



**GUIDE FOR BUILDING AND CLASSING**

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## **MOBILE OFFSHORE UNITS**

**JULY 2008 (Updated August 2012 – see next page)**

**American Bureau of Shipping  
Incorporated by Act of Legislature of  
the State of New York 1862**

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## **Updates**

### **August 2012 consolidation includes:**

- June 2011 version plus Notice No. 4 and Corrigenda/Editorials

### **June 2011 consolidation includes:**

- November 2010 version plus Notice No. 3

### **November 2010 consolidation includes:**

- May 2010 version plus Notice No. 2

### **May 2010 consolidation includes:**

- July 2008 version plus Notice No. 1 and Corrigenda/Editorials

## **Foreword** (1 May 2010)

This Guide specifies the ABS requirements for building and classing Mobile Offshore Units of self-elevating or column-stabilized type, not fitted with drilling equipment, production facilities, hydrocarbon storage, or any other system onboard handling hydrocarbons. Examples of Mobile Offshore Units covered by this Guide are:

- Accommodation Units
- Crane Units
- Construction and Maintenance Units
- Drilling Tenders
- Pipe and Cable Laying Units
- Wind Turbine Installation, Maintenance and Repair Units

and similar units used by the offshore industry.

The requirements contained in this Guide are for design, construction, and survey after construction of the Mobile Offshore Unit (including hull structure, equipment and marine machinery) and are based on the *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)*. Reference tables are provided to identify the requirements in the *MODU Rules* applicable to the Mobile Offshore Units.



## GUIDE FOR BUILDING AND CLASSING MOBILE OFFSHORE UNITS

### CONTENTS

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<b>CHAPTER 1</b>	<b>Scope and Conditions of Classification (Supplement to the ABS Rules for Conditions of Classification – Offshore Units and Structures)</b> .....	<b>1</b>
	Section 1 Classification .....	2
	Section 2 Classification Symbols and Notations .....	3
	Section 3 Rules for Classification .....	6
	Section 4 Plans and Design Data to be Submitted .....	7
	Section 5 Operating Manual .....	8
	[See also separately published booklet <i>ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)</i> ]	
<b>CHAPTER 2</b>	<b>General</b> .....	<b>10</b>
	Section 1 Definitions .....	11
	Section 2 Environmental Loadings .....	13
	Section 3 Material Selection .....	14
<b>CHAPTER 3</b>	<b>Hull Construction and Equipment</b> .....	<b>15</b>
	Section 1 Plans and Design Data to be Submitted .....	17
	Section 3 Hull Structures and Arrangements .....	19
	Section 3 Stability and Watertight/Weathertight Integrity .....	24
	Section 4 Position Mooring Systems .....	27
<b>CHAPTER 4</b>	<b>Machinery and Systems</b> .....	<b>28</b>
	Section 1 Machinery, Equipment and Their Installation .....	30
	Section 2 Pumps and Piping Systems .....	32
	Section 3 Electrical Installations .....	37
<b>CHAPTER 5</b>	<b>Fire and Safety – Measures and Features</b> .....	<b>47</b>
	Section 1 Passive Fire Protection .....	48
	Section 2 Active Fire Protection Systems and Equipment .....	50
	Section 3 Outfitting .....	53
<b>CHAPTER 6</b>	<b>Equipment and Machinery Certification</b> .....	<b>54</b>
	Section 1 Material, Marine Equipment and Machinery Certification .....	55

<b>CHAPTER 7</b>	<b>Surveys</b> .....	<b>61</b>
Section 1	Testing and Trials .....	63
Section 2	Surveys After Construction .....	71
<b>CHAPTER 8</b>	<b>Specific Unit Types</b> .....	<b>77</b>
Section 1	Accommodation Units .....	79
Section 2	Crane Units .....	82
Section 3	Construction and Maintenance Units .....	84
Section 4	Drilling Tenders .....	86
Section 5	Pipe and Cable Laying Units .....	88
<b>Section 6</b>	<b>Wind Installation, Maintenance, and Repair Units</b> .....	<b>90</b>
<b>Section 7</b>	<b>Multipurpose Units</b> .....	<b>93</b>
Appendix 1	Stability Criteria for Counter-Ballasted Crane Units .....	94

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CHAPTER **1** **Scope and Conditions of Classification**  
 (Supplement to the ABS Rules for Conditions of  
 Classification – Offshore Units and Structures)

**CONTENTS**

<b>SECTION 1</b>	<b>Classification</b> .....	<b>2</b>
<b>SECTION 2</b>	<b>Classification Symbols and Notations</b> .....	<b>3</b>
1	Units Built Under Survey.....	3
1.1	Self-Elevating Units .....	3
1.3	Column-Stabilized Units .....	3
1.5	Specific Unit Types.....	3
3	Service Limitations .....	3
5	Units Not Built Under Survey .....	3
7	Temporary Mooring Equipment and Systems .....	3
9	Position Mooring Equipment and Systems .....	4
9.1	Symbol <b>M</b> for Position Mooring Equipment .....	4
9.3	Symbol <b>P</b> for Position Mooring System .....	4
11	Propulsion Machinery .....	4
13	Thrusters .....	4
15	Dynamic Positioning Systems .....	4
17	Ice Strengthening.....	4
19	Automatic or Remote Control and Monitoring Systems.....	4
19.1	<b>ACC</b> or <b>ACCU</b> Notations.....	4
19.3	<b>AMCC</b> or <b>AMCCU</b> Notations.....	5
<b>SECTION 3</b>	<b>Rules for Classification</b> .....	<b>6</b>
1	Application of Rules .....	6
1.1	General.....	6
1.3	Application.....	6
<b>SECTION 4</b>	<b>Plans and Design Data to be Submitted</b> .....	<b>7</b>
1	Hull and Design Data .....	7
3	Machinery Plans .....	7
5	Calculations .....	7
7	Additional Plans .....	7
9	Submissions.....	7
<b>SECTION 5</b>	<b>Operating Manual</b> .....	<b>8</b>



## CHAPTER 1 **Scope and Conditions of Classification**

### SECTION 1 **Classification**

The requirements for conditions of classification are contained in the separate, generic *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*.

Additional requirements specific to mobile offshore units are contained in the following Sections of this Guide.





## CHAPTER 1 Scope and Conditions of Classification

### SECTION 2 Classification Symbols and Notations

A listing of Classification Symbols and Notations available to the Owners of vessels, offshore drilling and production units and other marine structures and systems, “List of ABS Notations and Symbols” is available from the ABS website “<http://www.eagle.org>”.

The following notations are specific to mobile offshore units.

#### 1 Units Built Under Survey

Mobile Offshore Units which have been built to the satisfaction of the ABS Surveyor, to the full requirements of the applicable Rules and this Guide or their equivalent, where approved by the Committee, will be classed and distinguished in the *Record* by the symbols **✕ A1** followed by the notation to the type of unit as follows.

##### 1.1 Self-Elevating Units

Units of this type, as described in 2-1/5.1, will be assigned a notation of **Self-Elevating Unit**.

##### 1.3 Column-Stabilized Units

Units of this type, as described in 2-1/5.3, will be assigned a notation of **Column-Stabilized Unit**.

##### 1.5 Specific Unit Types (1 May 2010)

Notations for specific types of units are given in the relevant Sections of Chapter 8.

#### 3 Service Limitations

This Guide is intended for units designed for unrestricted service. Units which are not designed to meet the full criteria for unrestricted service will be classed with a notation **Restricted Service**. See also Chapter 1, Section 5 of this Guide.

#### 5 Units Not Built Under Survey

Units which have not been built under ABS survey, but which are submitted for classification will be subject to a special classification survey. Where found satisfactory and thereafter approved by the Committee, they will be classed and distinguished in the *Record* by the symbols and notations as described in 1-2/1 and 1-2/11, but the mark **✕** signifying survey during construction will be omitted.

#### 7 Temporary Mooring Equipment and Systems (1 August 2012)

Temporary mooring is intended for release at anchor or in an emergency while the unit is in the transit mode.

The symbol **Ⓜ** will be placed after the symbols of classification to signify that the equipment for **anchoring (temporary mooring)** of the unit is in compliance with 3-4-1/3 of the *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)*.

For self-propelled units, symbol **Ⓜ** is mandatory and all **anchoring (temporary mooring)** equipment is to be fabricated and tested in presence of and to the satisfaction of the attending Surveyor, and certified in accordance with 6-1-10/Table 1 of the *MODU Rules*.

For non-propelled units fitted with an anchoring (temporary mooring) equipment, if the optional symbol **ⓔ** is requested, equipment is to be fabricated and tested in presence of and to the satisfaction of the attending Surveyor, and certified in accordance with 6-1-10/Table 1 of the *MODU Rules*.

## 9 Position Mooring Equipment and Systems (1 August 2012)

Position mooring is intended for maintaining position during the operation of the unit.

### 9.1 Symbol **Ⓜ** for Position Mooring Equipment

The symbol **Ⓜ** will be placed after the symbols of classification, provided the position mooring equipment, certified by ABS in accordance with the optional class service requested by the Owner, at least complies with 3-4-1/5 of the *MODU Rules* and with requirements of the Owner's specification.

### 9.3 Symbol **Ⓟ** for Position Mooring System

The symbol **Ⓟ** will be placed after the symbols of classification to signify that the position mooring systems, certified by ABS in accordance with the optional class service requested by the Owner, are in compliance with Appendix 3-4-A1 of the *MODU Rules* and 3-4-1/7 of the *MODU Rules* and with requirements of the Owner's specification.

## 11 Propulsion Machinery

Propulsion machinery and boilers which are required for propulsion and which have been constructed and installed to the satisfaction of the Surveyor, to the full requirements of these Rules or their equivalent, when found satisfactory after a trial and approved by the Committee, will be classed and distinguished in the *Record* by the notation **⊠ AMS**.

## 13 Thrusters

Thruster machinery for propulsion assist or athwartship thrust complying with Section 4-3-5 of the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*, manufactured and installed under ABS survey and found satisfactory after trials, will be distinguished in the *Record* by the notation **⊠ PAS** or **⊠ APS**, as appropriate.

## 15 Dynamic Positioning Systems

Dynamic positioning systems complying with the requirements of Section 4-3-5 of the *Steel Vessel Rules*, manufactured and installed under ABS survey and found satisfactory after trials, will be distinguished in the *Record* by the notation **⊠ DPS-0**, **⊠ DPS-1**, **⊠ DPS-2** or **⊠ DPS-3**, as appropriate.

## 17 Ice Strengthening

A notation **Ice Strengthening** will be added in the *Record* for units that comply with Appendix 3-2-A1 of the *MODU Rules*.

## 19 Automatic or Remote Control and Monitoring Systems

### 19.1 **⊠ ACC** or **⊠ ACCU** Notations

For automatic or remote control and monitoring systems of the propulsion machinery, ABS will consider additional classifications with symbols **⊠ ACC** or **⊠ ACCU**, as appropriate, provided that the applicable requirements of Part 4, Chapter 9 of the *Steel Vessel Rules* are satisfied.

