Classification of Offshore Units", the structural categories to take into account are those defined as "ship area" or "offshore area" (see Part D, Chapter 1, Sec 3, [1.1] of the "Rules for the Classification of Offshore Units").

Note 1: These structural type and service notation concern the following surface units:

- offshore service barge – oil storage
- offshore service barge – production
- offshore service barge – oil storage/production
- oil tanker ESP/offshore service ship – oil storage
- oil tanker ESP/offshore service ship – production
- oil tanker ESP/offshore service ship – oil storage/production

3.5 Substructures of fixed platforms (jackets)

3.5.1 The indications given are for guidance only. The actual categories are to be determined in accordance with [3.1] taking into account the actual design of the jacket.

3.5.2 The following structural elements are normally to be classed in the special category:

- all nodes on legs (main legs, skirts, chords of launchways), including cans, brace stubs (if any), ring stiffeners and other reinforcements
- whole legs where no can exists
- complex nodes between bracings of jacket rows
- padeyes for lifting or upending of jacket, including supporting cans, ring stiffeners and other reinforcements
- leg to pile connection pieces.

3.5.3 The following structural elements are normally to be classed in the first category, except parts classed in special category:

- legs (main legs, skirts, chords of launchways)
- all foundation piles
- bracings of rows and levels
- external or internal stiffening of legs
- framing or members supporting conductors, risers and essential caissons
- any attachment pieces onto special category elements.

3.5.4 The following structural elements are normally to be classed in the second category:

- mudmats
- additional temporary bracings for mudmats or launchways
- minor attachment pieces onto first category elements.

3.6 Topsides of fixed platforms

3.6.1 The indications given are for guidance only. The actual categories are to be determined in accordance with [3.1] taking into account the actual design of the topsides.

3.6.2 The following structural elements are normally to be classed in the special category, in the same conditions than in [3.5.2]:

- nodes of deck legs
- padeyes and adjacent structures.

3.6.3 The following structural elements are normally to be classed in the first category, except parts classed in the special category:

- deck legs
- heavily loaded elements forming main truss or frames of integrated decks, support frames or heavy modules
- structure supporting crane pedestals, large flare towers or long span bridges
- helideck frames
- primary framing of large flare towers or long span bridges
- all parts of nodes in above constructions
- connecting parts of important elements to legs.

3.6.4 Second category elements are structural elements which are classed neither in the special nor in the first categories.

3.7 Particulars items

3.7.1 The indications given are for guidance only. The actual categories are to be determined in accordance with [3.1] taking into account the actual design of the unit or installation.

3.7.2 The following structural elements are normally to be classed in the special category:

- padeyes and adjacent parts when used for essential operations
- connecting parts of crane pedestals to main structure.

3.7.3 The following structural elements are normally to be classed in the first category:

- legs and main beams of drill floor substructure of surface and column-stabilized units
- cantilever beams and substructure of drill floor (legs and main beams) of self-elevating units
- crane pedestals.

3.7.4 A weld is to be classed in the same category than the category of the element on which welding is performed. In case of a weld connecting two elements classed in different categories, the weld is to be classed in the category of the higher classed element.

SECTION 2

FORMING

1 Cold forming

1.1 General

1.1.1 Cold forming means forming at temperature not exceeding 250°C in general.

1.1.2 Usual cold forming processes are cold rolling or cold pressing of plates to cylindrical forms, cold bending of pipes and cold forming of plates into spherical shapes etc.

1.1.3 The cold forming process is to be such as not to impair the material properties. The effect of work hardening is to be considered and suitable heat treatment is to be applied as far as necessary.

1.2 Forming procedure

1.2.1 The cold forming is to be within the deformation range specified by the steel manufacturer for the products involved.

The deformation is to be calculated using a formula adapted to the product and the forming process and is to be submitted to the Society.

For cold rolling of plates, the deformation "A" is to be calculated using the following formula where R_i is the inner forming radius, or an equivalent formula accepted by the Society:

$$A = 100 \frac{e}{2R_i + e}$$

For values of deformation above the limit specified by the steel manufacturer or 5%, whichever is the less, a heat treatment is to be performed after cold forming.

The heat treatment may be omitted if strain ageing tests are performed with satisfactory results in accordance with [2.2.2].

1.2.2 Where applicable strain ageing tests are to be performed according to the following procedure:

- A sample is cold formed under the same conditions as those used for fabrication or is permanently strained to the expected permanent elongation used in fabrication.
- The sample is then subjected to an artificial ageing at 250°C for 1 hour.
- One set of three Charpy V-notch test specimens is taken in the strained sample artificially aged. The notch is to be located in the plastically strained area, in the part of the cross section with the highest strain. The longitudinal axis of the specimen is to be located in such way to test in the same direction as required by the base material specification.

- The impact testing temperature and the minimum average energy required are to be in accordance with the base material specification.
- One cylindrical tensile test specimen is to be taken and tested in order to check the tensile properties in the strained zone.

If the test results do not satisfy the base material specification, a suitable heat treatment procedure is to be qualified by tests agreed with the Society.

1.2.3 The cold bending of plates using a press for free bending is to be made using a punch with a sufficient radius in order to avoid excessive localized deformation in the outer side of the plate.

Welding in the bent area of plates intended for special category element is to be avoided. In other cases, such welding is subject to qualification tests on a representative sample.

2 Hot forming

2.1 General

2.1.1 Hot forming means forming at temperature exceeding 250°C in general.

2.1.2 The hot forming process is to be such as not to impair the material properties.

2.2 Hot forming procedure

2.2.1 The conditions of the hot forming of steel plates are to be described in a procedure prepared by the Builder with sufficient details and submitted to the Society.

2.2.2 The hot forming is to be in accordance with any limitations specified by the steel manufacturer for the products involved. Particular attention is to be paid to products rolled using thermomechanical controlled process (TM or TMCP).

2.2.3 If forming temperature is greater than 500°C, a suitable heat treatment is to be carried out after forming.

2.2.4 The forming procedure, together with any eventual subsequent heat treatment, is to be subject to qualification test on sample reproducing all conditions intended for production heat forming. The qualification tests are to include, as a minimum, a set of three Charpy V notch impact tests and one cylindrical tensile test. The results are to be in accordance with the base material specification.

2.2.5 In each case, when hot forming is subsequent to heat treatment, the Builder is to demonstrate to the Society that forming process and operating conditions are such as not to impair the material properties.