

No. 11 Materials Selection Guideline for Mobile Offshore Drilling Units

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Material selection for surface (ship or barge) type units is to be based on the material requirements contained in the Rules of the Classification Society. Structural elements for self-elevating and column stabilized units are to be considered in association with a defined minimum service temperature, influencing factors and application.

1. Minimum Service Temperature of Material

The minimum service temperature of the steel should be assumed equal to the lowest of the average daily atmospheric temperatures, based on meteorological data, for any anticipated area of operation. If data giving the lowest daily average temperature is not available and some other criterion is used (such as lowest monthly average temperature), the Classification Society should use this Guideline with discretion.

2. Influencing Factors

A particular application in association with a defined minimum service temperature depends on toughness parameters, taking the following influencing factors into account:

- a) Stress Relieving: A lower service temperature than stipulated in the Tables for the relevant steel grade may be considered when a stress relieving heat treatment is employed.
- b) Cold Forming: When cold forming subjects the extreme fibre to greater than about 3% strain consideration should be given to applying a suitable heat treatment.
- c) Steel Manufacturing Process: When a steel manufacturing process, such as normalizing, controlled or TM rolling, or grain refinement, is utilized when not specifically required by Requirement W11, a lower service temperature may be used subject to agreement of the Classification Society.

3. Application

3.1 Categories of Structural Members

For the purpose of this guide, structural members have been grouped into three application categories of increasing importance as follows:

- a) Secondary: Structural elements of minor importance, failure of which is unlikely to affect the overall integrity of the unit.
- b) Primary: Structural elements essential to the overall integrity of the unit.
- c) Special: Those portions of primary structural elements which are in way of critical load transfer points, stress concentrations, etc.

Some specific examples of structural elements which would fall into the aforementioned categories are as follows.

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(cont)**3.2 Column Stabilized Units**

3.2.1 Secondary Applications Structure

- a) internal structure including bulkheads and girders in vertical columns, decks, lower hulls, and diagonal and horizontal bracing, and framing members
- b) upper platform decks, or decks of upper hulls except areas where the structure is considered primary or special application
- c) certain large diameter vertical columns with low length to diameter ratios, except at intersections

3.2.2 Primary Application Structure

- a) external shell structure of vertical columns, lower and upper hulls, and diagonal and horizontal braces
- b) deck plating, heavy flanges, and bulkhead within the upper hull or platform which form "Box" or "I" type supporting structure which do not receive major concentrated loads
- c) bulkheads, flats or decks and framing which provide local reinforcement or continuity of structure in way of intersections except areas where the structure is considered special application

3.2.3 Special Application Structure

- a) external shell structure in way of intersections of vertical columns, decks and lower hulls
- b) portions of deck plating, heavy flanges, and bulkheads within the upper hull or platform which form "Box" or "I" type supporting structure which receive major concentrated loads
- c) major intersections of bracing members
- d) external brackets, portions of bulkheads, flats, and frames which are designed to receive concentrated loads at intersections of major structural members
- e) "through" material used at connections or vertical columns, upper platform decks, and upper or lower hulls which are designed to provide proper alignments and adequate load transfer

**No.
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(cont)**3.3 Self-Elevating Units**

3.3.1 Secondary Application Structure

- a) internal framing, including bulkheads and girders, in cylindrical legs
- b) internal bulkheads and framing members of upper hull structure
- c) internal bulkheads of bottom mat supporting structure except where the structure is considered primary or special application
- d) deck, side and bottom plating of upper hull except where the structure is considered primary application

3.3.2 Primary Applications Structure

- a) external plating of cylindrical legs
- b) plating of all components of lattice type legs
- c) combination of bulkhead, deck, side and bottom plating within the upper hull which form "Box" or "I" type main supporting structure
- d) jack-house supporting structure and bottom footing structure which receives initial transfer of load from legs
- e) internal bulkheads, shell and deck of bottom mat supporting structure which are designed to distribute major loads, either uniform or concentrated, into the mat structure

3.3.3 Special Application Structure

- a) vertical columns in way of intersection with the mat structure.
- b) intersections of lattices type leg structure which incorporate novel construction, including the use of steel castings.

3.4 Thickness limitations and grade remark

Table 1 provides thickness limitations in function of the application category, steel grade and minimum design temperature of the considered structural element.

When an owner or designer specifies material grades which exceed that indicated by Table 1 (and when they have been approved), approval of materials of lesser quality should not be considered without the written consent of the owner or designer.

Table 1: Thickness limitations (mm) of hull structural steel according to W11 and W16 for various application categories and design temperatures

Category	Grades	Minimum Design Temperature					
		0°C	-10°C	-20°C	-30°C	-40°C	-50°C
SECONDARY	A	30	20	10	X	X	X
	B	40	30	20	10	X	X
	D	50	50	45	35	25	15
	E	50	50	50	50	45	35
	A32 to A40	40	30	20	10	X	X
	D32 to D40	50	50	45	35	25	15
	E32 to E40	50	50	50	50	45	35
	F32 to F40	50	50	50	50	50	50
	AH420 to AH690	40	25	10	X	X	X
	DH420 to DH690	50	45	35	25	15	X
	EH420 to EH690	50	50	50	45	35	25
FH420 to FH690	50	50	50	50	50	45	
PRIMARY	A	20	10	X	X	X	X
	B	25	20	10	X	X	X
	D	45	40	30	20	10	X
	E	50	50	50	40	30	20
	A32 to A40	25	20	10	X	X	X
	D32 to D40	45	40	30	20	10	X
	E32 to E40	50	50	50	40	30	20
	F32 to F40	50	50	50	50	50	40
	AH420 to AH690	20	X	X	X	X	X
	DH420 to DH690	45	35	25	15	X	X
	EH420 to EH690	50	50	45	35	25	15
FH420 to FH690	50	50	50	50	45	35	
SPECIAL	A	X	X	X	X	X	X
	B	15	X	X	X	X	X
	D	30	20	10	X	X	X
	E	50	45	35	25	15	X
	A32 to A40	15	X	X	X	X	X
	D32 to D40	30	20	10	X	X	X
	E32 to E40	50	45	35	25	15	X
	F32 to F40	50	50	50	50	40	30
	AH420 to AH690	X	X	X	X	X	X
	DH420 to DH690	25	15	X	X	X	X
	EH420 to EH690	50	40	30	20	10	X
FH420 to FH690	50	50	50	40	30	20	

NOTES:

1. Thicknesses greater than shown in the Table will be specially considered by the Classification Society.
2. Substitution of materials considered to be equivalent to the Grades shown, or steels of different strength levels, will be specially considered by the Classification Society.
3. Interpolation of thicknesses for intermediate temperatures may be considered.
4. "X" indicates no application
5. Material delivery conditions as specified in UR W11 UR W16.
6. For grades A32 to F40: The letter "H" may be added either in front or behind the grade mark e.g. HA 32 or AH 32.

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