### 19.3 ☒ AMCC or ☒ AMCCU Notations

For automatic or remote control and monitoring systems of the machinery other than the propulsion machinery as referenced in Subsection 1/1 of the *ABS Guide for Automatic or Remote Control and Monitoring for Machinery and Systems (other than Propulsion) on Offshore Installations*, ABS will consider additional classifications with symbols **☒ AMCC** or **☒ AMCCU**, as appropriate, provided that the applicable requirements of the *ABS Guide for Automatic or Remote Control and Monitoring for Machinery and Systems (other than Propulsion) on Offshore Installations* are satisfied.



## CHAPTER 1 Scope and Conditions of Classification

### SECTION 3 Rules for Classification

#### 1 Application of Rules

##### 1.1 General

This Guide is applicable to Mobile Offshore Units intended for unrestricted ocean service, except where specifically mentioned otherwise.

This Guide is intended for use in conjunction with the *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)*, the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*, the *ABS Rules for Materials and Welding (Part 2)* and/or other applicable ABS Rules and Guides.

These requirements are applicable to those features that are permanent in nature and can be verified by plan review, calculation, physical survey or other appropriate means. Any statement in the applicable Rules and this Guide regarding other features is to be considered as guidance to the designer, builder, Owner, operator, or other client.

##### 1.3 Application

This Guide has an effective date of 1 July 2008. The application of this Guide and referred Rules is, in general, based on the contract date for construction between the shipbuilder and the prospective Owner (e.g., Rules which became effective on 1 July 2008 are not applicable to a unit for which the contract for construction was signed on 30 June 2008). See also 1-1-4/3 of the *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*.

## CHAPTER 1 Scope and Conditions of Classification

### SECTION 4 Plans and Design Data to be Submitted

#### 1 Hull and Design Data

Plans showing the scantlings, arrangements and details of the principal parts of the structure of each unit to be built under survey are to be submitted for review and approved before the work of construction are commenced, as described in 3-1/1 and 5-1/1.9.

#### 3 Machinery Plans

Plans are to be submitted showing the arrangements and details of all propulsion and auxiliary machinery, steering gear, boilers and pressure vessels, electrical systems, jacking or other self-elevating systems, bilge and ballast systems, fire extinguishing systems, and other pumps and piping systems as described in 4-1/1.7, 4-2/1.7, 4-3/1.5, 5-2/1.3 and 6-1/1.5.1.

#### 5 Calculations

Design support calculations are to be submitted as described in 3-1/3.

#### 7 Additional Plans (1 August 2012)

Where additional class notations or certification under the other Rules, Guides or regulations as described in Section 1-1-5 of the ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1) are requested, submission of additional plans and calculations may be required.

#### 9 Submissions (2011)

Plans from designers and builders should generally be submitted electronically to ABS. However, hard copies will also be accepted.

All plan submissions originating from manufacturers are understood to have been made with the cognizance of the builder.

## CHAPTER 1 Scope and Conditions of Classification

### SECTION 5 Operating Manual

#### 1

*(1 August 2012)* An operating manual which is consistent with the information and criteria upon which classification is based is to be placed aboard the unit for the guidance of the operating personnel. **The primary language of the Operating Manual is to be English.** Units not meeting the criteria of 3-1-3/1.3 and 4-1-1/7.7 of the *MODU Rules* for unrestricted service are to have the notation **Restricted Service** placed in the Operating Manual. In cases where units are designed to the criteria for unrestricted service, but where certain additional conditions specified by the Owner are presented which do not meet the criteria for unrestricted service, the Operating Booklet is to contain a notation **Limited Service Condition** for such additional condition. Insofar as classification is concerned, the operating manual is to include, as appropriate, the following information:

#### 1.1

A general description of the unit, including major dimensions, lightship characteristics;

#### 1.3

Summaries of approved modes of operation (See 2-1/7), including for each mode of operation:

- i)* *(1 August 2012)* Limiting environmental conditions, including wave height and period, wind velocity, current velocity, **service temperature of the unit** (see 3-1-1/25 of the *MODU Rules*), minimum **expected** sea temperature, sea bed penetration, spud can-soil stiffness, air gap, and water depth;
- ii)* Design deck loadings, mooring loads, icing loads, variable load, total elevated load, cantilever load, cranes and elevating systems and types of helicopter for which the helideck is designed;
- iii)* Draft or draft range, leg length, spud can position and whether buoyant or non-buoyant, disposition of movable equipment (See 3-3/3) such as cantilevers, crane booms, etc.;
- iv)* Maximum allowable KG versus draft curves or equivalent and associated limitations or assumptions upon which the allowable KG is based;
- v)* Disposition (open or closed) of watertight and weathertight closures (See 3-3/9);
- vi)* Identification of “Restricted Service” or “Limited Service” conditions.

#### 1.5

Information showing:

- i)* General arrangements;
- ii)* Preload capacity (See 3-1-3/1.11 and 3-2-3/5.7 of the *MODU Rules*);
- iii)* Watertight and weathertight boundaries, location of unprotected openings, and watertight and weathertight closures;
- iv)* Type, location and quantities of permanent ballast;
- v)* Allowable deck loadings (See 3-1-3/1.11 of the *MODU Rules*);
- vi)* Capacity, centers of gravity and free surface correction for each tank;
- vii)* Capacity and centers of gravity of each void provided with sounding arrangements but not provided with means of draining [See 3-1-3/1.3.3(a) of the *MODU Rules*];

- viii) Location and means of draining voids, as specified in 4-2-4/3.3 of the *MODU Rules*;
- ix) Hydrostatic curves or equivalent;
- x) Hazardous areas (See Section 4-3/11);
- xi) Simplified electrical one line diagrams of main power and emergency power systems;
- xii) Schematic diagrams of the bilge, ballast and ballast control system;

**1.7**

Ballasting procedure as specified in 4-2-4/13.1 of the *MODU Rules*;

**1.9**

Procedure for elevating and preloading;

**1.11**

Loading and KG work sheets, sample calculations for each mode of operation and instructions for their use.

**1.13**

The Operating Manual is to be submitted for review by the American Bureau of Shipping solely to **verify** the presence of the above information which is to be consistent with the design information and limitations considered in the unit's classification. The American Bureau of Shipping is not responsible for the operation of the unit.

The Operating Manual required by this section does not need to be in addition to that required by flag and coastal Administrations. These administrations may require that additional information be included in the Operating Manual.



## CHAPTER 2 General

### CONTENTS

<b>SECTION 1</b>	<b>Definitions</b> .....	<b>11</b>
1	General .....	11
3	Mobile Offshore Unit or Unit.....	11
5	Types of Unit.....	11
5.1	Self-Elevating Unit .....	11
5.3	Column-Stabilized Unit .....	11
7	Mode of Operation .....	11
7.1	Normal Operating Condition .....	11
7.3	Severe Storm Condition.....	12
7.5	Transit Conditions.....	12
<b>SECTION 2</b>	<b>Environmental Loadings</b> .....	<b>13</b>
1	Loading Criteria.....	13
TABLE 1	Environmental Loading Criteria.....	13
<b>SECTION 3</b>	<b>Material Selection</b> .....	<b>14</b>
1	Materials.....	14
TABLE 1	Material Selection.....	14





## CHAPTER 2 General

### SECTION 1 Definitions

#### 1 General

For the purpose of this Guide, the terms in Section 3-1-1 of the *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)* have the same meaning unless stated otherwise in this Section or other part of this Guide.

#### 3 Mobile Offshore Unit or Unit

A vessel or a structure not fixed to the sea bed, capable of engaging in offshore operations other than drilling, production, storage, or handling of hydrocarbons, whether designed for operation afloat or supported on the sea bed.

#### 5 Types of Unit

##### 5.1 Self-Elevating Unit (1 August 2012)

A unit with movable legs capable of raising its hull above the surface of the sea and lowering it back into the sea.

The hull has sufficient buoyancy to transport the unit to the desired location. Once on location, the hull is raised to a predetermined elevation above the sea surface on its legs, which are supported by the sea bed.

The legs of such units may be designed to penetrate the sea bed, may be fitted with enlarged sections or footings, or may be attached to a bottom mat.

##### 5.3 Column-Stabilized Unit

A unit with the main deck connected to the underwater hull or footings by columns or caissons.

The unit depends upon the buoyancy of columns for flotation and stability for all afloat modes of operation, or in the raising or lowering of the unit. Lower hulls or footings may be provided at the bottom of the columns.

###### 5.3.1 Semi-Submersible Unit

A column-stabilized unit designed for offshore operations, either afloat or supported by sea bed.

###### 5.3.2 Submersible Unit

A column-stabilized unit designed for offshore operations solely when supported by sea bed.

#### 7 Mode of Operation

A *Mode of Operation* is a condition or manner in which a unit may operate or function while on location or in transit and includes the following.

##### 7.1 Normal Operating Condition

A *Normal Operating Condition* is a condition wherein a unit is on location to perform its function, and combined environmental and operational loading are within the appropriate design limits established for such operations. The unit may be either afloat or supported by the sea bed.

### 7.3 Severe Storm Condition

A *Severe Storm Condition* is a condition wherein a unit may be subjected to the most severe environmental loadings for which it was designed. During the severe storm condition, it may be necessary to discontinue operations due to the severity of the environmental loadings. The unit may be either afloat or supported by the sea bed.

### 7.5 Transit Conditions

*Transit Conditions* are all unit movements from one geographical location to another.



## CHAPTER 2 General

### SECTION 2 Environmental Loadings

#### 1 Loading Criteria (1 August 2012)

A unit's modes of operation should be investigated using anticipated loads, including gravity and functional loads together with relevant environmental loads due to the effects of wind, waves, currents, and where deemed necessary by the Owner or designer, the effects of earthquake, sea bed supporting capabilities, ambient temperature, fouling, ice, etc. Where applicable, the loads indicated herein are to be adhered to for all types of mobile offshore units. The Owner is to specify the environmental conditions for which the plans for the unit are to be approved. These design environmental conditions are to be recorded in the Operating Manual [see 1-1-5/1.3i) of the *MODU Rules Supplement to the ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*].

The environmental loading criteria for mobile offshore units are defined in Section 3-1-3 of the *MODU Rules*, as shown in 2-2/Table 1.

**TABLE 1**  
**Environmental Loading Criteria**

	<i>Section of MODU Rules</i>
Wind Loadings	3-1-3/1.3
Wave Loadings	3-1-3/1.5
Current Loading	3-1-3/1.7
Loading due to Vortex Shedding	3-1-3/1.9
Gravity and Functional Loads	3-1-3/1.11

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

For analysis methods based on the Shallow Water Wave Theory and the Wave Theory for Deep Water, reference is made to Appendices 3-1-A1 and 3-1-A2 of the *MODU Rules*.

For selecting design waves for structural analysis of column-stabilized units (twin-hull semi-submersible), reference is made to Appendix 3-2-A2 of the *MODU Rules*.



## CHAPTER 2 General

### SECTION 3 Material Selection

#### 1 Materials

This Section covers materials used for the construction of mobile offshore units. Structural materials are to be suitable for intended service conditions. They are to be of good commercial quality, defined by a recognized specification and free of injurious defects. Materials used in the construction of the hull and machinery of mobile offshore units are to be in accordance with the *ABS Rules for Materials and Welding (Part 2)*.

The requirements for material selection are determined by [Section 3-1-4](#) of the *MODU Rules*, as shown in 2-3/Table 1.

**TABLE 1**  
**Material Selection (1 August 2012)**

	<i>Section of MODU Rules</i>
Material Characteristics	3-1-4/1.3
Toughness	3-1-4/1.5
Materials Other than Steel	3-1-4/1.7
Service Temperature	3-1-4/1.9
Hull Steel Grades	3-1-4/3
Selection of Grades	3-1-4/5

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

A guide for material selection for ABS Grades of high strength quenched and tempered steel is provided in Appendix 3-1-A3 of the *MODU Rules*.



## CHAPTER 3 Hull Construction and Equipment

### CONTENTS

<b>SECTION 1</b>	<b>Plans and Design Data to be Submitted.....</b>	<b>17</b>
1	Hull and Design Data .....	17
3	Calculations .....	18
<b>SECTION 2</b>	<b>Hull Structures and Arrangements.....</b>	<b>19</b>
1	Structural Analysis .....	19
1.1	Structural Analysis.....	19
1.3	Allowable Stresses .....	19
3	Common Structures .....	20
3.1	Materials.....	20
3.3	Scantlings.....	20
3.5	Protection of Steel Work.....	20
3.7	Structural Considerations .....	20
5	Self-Elevating Units.....	21
5.1	Application.....	21
5.3	General Requirements for Materials and Scantlings .....	21
5.5	Structural Considerations .....	21
7	Column-Stabilized Units.....	21
7.1	Application.....	21
7.3	Special Considerations Regarding Stresses .....	21
7.5	Effect of Mooring Forces on Local Structure .....	22
7.7	Material Selection.....	22
7.9	Structural Considerations .....	22
9	Welding, Forming and Weld Design .....	22
9.1	Weld Design.....	22
11	Navigation in Ice .....	22
11.1	Column-Stabilized Units .....	22
11.3	Self-Elevating Units .....	22
11.5	Novel Features .....	23
TABLE 1	Structural Analysis .....	19
TABLE 2	Allowable Stresses.....	19
TABLE 3	Common Structures.....	20
TABLE 4	Self-Elevating Units.....	21
TABLE 5	Column-Stabilized Units.....	22
TABLE 6	Weld Design.....	22
FIGURE 1	Typical Hull Construction .....	23

<b>SECTION 3</b>	<b>Stability and Watertight/Weathertight Integrity.....</b>	<b>24</b>
1	Stability.....	24
3	Stability Criteria.....	24
5	Load Line.....	25
7	Extent of Damage for Damage Stability Studies.....	25
9	Watertight/Weathertight Integrity.....	26
11	Onboard Computers for Stability Calculations.....	26
TABLE 1	Stability.....	24
TABLE 2	Stability Criteria.....	25
TABLE 3	Extent of Damage.....	25
TABLE 4	Watertight/Weathertight Integrity.....	26
<b>SECTION 4</b>	<b>Position Mooring Systems .....</b>	<b>27</b>
1	Position Mooring Systems and Equipment.....	27
1.1	Temporary Mooring Equipment.....	27
1.3	Position Mooring Equipment.....	27
1.5	Position Mooring Systems.....	27
TABLE 1	Mooring Systems.....	27

## CHAPTER 3 Hull Construction and Equipment

### SECTION 1 Plans and Design Data to be Submitted

#### 1 Hull and Design Data

Plans showing the scantlings, arrangements and details of the principal parts of the structure of each unit to be built under survey are to be submitted for review and approved before the work of construction are commenced. These plans are to clearly indicate the scantlings, joint details and welding, or other methods of connection. In general, plans are to include the following, where applicable. Additional plans may be required where the required attendance of the Surveyor is anticipated at more than one location.

- General arrangement
- Inboard and outboard profile
- An arrangement plan of watertight compartmentation
- Diagrams showing the extent to which the watertight and weathertight integrity is intended to be maintained, including the location, type and disposition of watertight and weathertight closures.
- Summary of distributions of fixed and variable weights for each reviewed condition.
- Type, location and quantities of permanent ballast
- Loadings for all decks
- Transverse sections showing scantlings
- Longitudinal sections showing scantlings
- Decks
- Helicopter deck with helicopter particulars (See 3-2-2/3.1 of the *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)*)
- Framing
- Shell plating
- Watertight bulkheads and flats
- Structural bulkheads and flats
- Tank bulkheads and flats with level of top of overflows and air pipes
- Pillars and girders
- Diagonals and struts
- Legs
- Structure in way of jacking or other elevating arrangements
- Stability columns and intermediate columns
- Hulls, pontoons, footings, spudcans, pads or mats
- Superstructures and deck houses
- Arrangement and details of watertight doors and hatches

- Foundations for anchoring equipment, industrial equipment, etc., where attached to hull structure, superstructures or deckhouses
- Welding details and procedures
- Lines and offsets
- Curves of form or equivalent data
- Wind heeling moment curves or equivalent data
- Capacity plan
- Tank sounding tables
- Corrosion control arrangements
- Methods and locations for nondestructive testing
- Plans for conducting underwater inspections in lieu of drydocking
- *(1 August 2012)* A description of environmental conditions including the service temperature of the unit (see 3-1-1/25 of the MODU Rules) and minimum expected sea temperatures for each mode of operation
- *(1 August 2012)* Critical structural areas identified in structural analyses (see 3-1-1/29 of the MODU Rules)

### 3 Calculations

The following calculations are to be submitted.

- Structural analysis, including fatigue analysis
- Resultant forces and moments from wind, waves, current, mooring and other environmental loadings
- Effects of icing on structural loadings and stability
- Wind resistance area of exposed structural elements
- Stability calculations, both intact and damaged
- Calculations substantiating adequacy of structure to transmit forces between legs and hull through the jacking or other self-elevating system
- Evaluation of the unit's ability to resist overturning while bearing on the sea bed

Submitted calculations are to be suitably referenced.

Results from model tests or dynamic response calculations may be submitted as alternatives or substantiation for required calculations.



## CHAPTER 3 Hull Construction and Equipment

### SECTION 2 Hull Structures and Arrangements

#### 1 Structural Analysis

##### 1.1 Structural Analysis

The structure of mobile offshore units is to be analyzed in accordance with 3-2-1/1 of the *MODU Rules*, as shown in 3-2/Table 1.

**TABLE 1**  
**Structural Analysis**

	<i>Section of MODU Rules</i>
Analysis of Primary Structure	3-2-1/1.1
Consideration of Local Stresses	3-2-1/1.3
Combination of Stress Components	3-2-1/1.5
Consideration of Buckling	3-2-1/1.7
Determination of Bending Stresses	3-2-1/1.9
Determination of Shear Stresses	3-2-1/1.11
Stress Concentration	3-2-1/1.13
Analysis and Details of Structural Connections	3-2-1/1.15
Fatigue Analysis	3-2-1/1.17
Plastic Analysis	3-2-1/1.19

##### 1.3 Allowable Stresses

The scantlings of effective structural elements of the primary frame of the unit, analyzed in accordance with 3-2/1.1, are to be determined on the basis of the allowable stresses specified in 3-2-1/3 of the *MODU Rules*, as shown in 3-2/Table 2.

**TABLE 2**  
**Allowable Stresses**

	<i>Section of MODU Rules</i>
Individual Stresses	3-2-1/3.3
Buckling Considerations	3-2-1/3.5
Members Subjected to Combined Axial Load and Bending	3-2-1/3.7
Column Buckling Stresses	3-2-1/3.9
Equivalent Stress Criteria for Plated Structures	3-2-1/3.11

### 3 Common Structures

#### 3.1 Materials

This Guide, except where specified otherwise, is intended for mobile offshore units constructed of steel, manufactured and having the properties as specified in Chapter 3 of the *ABS Rules for Materials and Welding (Part 2)*. Where it is intended to use steel or other material having properties differing from those specified in Chapter 3 of the above referenced Part 2, the use of such material and the corresponding scantlings will be specially considered.

#### 3.3 Scantlings

Scantlings of the major structural elements of the unit are to be determined in accordance with this Guide. Scantlings of structural elements which are subjected to local loads only, and which are not considered to be effective components of the primary structural frame of the unit, are to comply with the applicable requirements of the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)* or the *ABS Rules for Building and Classing Steel Barges (Barge Rules)*.

#### 3.5 Protection of Steel Work (1 August 2012)

Unless otherwise approved, all steel work is to be suitably coated. Tanks or preload spaces intended for seawater ballast are to have a corrosion-resistant hard coating on all internal surfaces. Other effective methods of corrosion protection will be specially considered.

In cases where scantlings are based on 3-2/1.1 and 3-2/1.3, and corrosion control methods are not provided, the scantlings are to be suitably increased.

##### 3.5.1 Performance Standards for Protective Coating (PSPC)

Where requested by the Owner, a unit with protective coatings which are found to comply with the requirements in the *ABS Guide for the Class Notation Coating Performance Standard (CPS)* will be assigned and distinguished in the Record with the class notation **CPS**.

#### 3.7 Structural Considerations

Independently of the type of mobile offshore unit, the structures of elements such as helicopter decks, watertight bulkheads and decks or tank boundaries are to comply with the requirements of Section 3-2-2 of the *MODU Rules*, as shown in 3-2/Table 3.

**TABLE 3**  
**Common Structures (2011)**

	<i>Section of MODU Rules</i>
Helicopter Deck	3-2-2/3
Watertight Bulkheads and Watertight Flats	3-2-2/7, 3-2-2/13
Tank Bulkheads and Tank Flats	3-2-2/9, 3-2-2/13
Appurtenant Structure	3-2-2/11
Lifeboat Platform	3-2-2/11.3
Crane Pedestal and Foundation	3-2-2/11.5

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 5 Self-Elevating Units

### 5.1 Application

This Subsection applies to self-elevating units, as defined in 2-1/5.1.

### 5.3 General Requirements for **Materials and Scantlings** (1 August 2012)

#### 5.3.1 Material Selection

Grouping of structural elements of self-elevating units into material application categories (special, primary, secondary) is to be in accordance with 3-2-3/3.1 of the *MODU Rules*.

#### 5.3.2 Scantlings

Scantlings of the major structural elements of the unit are to be determined in accordance with the requirements of Sections 3-2/1 and 3-2/3. Where applicable, and except as outlined below, scantlings are also to meet the requirements of the *Steel Vessel Rules* or the *Barge Rules*. The section modulus requirement for framing members, in general, may be determined from the equations in 3-2-4/3 of the *MODU Rules*, where the values of  $c$ ,  $h$ ,  $s$  and  $\ell$  are as indicated in 3-2/Figure 1.

### 5.5 Structural Considerations

Structures specific to self-elevating units and related structural considerations are to be in accordance with Section 3-2-3 of the *MODU Rules*, as shown in 3-2/Table 4.

**TABLE 4**  
**Self-Elevating Units**

	<i>Section of MODU Rules</i>
Units Elevated Modes	3-2-3/5
Legs	3-2-3/7
Hull Interface Structure with Legs	3-2-3/9
Hull Structure	3-2-3/11
Spudcan and Bottom Mat	3-2-3/13
Deckhouses	3-2-3/15

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 7 Column-Stabilized Units

### 7.1 Application

This Subsection applies to column-stabilized units, as defined in 2-1/5.3.

### 7.3 Special Considerations Regarding Stresses

On column-stabilized units, the highest stresses in some members may be associated with environmental conditions less severe than the maximums specified by the Owner. Where considered necessary, such stresses and the increased probability of their occurrence are to be taken into account by either or both of the following.

- i) Suitable reduction of the allowable stress levels given in 3-2/1.3 for combined loadings, as defined in 3-2-1/1.1 ii) of the *MODU Rules*.
- ii) Detailed investigation of the fatigue properties in order to evaluate the possibility of high stresses in association with probability of occurrence.

Particular attention is also to be given to the structural details in critical areas such as bracing members, joint connections, etc.

### 7.5 Effect of Mooring Forces on Local Structure

Local structure in way of fairleads, winches, etc., forming part of the position mooring system, is to be capable of withstanding forces equivalent to the breaking strength of the mooring line with the allowable stresses of combined loading conditions defined in 3-2/1.3.

### 7.7 Material Selection (1 August 2012)

Grouping of structural elements of column-stabilized units into material application categories (special, primary, secondary) is to be in accordance with 3-2-4/1.7 of the *MODU Rules*.

### 7.9 Structural Considerations

Structures specific to column-stabilized units and related structural considerations are to be in accordance with Section 3-2-4 of the *MODU Rules*, as shown in 3-2/Table 5.

**TABLE 5**  
**Column-Stabilized Units (2011)**

	<i>Section of MODU Rules</i>
Upper Structure	3-2-4/3, 3-2-4/15
Columns, Lower Hulls and Footings	3-2-4/5
Deckhouses	3-2-4/7
Wave Clearance	3-2-4/9
Structural Redundancy	3-2-4/11

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 9 Welding, Forming and Weld Design (1 August 2012)

### 9.1 Weld Design

Weld design is to be in compliance with Section 3-2-6 of the *MODU Rules*, as shown in 3-2/Table 6.

**TABLE 6**  
**Weld Design (1 August 2012)**

	<i>Section of MODU Rules</i>
Fillet Welds	3-2-6/1
Full or Partial Penetration Corner or Tee Joints	3-2-6/3
Alternatives	3-2-6/5

## 11 Navigation in Ice

### 11.1 Column-Stabilized Units

Subsections 3-2-A1/3 through 3-2-A1/15 of the *MODU Rules* are intended for column-stabilized units navigating in ice. Column-stabilized units constructed in accordance with 3-2-A1 of the *MODU Rules* will be distinguished in the *Record* by **Ice Class** followed by ice class **A1**, **A0**, **B0**, **C0** or **D0** to indicate the degree of strengthening adopted.

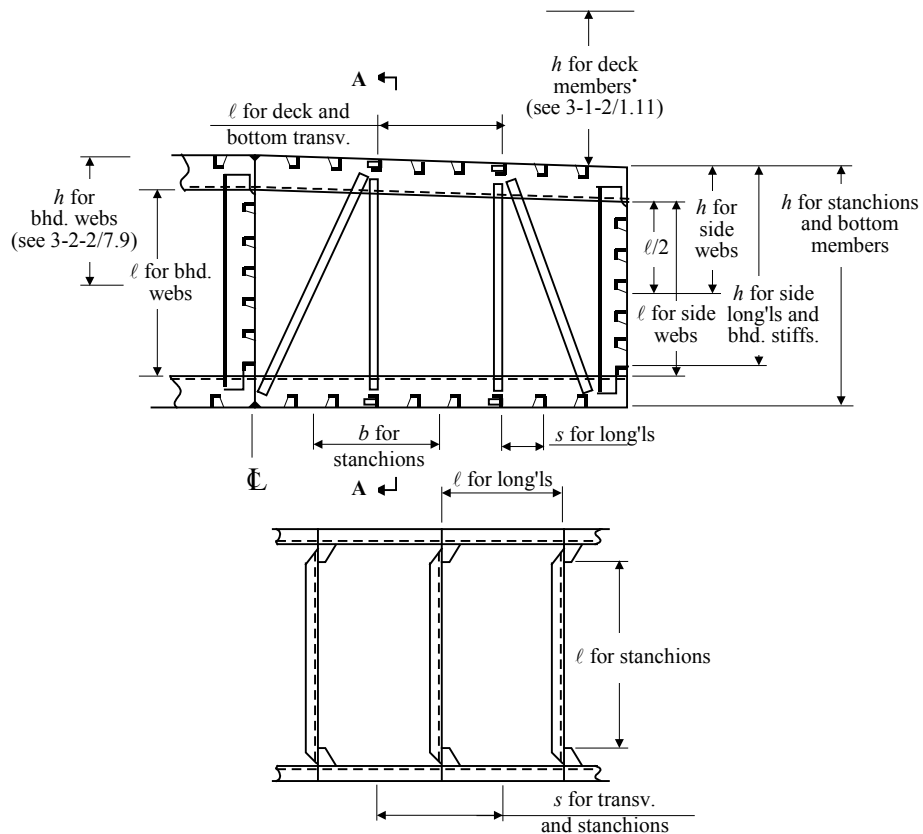
### 11.3 Self-Elevating Units

Ice strengthening for self-elevating units is to be in accordance with Subsection 6-1-1/33 of the *Steel Vessel Rules* including 6-1-5/31 for non-self-propelled units.

11.5 Novel Features

Ice strengthening notations and requirements for units of novel type or design will be specially considered.

**FIGURE 1**  
**Typical Hull Construction**



Section A-A

\*Not to be less than  $L/50 + 0.762$  meters ( $L/50 + 2.5$  feet), maximum 2.9 m (9.5 ft) where  $L$  is the length of the unit in m (ft).

Note: Typical transverse section (longitudinal framing) shown. References are to *MODU Rules*

Bottom transverses (or girders)	$c = 1.50$	Bottom long'ls (or frames)	$c = 1.34$
Side webs (or girders)	$c = 1.50$	Side long'ls (or frames)	$c = 1.00$
Deck transverses (or girders)	$c = 1.00$	Deck long'ls (or beams)	$c = 0.60$
Bulkhead webs (or girders)	$c = 1.00$	Bulkhead stiffeners	$c = 0.70$

$$\text{Stanchions } W = fbs \text{ kN (tf, Ltf)}$$

$$f = 10.5 (1.07, 0.03)$$

$$b, h \text{ and } s \text{ in meters (feet)}$$

In way of tanks, scantlings are also to meet the requirements of 3-2-2/9 of the *MODU Rules*.

## CHAPTER 3 Hull Construction and Equipment

### SECTION 3 Stability and Watertight/Weathertight Integrity

#### 1 Stability (1 August 2012)

All units are to have positive metacentric height in calm water equilibrium position for all afloat conditions, including temporary positions when raising or lowering. For the purpose of determining compliance with the stability requirements contained herein, it is to be assumed that the unit is floating free of mooring restraints. However, detrimental effects of catenary mooring systems or of the thrusters for dynamically positioned units are to be considered.

The metacentric height is to be specified for each mode of operation and guidance is to be included in the Operating Manual on the procedure to determine and satisfy the expected metacentric height. This may be accomplished by including the minimum metacentric height in the calculation of the allowable KG.

The wind speeds referenced in this section are to be used to calculate overturning moments for intact and damage stability calculations. These wind speeds are not intended to represent actual environmental limits.

Stability requirements in accordance with 3-3-2/1 and 3-3-1/3 of the *MODU Rules* are to be complied with, as shown in 3-3/Table 1.

**TABLE 1**  
**Stability (1 August 2012)**

	<i>Section of MODU Rules</i>
Stability Afloat	3-3-2/1.3
Intact Stability	3-3-2/1.3.1
Damage Stability	3-3-2/1.3.2, 1.3.3
Alternatives for Treatment of Void Spaces	3-3-2/1.3.4
Inclining Experiment	3-3-1/3

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

#### 3 Stability Criteria

Righting moment curves and overturning moment curves with supporting calculations are to be prepared for the full range of anticipated operating drafts. The calculations are to be performed in a manner to reflect a sustained wind force from any horizontal direction in order to determine the critical stability axis. For purposes of these calculations, the configuration of the unit is to reflect the actual condition of the unit during afloat operation, such as the operation of cranes and the position of legs for self-elevating units.

The stability criteria in accordance with 3-3-2/3 of the *MODU Rules* are to be applied to mobile offshore units, as shown in 3-3/Table 2.

**TABLE 2**  
**Stability Criteria (1 August 2012)**

	<i>Section of MODU Rules</i>
Righting Moment	3-3-2/3.3
Overturning Moment	3-3-2/3.7
Wind Tunnel Tests	3-3-2/3.9
Alternative Stability Criteria	3-3-2/3.11

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 5 Load Line

Every mobile unit is to have marks which designate the maximum permissible draft when the unit is in the afloat condition. Such markings are to be placed at suitable visible locations on the structure, to the satisfaction of ABS. On column-stabilized units, where practical, these marks are to be visible to the person in charge of mooring, lowering or otherwise operating the unit.

The load lines are to be established under the terms of the International Convention on Load Lines. Where minimum free-boards cannot be computed by the normal methods laid down by the Convention, they are to be determined on the basis of compliance with the intact or damage stability requirements for afloat modes of operation. The requirement that the draft of the unit not exceed the assigned load line may be considered temporarily not applicable for bottom-supported units when raising, lowering or resting on the sea bed.

The requirements of the International Convention on Load Lines with respect to weathertightness and watertightness of decks, superstructures, deckhouses, doors, hatchway covers, other openings, ventilators, air pipes, scuppers, inlets and discharges, etc., are to be taken as a basis for all units in the afloat condition. (For column-stabilized units, see also 3-3-2/5.1 of the *MODU Rules*)

## 7 Extent of Damage for Damage Stability Studies

In assessing the damage stability of mobile offshore units, as required by 3-3-2/1.3.2 and 3-3-2/1.3.3 of the *MODU Rules*, the following extent of damage is to be assumed.

If damage of a lesser extent results in a more severe condition, such lesser extent is to be assumed.

All piping, ventilating systems, trunks, etc., within the assumed damage area are to be considered damaged. Positive means of closure are to be provided to preclude progressive flooding of other intact spaces. See 3-2-2/7 of the *MODU Rules* for specific requirements for watertight bulkheads and flats.

The extent of damage for mobile offshore units is defined in 3-3-2/3.5 of the *MODU Rules*, as shown in 3-3/Table 3.

**TABLE 3**  
**Extent of Damage**

	<i>Section of MODU Rules</i>
Self-Elevating Units	3-3-2/3.5.1
Column-Stabilized Units	3-3-2/3.5.2

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 9 Watertight/Weathertight Integrity

Watertight and weathertight integrity in mobile offshore units is to be in compliance with 3-3-2/5 of the *MODU Rules*, as shown in 3-3/Table 4.

**TABLE 4**  
**Watertight/Weathertight Integrity**

	<i>Section of MODU Rules</i>
Weathertight Integrity	3-3-2/5.1
Watertight Integrity	3-3-2/5.3
Penetrations	3-3-2/5.5

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 11 Onboard Computers for Stability Calculations

The use of onboard computers for stability calculations is not a requirement of class. However, if stability software is installed onboard mobile offshore units contracted on or after 1 July 2005, it should cover all stability requirements applicable to the unit and is to be approved by ABS for compliance with the requirements of Appendix 3-3-A2 of the *MODU Rules*, “Onboard Computers for Stability Calculations”.





## CHAPTER 3 Hull Construction and Equipment

### SECTION 4 Position Mooring Systems

#### 1 Position Mooring Systems and Equipment (1 August 2012)

The symbols **E**, **M** and **P** are not required as a condition of classification, except as indicated hereunder and in 8-5/9 of this Guide.

All self-propelled units are to have temporary mooring equipment for anchoring while the unit is in the transit mode. The symbol **E** is a condition of classification for self-propelled units.

For non-self-propelled units, when requested by the Owner, the symbol **E** may be placed after the symbols of classification in the *Record*.

##### 1.1 Temporary Mooring Equipment

The symbol **E** placed after the symbols of classification in the *Record*, thus: **A1 E**, which will signify that the equipment for temporary mooring, for anchoring while the unit is in the transit mode, is in compliance with the applicable requirements of Section 3-4-1 of the *MODU Rules* as shown in 3-4/Table 1 or with requirements corresponding to the service limitation noted in the unit's classification, which have been specially approved for the particular service. For drilling units with symbol **P**, this requirement may be met if position mooring equipment can be released in an emergency while the unit is in the transit mode.

**TABLE 1**  
**Mooring Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
Anchoring and Mooring Equipment	3-4-1/9
Equipment Mass and Size	3-4-1/11
Tests	3-4-1/13
Anchor Types	3-4-1/15
Windlass Support Structure and Cable Stopper	3-4-1/17
Hawse Pipes	3-4-1/19

*Note:* Any reference to "drilling" in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

##### 1.3 Position Mooring Equipment

When requested by the Owner, the symbol **M** may be placed after the symbols of classification in the *Record*, thus: **A1 M**, which will signify that the mooring equipment, anchors, chain or wire rope which have been specified by the Owner for position mooring have been tested in accordance with the specifications of the Owner and in the presence of a Surveyor. See 7-1-A1/1.3 of the *MODU Rules*.

##### 1.5 Position Mooring Systems

When requested by the Owner, ABS is prepared to certify the position mooring capability of the unit in accordance with the requirements outlined in Appendix 3-4-A1 of the *MODU Rules*. A unit so certified for position mooring will be designated in the *Record* by the symbol **P** placed after the symbols of classification in the *Record*, thus: **A1 P**.

## CHAPTER 4 Machinery and Systems

### CONTENTS

<b>SECTION 1</b>	<b>Machinery, Equipment and Their Installation .....</b>	<b>30</b>
1	General .....	30
1.1	Requirements for Classification .....	30
1.3	Prime Movers .....	30
1.5	Thrusters and Dynamic Positioning Systems .....	30
1.7	Moving Cantilevers, Skid Beams and Moveable Structures .....	30
1.9	Unattended Machinery Spaces.....	31
TABLE 1	Certification of Machinery .....	30
<b>SECTION 2</b>	<b>Pumps and Piping Systems .....</b>	<b>32</b>
1	General .....	32
1.1	Damage Stability.....	32
1.3	Segregation of Piping Systems.....	32
1.5	Piping Classes .....	32
1.7	Plans and Data to Be Submitted.....	32
1.9	Material and General Installation Requirements.....	33
3	Pumps, Pipes, Valves and Fittings .....	34
3.1	Service Conditions.....	34
3.3	Standards for Valves, Fittings and Flanges .....	34
3.5	Pumps, Pipes, Valves and Fittings .....	34
5	Tank Vents and Overflows.....	34
7	Bilge and Ballast Systems and Tanks .....	35
9	Fuel Oil Systems and Tanks.....	35
11	Other Piping Systems and Tanks .....	35
TABLE 1	Tests and Installation .....	33
TABLE 2	Pumps and Piping Components and Details .....	34
TABLE 3	Tank Vents and Overflows.....	34
TABLE 4	Bilge and Ballast Systems and Tanks.....	35
TABLE 5	Fuel Oil Systems and Tanks .....	35
TABLE 6	Other Piping Systems and Tanks .....	36

<b>SECTION 3</b>	<b>Electrical Installations .....</b>	<b>37</b>
1	General .....	37
	1.1 Application.....	37
	1.3 Definitions.....	37
	1.5 Plans and Data to Be Submitted .....	37
	1.7 General Requirements .....	37
3	Electrical Systems.....	38
	3.1 Plans and Data to Be Submitted .....	38
	3.3 Electrical System Requirements.....	39
5	Installation.....	39
	5.1 Plans and Data to Be Submitted .....	39
	5.3 Installation and Arrangement Requirements .....	40
7	Machinery and Equipment .....	40
	7.1 Machinery and Equipment Requirements.....	40
9	Specialized Installations.....	41
	9.1 High Voltage Systems .....	41
	9.3 Electric Propulsion System.....	41
	9.5 Three-wire Dual-voltage DC System .....	42
11	Hazardous Areas .....	42
	11.1 Definitions.....	42
	11.2 Plans and Data to be Submitted.....	43
	11.3 Classification of Areas .....	43
	11.5 Hazardous Areas.....	45
<b>TABLE 1</b>	<b>Electrical Installations .....</b>	<b>37</b>
<b>TABLE 2</b>	<b>Electrical Systems.....</b>	<b>39</b>
<b>TABLE 3</b>	<b>Installation.....</b>	<b>40</b>
<b>TABLE 4</b>	<b>Machinery and Equipment .....</b>	<b>40</b>
<b>TABLE 5</b>	<b>High Voltage Systems.....</b>	<b>41</b>
<b>TABLE 6</b>	<b>Electric Propulsion System .....</b>	<b>42</b>
<b>TABLE 7</b>	<b>Three-wire Dual-voltage DC System .....</b>	<b>42</b>
<b>TABLE 8</b>	<b>Hazardous Areas .....</b>	<b>46</b>

## CHAPTER 4 Machinery and Systems

### SECTION 1 Machinery, Equipment and Their Installation

#### 1 General (1 August 2012)

##### 1.1 Requirements for Classification

Chapter 4 contains general requirements for machinery, equipment and systems and the design requirements for piping systems and electrical systems.

Chapter 5 contains the design requirements for safety systems, including fire extinguishing systems.

Chapter 6 contains the design, testing and survey requirements for the certification of equipment, machinery and system components at vendor's shop.

Chapter 7 contains the survey requirements during construction of units at builder's yard and the requirements for periodical surveys after construction.

General requirements for machinery, equipment and systems are contained in Section 4-1-1 of the *MODU Rules*, as shown in 4-1/Table 1.

**TABLE 1**  
**Certification of Machinery (1 August 2012)**

	<i>Section of MODU Rules</i>
Definitions	4-1-1/3
Machinery Plans	4-1-1/5
Inclinations	4-1-1/7.1
Dead Ship Start	4-1-1/7.3
Unattended Machinery Spaces	4-1-1/7.5
Ambient Temperature	4-1-1/7.7
Materials Containing Asbestos	4-1-1/7.9
Materials and Welding for machinery Components	4-1-1/7.11

##### 1.3 Prime Movers

Prime movers (diesel engines, gas turbines, steam turbines) are to be in accordance with 4-1-2/1 of the *MODU Rules*.

##### 1.5 Thrusters and Dynamic Positioning Systems

Compliance with the provisions of Section 4-3-5 of the *Steel Vessel Rules* is required for main propulsion thrusters in all cases and for propulsion assist thrusters, athwartship thrusters and dynamic positioning systems, including their thrusters, where an optional notation in accordance with 1-2/13 or 1-2/15 is desired.

##### 1.7 Moving Cantilevers, Skid Beams and Moveable Structures

Documentation is to be submitted in accordance with 4-1-2/7 of the *MODU Rules* for moving cantilevers, skid beams or moveable structures.

## 1.9 Unattended Machinery Spaces

Controls necessary for safe operation are to be provided for machinery in spaces which are not normally manned. Relevant data is to be submitted to permit the assessment of the effect of such controls on the safety of the unit. See 4-2-4/3.7 of the *MODU Rules* for bilge alarm systems and 5-3-1/15 of the *MODU Rules* for fire precautions for such spaces.

For self-propelled units where it is intended that propulsion machinery space be periodically unattended and that propulsion machinery be controlled primarily from the navigation bridge, **⊠ ACCU** notation will be assigned upon verification of compliance with the provisions of Section 4-9-4 of the *Steel Vessel Rules*.

For non-self-propelled units where it is intended that the machinery space(s) and the local centralized control and monitoring station(s) (if provided) be periodically unmanned, and that the machinery/ systems be controlled and monitored from a remote control and monitoring center located outside the machinery space(s), **⊠ AMCCU** notation will be assigned upon verification of compliance with the provisions of Section 3 of the *ABS Guide for Automatic or Remote Control and Monitoring for Machinery and Systems (other than Propulsion) on Offshore Installations*.

**⊠ ACCU** and **⊠ AMCCU** notations are not mandatory and will be assigned upon request.

## CHAPTER 4 Machinery and Systems

### SECTION 2 Pumps and Piping Systems

#### 1 General

Piping systems are to be in accordance with the applicable requirements of this Section. All piping systems are to be installed and tested in accordance with this Guide and related Rules or recognized standards to the satisfaction of the attending Surveyor. *For definitions of terms, refer to 4-2-1/3 of the MODU Rules.*

#### 1.1 Damage Stability

When considering the design and layout of piping systems, consideration is to be given to the damage stability requirements and the assumed extent of damage for the type of unit under consideration, as outlined in 3-3/7.

#### 1.3 Segregation of Piping Systems

Piping systems carrying non-hazardous fluids are to be segregated from piping systems which may contain hazardous fluids. Cross connection of the piping systems may be made where means for avoiding possible contamination of the non-hazardous fluid system by the hazardous medium are provided.

#### 1.5 Piping Classes (1 August 2012)

To distinguish between detail requirements of the various systems, the piping is divided into **three classes** as detailed in 4-2-1/5 of the MODU Rules.

#### 1.7 Plans and Data to Be Submitted

##### 1.7.1 Plans

Before proceeding with the work, plans are to be submitted, showing clearly the diagrammatic details or arrangement of the following.

- General arrangement of pumps and piping
- Sanitary system
- Bilge and ballast systems
- Compressed air systems
- Essential control-air systems
- Vent, sounding and overflow pipes
- Fuel-oil filling, transfer and service systems
- Boiler-feed systems
- Steam and exhaust piping
- Lubricating-oil systems
- Hydraulic power piping systems
- Essential sea-water and fresh-water service systems
- Starting-air systems

- Fire-main and fire-extinguishing systems
- Steering-gear piping systems
- Systems conveying toxic liquids, low flash point below 60°C (140°F) liquids or flammable gas.
- Exhaust piping for internal combustion engines and boilers
- (1 August 2012) All Class I and Class II piping systems not covered above, except for those which form part of an independently manufactured unit.
- A description of the bilge, ballast and drainage systems
- A description of the ballast control system for column-stabilized units
- Diagrams showing the extent to which the watertight and weathertight integrity is intended to be maintained, including the location, type and disposition of watertight and weathertight closures.

1.7.2 All Piping Systems

The plans are to consist of a diagrammatic drawing of each system accompanied by lists of material giving size, wall thickness, maximum working pressure and material of all pipes and the type, size, pressure rating and material of valves and fittings. Where superheated steam is used, the temperatures are also to be given.

1.7.3 Booklet of Standard Details

A booklet of standard piping practices and details, including such items as bulkheads, deck and shell penetrations, welding details including dimensions, pipe joining details, etc., is to be submitted. Pipe weld details are to comply with Chapter 4 of the *ABS Rules for Materials and Welding (Part 2)*. Applicable limitations should be specified.

**1.9 Material and General Installation Requirements**

In addition, pumps and piping systems in mobile offshore units are to comply with the material tests and installation requirements indicated in Sections 4-2-1 and 4-2-2 of the *MODU Rules*, as shown in 4-2/Table 1.

**TABLE 1**  
**Tests and Installation (1 August 2012)**

	<i>Section of MODU Rules</i>
Material Tests and Inspections	4-2-1/9
Protection	4-2-1/11.1
Pipes Near Switchboards	4-2-1/11.3
Expansion or Contraction Stresses	4-2-1/11.5
Molded Expansion Joints	4-2-1/11.7
Metallic Bellow Type Expansion Joints	4-2-1/11.9
Pipe Joints	4-2-1/11.11
Mechanical Joints	4-2-1/11.13
Bulkhead, Deck or Tank-Top Penetrations	4-2-1/11.15
Collision-bulkhead Penetrations	4-2-1/11.17
Sluice Valves and Cocks	4-2-1/11.19
Relief Valves	4-2-1/11.21
Common Overboard Discharge	4-2-1/11.23
Remote Operation	4-2-1/11.25
Instruments	4-2-1/11.27
Flexible Hoses	4-2-1/11.29
Control of Static Electricity	4-2-1/11.31
Leakage Containment	4-2-1/11.33

### 3 Pumps, Pipes, Valves and Fittings

#### 3.1 Service Conditions

The piping details determined in accordance with this Section are to be based on the maximum working pressure and temperature to which they may be exposed in service under normal sustained operating conditions. For boiler-feed and blow-off service, see 4-6-6/3.5, 4-6-6/3.15 and 4-6-6/5.3.1 of the *Steel Vessel Rules*.

#### 3.3 Standards for Valves, Fittings and Flanges

The following requirements for valves, fittings and flanges are based upon standards of the American National Standards Institute. The suitability and application of those manufactured in accordance with other recognized standards will be considered.

#### 3.5 Pumps, Pipes, Valves and Fittings (1 August 2012)

Pumps, pipes, valves, fittings and other components and details of piping systems for mobile offshore units are to be in accordance with Section 4-2-2 of the *MODU Rules*, as shown in 4-2/Table 2. For pump requirements refer to 6-1-6/7.3.2 of the *MODU Rules*. Certification of piping components at vendor's plant is covered in Part 6 of the *MODU Rules*.

**TABLE 2**  
**Pumps and Piping Components and Details (1 August 2012)**

	<i>Section of MODU Rules</i>
Metallic Pipes	4-2-2/5
Plastic Pipes	4-2-2/7
Valves	4-2-2/9
Pipe Fittings	4-2-2/11
Welded Nonstandard Valves and Fittings	4-2-2/13
Flanges	4-2-2/15
Material of Valves and Fittings	4-2-2/17
Fluid Power Cylinders	4-2-2/19
Sea Inlets and Overboard Discharges	4-2-2/21
Scuppers and Drains on Self-Elevating Units	4-2-2/23
Cooler Installations External to the Hull	4-2-2/27
Penetrations through Watertight Boundaries	4-2-2/29

### 5 Tank Vents and Overflows

Tank vents, overflows and sounding arrangements in mobile offshore units are to be in accordance with Section 4-2-3 of the *MODU Rules*, as shown in 4-2/Table 3.

**TABLE 3**  
**Tank Vents and Overflows**

	<i>Section of MODU Rules</i>
Tank Vents and Overflows	4-2-3/1
Sounding Arrangements	4-2-3/3



## 7 Bilge and Ballast Systems and Tanks

Bilge and ballast systems and tanks for mobile offshore units are to be in accordance with Section 4-2-4 of the *MODU Rules*, as shown in 4-2/Table 4.

**TABLE 4**  
**Bilge and Ballast Systems and Tanks (1 August 2012)**

	<i>Section of MODU Rules</i>
General Arrangement of Bilge Systems	4-2-4/3
Bilge Piping (All Units)	4-2-4/5
Bilge Pumps (All Units)	4-2-4/7
Size of Bilge Suctions	4-2-4/9.3
Ballast Piping (All Units)	4-2-4/11
Ballasting System for Column-Stabilized Units	4-2-4/13

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 9 Fuel Oil Systems and Tanks

Fuel oil systems and tanks installed on board mobile offshore units are to be in accordance with Section 4-2-5 of the *MODU Rules*, as shown in 4-2/Table 5.

**TABLE 5**  
**Fuel Oil Systems and Tanks (1 August 2012)**

	<i>Section of MODU Rules</i>
Fuel Oil Piping System – General	4-2-5/1
Fuel-oil Transfer and Filling	4-2-5/3
Fuel-oil Service System for Boilers	4-2-5/5
Fuel -oil Service System for Internal Combustion Engines	4-2-5/7
Low Flash Point Fuels	4-2-5/9
Additional Measures for Oil Pollution Prevention	4-2-5/11
Class Notation – <b>POT</b>	4-2-5/13

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 11 Other Piping Systems and Tanks

Piping systems and tanks, other than bilge, ballast or fuel oil service, installed on board mobile offshore units are to be in accordance with Section 4-2-6 of the *MODU Rules*, as shown in 4-2/Table 6.

**TABLE 6**  
**Other Piping Systems and Tanks (1 August 2012)**

	<i>Section of MODU Rules</i>
Lubricating-oil Systems	4-2-6/1
Hydraulic Systems	4-2-6/3
Fixed Oxygen-Acetylene Installations	4-2-6/5
Fuel Storage for Helicopter Facilities	4-2-6/7
Starting-air Systems	4-2-6/9
Cooling-water Systems for Internal Combustion Engines	4-2-6/11
Exhaust System	4-2-6/13
Helicopter Deck Drainage Arrangements	4-2-6/17
Boiler and Associated Piping	4-2-6/19
Steering Gear Piping	4-2-6/21
Gas Turbine Piping	4-2-6/23
Raw Water Systems for Self-elevating Units in Elevated Condition	4-2-6/25

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## CHAPTER 4 Machinery and Systems

### SECTION 3 Electrical Installations

#### 1 General

##### 1.1 Application

Electrical apparatus and wiring systems are to be constructed and installed in accordance with the requirements of this Section.

##### 1.3 Definitions

The definitions as indicated in 4-3-1/3 of the *MODU Rules* are applicable for the purpose of this Section.

##### 1.5 Plans and Data to Be Submitted

See 4-3/3.1, 4-3/5.1, 4-3/9.3.2, and 4-3/11.3.

##### 1.7 General Requirements

Electrical installations for mobile offshore units are to comply with Section 4-3-1 of the *MODU Rules*, as shown in 4-3/Table 1.

**TABLE 1**  
**Electrical Installations (1 August 2012)**

	<i>Section of MODU Rules</i>
Standard Distribution System	4-3-1/7
Voltage and Frequency Variations	4-3-1/9
Materials	4-3-1/11
Grounding Arrangements	4-3-1/13
Degree of Protection for Enclosure	4-3-1/15
Temperature Ratings	4-3-1/17
Clearance and Creepage Distances	4-3-1/19

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

### 3 Electrical Systems

#### 3.1 Plans and Data to Be Submitted

##### 3.1.1 System Diagrams

One line diagrams for the following electrical systems are to be submitted for review.

- Power Supply and Distribution
- Lighting including Navigation Light
- Internal Communication
- General Emergency Alarm
- Fire Detection and Alarm
- Steering Gear Control (for self-propelled units)
- Intrinsically-safe Equipment
- Emergency Generator Starting

##### 3.1.2 Data for Wiring Systems

The one line diagrams are to show the circuit designation, type and size of cables, cable grouping and banking, trip setting and rating of the circuit protection devices, the location of electrical equipment accompanied by list of components, complete feeder list, rated load current for each branch circuit, and voltage drop for longest run of each size cable. The one line diagram for power supply and distribution systems is to indicate the following component details.

- Generator: kW rating, voltage, rated current, frequency, number of phases, power factor
- Batteries: type, voltage, capacity, conductor protection (when required)
- Motors: kW rating, remote stops (when required)
- Transformers: kVA rating, rated voltage and current on primary and secondary side, connection method

The one line diagram for power supply and distribution systems is also to include a list of sequential start of motors and equipment having emergency tripping or preferential tripping features

##### 3.1.3 Short-circuit Data

In order to establish that the protective devices on the main and emergency switchboards have sufficient short-circuit breaking and making capacities, data are to be submitted giving the maximum calculated short-circuit current in symmetrical r.m.s. and asymmetrical peak values available at the main bus bars together with the maximum allowable breaking and making capacities of the protective device. Similar calculations are to be made at other points in the distribution system where necessary to determine the adequacy of the interrupting capacities of protective devices.

##### 3.1.4 Protective Device Coordination

A protective device coordination study is to be submitted for review. This protective device coordination study is to consist of an organized time-current study of all protective devices in series from the utilization equipment to the source for all circuit protection devices having different setting or time-current characteristics for long-time delay tripping, short-time delay tripping and instantaneous tripping, where applicable. Where an overcurrent relay is provided in series and adjacent to the circuit protection device, the operating and time-current characteristics of the relay are to be considered for coordination. See 4-3-2/9.1.5 of the *MODU Rules*.

##### 3.1.5 Load Analysis

An electric-plant load analysis is to be submitted for review. The load analysis of the electric-plant (including high voltage main service transformers or converters, where applicable) is to cover all operating conditions of the unit, including normal sea going (if applicable) and emergency operations.

### 3.3 Electrical System Requirements

Electrical systems for mobile offshore units are to comply with Section 4-3-2 of the *MODU Rules*, as shown in 4-3/Table 2.

**TABLE 2**  
**Electrical Systems**

	<i>Section of MODU Rules</i>
Main <b>Service</b> Source of Power	4-3-2/3
Emergency Source of Power	4-3-2/5
Distribution System	4-3-2/7
Circuit Protection System	4-3-2/9
Systems for Steering Gear Installed in Self-propelled Units	4-3-2/11
Lighting and Navigation Light Systems	4-3-2/13
Interior Communication Systems	4-3-2/15
Manually Operated Alarms	4-3-2/17
Fire Protection and Fire Detection Systems	4-3-2/19

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 5 Installation

### 5.1 Plans and Data to Be Submitted

#### 5.1.1 Booklet of Standard Details

A booklet of the standard wiring practices and details, including such items as cable supports, earthing details, bulkhead and deck penetrations, cable joints and sealing, cable splicing, watertight and explosion-proof connections to equipment, earthing and bonding connections, etc., as applicable, is to be submitted. Where cable penetration methods for A- or B-class decks or bulkheads are shown, an evidence of approval by an Administration signatory to 1974 SOLAS as amended is also to be submitted.

#### 5.1.2 Arrangement of Electrical Equipment

A general arrangement plan showing the location of at least the following electrical equipment is to be submitted for review.

- Generator, Essential Motor, and Transformer
- Battery
- Switchboard, Battery Charger, and Motor Controller
- Emergency Lighting Fixture
- General Emergency Alarm Device and Alarm Actuator
- Detector, Manual Call Point and Alarm Panel for Fire
- Detection and Alarm System
- Certified-safe Type Equipment

Where cable splices or cable junction boxes are provided, locations of the splices and cable junction boxes together with the information of their services are also to be submitted for review.

5.1.3 Electrical Equipment in Hazardous Areas

A plan showing hazardous areas is to be submitted for review together with the following:

- A list/booklet of intended electrical equipment in the indicated hazardous areas, including a description of the equipment, applicable degree of protection and ratings. See 4-3-3/9.3 of the *MODU Rules*.
- For intrinsically-safe systems, also wiring plans, installation instructions with any restrictions imposed by the certification agency.
- Detail of installation for echo sounder, speed log and impressed current cathodic protection system where located in these areas.

When the selection of the equipment has been finalized, a list/booklet identifying all equipment in the hazardous areas, their method of protection (flameproof, intrinsically safe, etc.), rating (flammable gas group and temperature class), manufacturer’s name, model number and evidence of certification is to be submitted for review. A copy of this list/booklet is to be maintained onboard for future reference. See 7-2-5/9.3 and 4-3-3/9.1 of the *MODU Rules*.

5.1.4 Maintenance Schedule of Batteries

Maintenance schedule of batteries for essential and emergency services. See 4-3-3/3.7.5 of the *MODU Rules*.

5.3 Installation and Arrangement Requirements

The installation and arrangement of electrical equipment onboard mobile offshore units is to comply with Section 4-3-3 of the *MODU Rules*, as shown in 4-3/Table 3.

**TABLE 3**  
**Installation**

	<i>Section of MODU Rules</i>
Equipment Installation and Arrangement	4-3-3/3
Cable Installation	4-3-3/5
Earthing	4-3-3/7
Equipment and Installation in Hazardous Area	4-3-3/9

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

**7 Machinery and Equipment**

**7.1 Machinery and Equipment Requirements**

The electrical machinery and equipment for mobile offshore units are to comply with Section 4-3-4 of the *MODU Rules*, as shown in 4-3/Table 4.

**TABLE 4**  
**Machinery and Equipment (1 August 2012)**

	<i>Section of MODU Rules</i>
Certification of Electrical Machinery and Equipment	4-3-4/1
Battery Systems and Uninterruptible Power Systems (UPS)	4-3-4/3
Computer Based Systems	4-3-4/5
Cables and Wires	4-3-4/7

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 9 Specialized Installations

### 9.1 High Voltage Systems (1 August 2012)

High voltage systems for mobile offshore units are to comply with Section 4-3-5/1 of the *MODU Rules*, as shown in 4-3/Table 5.

**TABLE 5**  
**High Voltage Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
<b>General</b>	4-3-5/1.1
System Design	4-3-5/1.3
Circuit Breakers and Switches – Auxiliary Circuit Power Supply Systems for Operating Energy	4-3-5/1.5
Circuit Protection	4-3-5/1.7
Equipment Installation and Arrangement	4-3-5/1.9
<b>Cable Construction</b>	4-3-5/1.11

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

### 9.3 Electric Propulsion System

#### 9.3.1 Application

The following requirements in this sub-section are applicable to electric propulsion systems. Electric propulsion systems complying with any other recognized standard will be considered. Unless stated otherwise, electric propulsion equipment and systems are to comply with the applicable requirements in other parts of Chapter 4, Section 3, as well.

#### 9.3.2 Plans and Data to Be Submitted

In addition to the plans and data to be submitted in accordance with 4-3/3.1, 4-3/5.1, and 4-3/7.1, the following plans and data are to be submitted for review.

- One line diagrams of propulsion control system for power supply, circuit protection, alarm, monitoring, safety and emergency shutdown systems, including list of alarm and monitoring points.
- Plans showing the location of propulsion controls and its monitoring stations.
- Arrangements and details of the propulsion control console or panel including schematic diagram of the system therein.
- Arrangements and details of electric coupling.
- Arrangements and details of the semiconductor converters enclosure for propulsion system including data for semiconductor converter, cooling system with its interlocking arrangement.

#### 9.3.3 Electric Propulsion System

Electric propulsion systems for mobile offshore units are to comply with Section 4-3-5/3 of the *MODU Rules*, as shown in 4-3/Table 6.

**TABLE 6**  
**Electric Propulsion System**

	<i>Section of MODU Rules</i>
System Design	4-3-5/3.3
Propulsion Power Supply Systems	4-3-5/3.5
Circuit Protection	4-3-5/3.7
Protection for Earth Leakage	4-3-5/3.9
Electric Propulsion Control	4-3-5/3.11
Instrumentation at the Control Station	4-3-5/3.13
Equipment Installation and Arrangement	4-3-5/3.15
Machinery and Equipment	4-3-5/3.17

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 9.5 Three-wire Dual-voltage DC System

Three-wire dual-voltage DC systems for mobile offshore units are to comply with Section 4-3-5/5 of the *MODU Rules*, as shown in 4-3/Table 7.

**TABLE 7**  
**Three-wire Dual-voltage DC System**

	<i>Section of MODU Rules</i>
Three-wire DC Generators	4-3-5/5.1
Neutral Earthing	4-3-5/5.3
Size of Neutral Conductor	4-3-5/5.5

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 11 Hazardous Areas

### 11.1 Definitions

#### 11.1.1 Hazardous Areas (1 August 2012)

Hazardous areas are all those areas where a flammable atmosphere may be expected to exist continuously or intermittently. See IEC Publication 60079-10. Such flammable atmospheres may arise from operations such as use and storage of flammable liquids, paint and acetylene, or any such operation pertinent to the particular service of the unit. Hazardous areas are subdivided into Zones 0, 1, 2, defined as follows:

- *Zone 0* A zone in which ignitable concentrations of flammable gases or vapors are continuously present or present for long periods.
- *Zone 1* A zone in which ignitable concentrations of flammable gases or vapors are likely to occur in normal operating conditions.
- *Zone 2* A zone in which ignitable concentrations of flammable gases or vapors are not likely to occur, and if it occurs, it will exist only for a short time.

#### 11.1.2 Enclosed Space

An enclosed space is considered to be a space bounded by decks and bulkheads which may or may not have doors, windows or other similar openings.



### 11.1.3 Semi-Enclosed Location

A semi-enclosed location is considered to be a location where natural conditions of ventilation are notably different from those on open decks due to the presence of structure such as roofs, windbreaks and bulkheads and which are arranged so that the dispersion of gas may not occur.

### 11.1.4 Outdoor Location

An outdoor location is considered to be a location substantially free of structures (or other obstructions) where natural ventilation is not impeded and causes the rapid dispersion (dilution) of gases and vapors, and stagnant areas are not present.

## 11.2 Plans and Data to be Submitted (1 August 2012)

The following data should generally be submitted electronically to ABS. However, hard copies will also be accepted.

- Arrangement plans clearly indicating the hazardous areas
- A description of the ventilating system for all hazardous areas
- Complete particulars of the ventilating system including capacities of fans, number of complete changes of air per minute, air flows, areas subject to positive and negative pressure, and location and direction of opening of self-closing doors

## 11.3 Classification of Areas

For the purpose of this Guide and by definition (see 2-1/3), mobile offshore units are not intended to install drilling or production equipment on board or provide storage of hydrocarbons. However, these units may be temporarily used to store or install equipment in open deck areas from the drilling or production units they support. These storage areas where hydrocarbon vapors may be present during the operation of the unit are to be designated as a hazardous zone appropriate to the expected hazard.

Other areas or spaces of the unit where flammable or explosive gases, vapors or dust are normally present or likely to be present are to be designated hazardous areas. Hazardous areas are to be classified based on the likelihood of presence and the concentration and type of flammable atmosphere, as well as in terms of the extent of the area or space.

### 11.3.1 General

The following hazardous areas may normally apply to mobile offshore units. Hazardous areas as specified may be extended or reduced depending on the actual arrangements in each case by use of windshields, special ventilation arrangements, structural arrangements (e.g., low deck head), etc. Alternative arrangements in accordance with API RP 505 or other equivalent recognized standard may be considered. See also 4-3-6/7 of the *MODU Rules*.

*Hazardous Areas Zone 0 include:*

- (1 August 2012)* Internal spaces of closed tanks and piping or oil [closed-cup flash point below 60°C (140°F)] or flammable gas and vapor.
- Outdoor location within 0.5 m (1.65 ft) from an opening to the hazardous areas defined in *i*), such as a tank vent.

*Hazardous Areas Zone 1 include:*

- Enclosed spaces containing tanks and pipes described in *i*);
- Enclosed spaces containing liquid or solid substances that are likely to emit flammable gases or vapors;
- An enclosed space or semi-enclosed location:
  - Having a direct access or opening into the hazardous areas defined in *iii*) or *iv*) or other Zone 1 areas, through a door, a ventilation opening, etc.;
  - Immediately adjacent to the closed tanks defined in *i*); or
  - Containing pumps or piping used for conveying liquid described in *i*), except for all-welded or continuous closed piping systems without valves, flanges or similar devices;

- vi) Outdoor location within 1 m (3.3 ft) beyond the Zone 0 area defined in *ii*);
- vii) Outdoor location within 1.5 m (5 ft) from an opening to the hazardous areas defined in *iii*), *iv*) or *v*), such as a door, a ventilation opening, a tank vent, etc;
- viii) Outdoor or semi-enclosed locations within 1.5 m (5 ft) from any equipment, container, etc., stowed in a designated open deck area, that are likely to emit flammable gases or vapors. An area of open deck may be a designated Zone 1 hazardous area for the future stowage of this type of products with a height of 1.5 m (5 ft) above the estimated maximum height of the equipment, container, etc. to be stowed. Equipment, containers, etc., that can generate a Zone 1 hazardous area, may be located within the designated Zone 1 hazardous area;
- ix) Pits, ducts or similar structures in locations which otherwise would be Zone 2 but which are arranged so the dispersion of gas may not occur.

*Hazardous Areas Zone 2 include:*

- x) Outdoor location within 3 m (10 ft) from the boundaries of the closed tanks defined in *i*);
- xi) Outdoor location within 1.5 m (5 ft) from pumps or piping used for conveying liquid described in *i*), except for all-welded or continuous closed piping systems without valves, flanges or similar devices;
- xii) Outdoor location within 1.5 m (5 ft) beyond the Zone 1 areas defined in *vi*) and *vii*);
- xiii) Outdoor or semi-enclosed location within 1.5 m (5 ft) beyond the Zone 1 areas defined in *viii*). An area of the open deck may be a designated Zone 2 hazardous area. Equipment, containers, etc. that can generate a Zone 2 hazardous area, may be located within the designated Zone 2 hazardous area;
- xiv) Air lock spaces between Zone 1 and non-hazardous space, in accordance with 4-3-6/7.5i) of the *MODU Rules*.

### 11.3.2 Miscellaneous Spaces

The following spaces are to be regarded as hazardous areas:

#### 11.3.2(a) Paint Stores

- i) *Hazardous Areas Zone 1:*
  - The interior of the paint store;
  - Outdoor or semi-enclosed locations within 0.5 m (1.65 ft) from the boundaries of the ventilation inlet and natural ventilation outlet;
  - Outdoor or semi-enclosed locations within 1.5 m (5 ft) from the boundaries of the power ventilation outlet.
- ii) *Hazardous Areas Zone 2:*
  - Outdoor or semi-enclosed locations within 0.5 m (1.65 ft) beyond the Zone 1 area from the ventilation inlet and natural ventilation outlet;
  - Outdoor or semi-enclosed locations within 1.5 m (5 ft) beyond the Zone 1 area from the power ventilation outlet.

See also 4-3-3/9.5 of the *MODU Rules*.

#### 11.3.2(b) Battery rooms

- i) *Hazardous Areas Zone 1:*
  - The interior of the battery room;
  - Outdoor or semi-enclosed locations within 0.5 m (1.65 ft) from the boundaries of the natural ventilation outlet.
  - Outdoor or semi-enclosed locations within 1.5 m (5 ft) from the boundaries of the power ventilation outlet.

ii) *Hazardous Areas Zone 2:*

- Outdoor or semi-enclosed locations within 0.5 m (1.65 ft) beyond the Zone 1 area from the natural ventilation outlet;
- Outdoor or semi-enclosed locations within 1.5 m (5 ft) beyond the Zone 1 area from the power ventilation outlet.

See also 4-3-3/3.7 of the *MODU Rules*.

11.3.2(c) *Helicopter refueling facilities*

i) *Hazardous Areas Zone 1:*

- Enclosed space containing components of the refueling pump/equipment;
- Outdoor or semi-enclosed locations within 1.5 m (5 ft) from the boundaries of the ventilation outlet of enclosed space containing refueling pump/equipment;
- Outdoor or semi-enclosed locations within 1.5 m (5 ft) from the boundaries of the tank vent outlet;
- Outdoor or semi-enclosed locations within 1.5 m (5 ft) from the boundaries of the refueling pump/equipment.

ii) *Hazardous Areas Zone 2:*

- Outdoor or semi-enclosed locations within 1.5 m (5 ft) beyond the Zone 1 area from the ventilation outlet of enclosed space containing refueling pump/equipment;
- Outdoor or semi-enclosed locations within 1.5 m (5 ft) beyond the Zone 1 area from the tank vent outlet;
- Outdoor or semi-enclosed locations within 1.5 m (5 ft) beyond the Zone 1 area from the refueling pump/equipment.

See also 4-2-6/7.1.2 of the *MODU Rules*.

11.3.2(d) *Oxygen-acetylene storage rooms*

i) *Hazardous Areas Zone 1:*

- The interior of the storage room;
- Outdoor or semi-enclosed locations within 0.5 m (1.65 ft) from the boundaries of natural ventilation outlet;
- Outdoor and semi-enclosed locations within 1.5 m (5 ft) from the boundaries of power ventilation outlet.

ii) *Hazardous Areas Zone 2:*

- Outdoor or semi-enclosed locations within 0.5 m (1.65 ft) beyond the Zone 1 area from the natural ventilation outlet;
- Outdoor or semi-enclosed locations within 1.5 m (5 ft) beyond the Zone 1 area from the power ventilation outlet.

See also 4-2-6/5.3 of the *MODU Rules*.

## 11.5 Hazardous Areas

Electrical equipment and wiring installed in a hazardous area is to comply with 4-3-3/9 of the *MODU Rules*. The extent and conditions of the hazardous zones are to be determined in accordance with Section 4-3-6 of the *MODU Rules*, as shown in 4-3/Table 8.

**TABLE 8**  
**Hazardous Areas (1 August 2012)**

	<i>Section of MODU Rules</i>
Openings, Access, and Ventilation Conditions Affecting the Extent of Hazardous Zones	4-3-6/7
Ventilation	4-3-6/9
Machinery Installations in Hazardous Areas	4-3-6/11

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.



## CHAPTER 5 Fire and Safety – Measures and Features

### CONTENTS

<b>SECTION 1</b>	<b>Passive Fire Protection.....</b>	<b>48</b>
1	Structural Fire Protection .....	48
1.1	Administration Review .....	48
1.3	ABS Review .....	48
1.5	Materials Containing Asbestos .....	48
1.6	Alternative Design and Arrangements .....	48
1.7	Plans and Specifications .....	48
1.9	Structural Fire Protection .....	49
	<b>TABLE 1</b> Structural Fire Protection .....	<b>49</b>
<b>SECTION 2</b>	<b>Active Fire Protection Systems and Equipment.....</b>	<b>50</b>
1	Systems and Equipment .....	50
1.1	Governmental Authority .....	50
1.3	Plans and Specifications .....	50
3	Fixed Fire Fighting Systems .....	51
3.1	Fire Main Systems .....	51
3.3	Additional Fixed Fire Fighting Systems .....	51
5	Portable Fire Fighting Systems .....	51
7	Other Fire Protection Requirements .....	52
7.1	Fire Detection and Alarm Systems .....	52
7.3	General Alarm .....	52
7.5	Ventilation System Alarms .....	52
	<b>TABLE 1</b> Fire Main Systems .....	<b>51</b>
	<b>TABLE 2</b> Additional Fixed Fire Fighting Systems .....	<b>51</b>
	<b>TABLE 3</b> Portable Fire Fighting Systems .....	<b>51</b>
<b>SECTION 3</b>	<b>Outfitting .....</b>	<b>53</b>
1	General .....	53
	<b>TABLE 1</b> Outfitting .....	<b>53</b>

## CHAPTER 5 Fire and Safety – Measures and Features

### SECTION 1 Passive Fire Protection

#### 1 Structural Fire Protection

All mobile offshore units are to meet the requirements of this Section with regard to structural fire protection, protection of accommodation spaces, service spaces and control stations.

##### 1.1 Administration Review

When a Mobile Offshore Unit Safety Certificate is issued by an Administration or its agent other than ABS, such certificate will be accepted as evidence that the unit is in accordance with the requirements of this Section.

##### 1.3 ABS Review

In all other cases, the required information and plans are to be submitted to ABS for review.

##### 1.5 Materials Containing Asbestos (2011)

Installation of materials which contain asbestos is prohibited.

##### 1.6 Alternative Design and Arrangements (1 August 2012)

When fire safety design or arrangements deviate from the prescriptive provisions of this Guide, including innovative means of passive fire protection, an engineering analysis, evaluation and approval of the alternative design and arrangements is to be carried out in accordance with SOLAS Regulation II-2/17 and *ABS Guidance Notes on Alternative Design and Arrangements for Fire Safety*.

##### 1.7 Plans and Specifications

The following plans together with supporting data and particulars are to be submitted.

- General arrangement
- Structural fire protection layout plan for decks and bulkheads
- Plans or a booklet of joiner work details of construction for all decks, bulkheads and doors
- Ventilation plan showing all horizontal and vertical duct work listing all materials, duct size and gauge
- Penetration details through bulkheads and decks to accommodate ventilation, piping, electrical, etc.
- Escape plan (depicting escape routes as determined by 5-3-1/1 of the *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)*).

### 1.9 Structural Fire Protection

Structural fire protection for mobile offshore units is to comply with 5-1-1/3 and 5-1-1/5 of the *MODU Rules*, as shown in 5-1/Table 1.

**TABLE 1**  
**Structural Fire Protection (1 August 2012)**

	<i>Section of MODU Rules</i>
Construction Materials	5-1-1/3.1
Alternate Materials	5-1-1/3.3
<i>Details, Materials and Methods of Construction</i>	<i>5-1-1/3.5</i>
Fire Integrity of Bulkheads and Decks	5-1-1/3.7
Application of Tables	5-1-1/3.9
Other General Requirements	5-1-1/3.11 through 3.23
Protection of Accommodation Spaces, Service Spaces and Control Stations	5-1-1/5

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## CHAPTER 5 Fire and Safety – Measures and Features

### SECTION 2 Active Fire Protection Systems and Equipment

#### 1 Systems and Equipment

##### 1.1 Governmental Authority

Attention is drawn to the appropriate governmental authority in each case, as there may be additional requirements, depending on the size, type and intended service of the unit, as well as other particulars and details. Consideration will be given to fire extinguishing systems which comply with the published requirements of the governmental authority in which the unit is to be registered, as an equivalent alternative or addition to the requirements of this section.

##### 1.3 Plans and Specifications

###### 1.3.1 General (1 August 2012)

The following plans together with supporting data and particulars are to be submitted.

- Arrangement and details of fire main systems
- Foam smothering systems
- Other fire extinguishing arrangements.
- Fire control plans
- Fire detection systems
- Fixed fire extinguishing systems
- Fire extinguishing appliances
- Control station for emergency closing of openings and stopping machinery
- Fireman's outfits
- The most severe service condition for the operation of the emergency fire pump (e.g., lightest draft as shown in Trim and Stability Booklet, etc.)
- Calculations and pump data demonstrating that the emergency fire pump system can meet the operational requirements specified in 5-2-2/1.1 of the *MODU Rules* with the proposed pump location and piping arrangements (e.g., adequate suction lift, discharge pressure, capacity, etc.) at the most severe service condition

###### 1.3.2 Fire Control Plans

Fire control plans are to be permanently exhibited for the guidance of operating personnel, showing clearly for each deck provision, location, controls and particulars, as applicable, of the following:

- Fixed fire detection, alarm and extinguishing systems
- Portable fire-fighting equipment and appliances
- Controls of fuel-oil pumps and valves
- Ventilation system shut-downs and closing of openings.
- Locations and type of fire retarding bulkheads



### 3 Fixed Fire Fighting Systems

#### 3.1 Fire Main Systems

Fire main systems for mobile offshore units are to comply with Section 5-2-2 of the *MODU Rules*, as shown in 5-2/Table 1.

**TABLE 1**  
**Fire Main Systems**

	<i>Section of MODU Rules</i>
Fire Pumps	5-2-2/1.1
Fire Main	5-2-2/1.3
Hydrants, Hoses and Nozzles	5-2-2/1.5

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

#### 3.3 Additional Fixed Fire Fighting Systems

In addition to the fire main system, other fixed fire fighting systems for mobile offshore units are to comply with Section 5-2-3 of the *MODU Rules*, as shown in 5-2/Table 2.

**TABLE 2**  
**Additional Fixed Fire Fighting Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
Fixed Firefighting Systems	5-2-3/1
Gas Smothering	5-2-3/3
Foam	5-2-3/5
Fixed Pressure Water Spraying Systems	5-2-3/7
Protection of Helicopter Decks and Refueling Facilities	5-2-3/9
Paint and Flammable Liquid Lockers	5-2-3/11

### 5 Portable Fire Fighting Systems

Portable fire fighting systems for mobile offshore units are to comply with Section 5-2-4 of the *MODU Rules*, as shown in 5-2/Table 3.

**TABLE 3**  
**Portable Fire Fighting Systems**

	<i>Section of MODU Rules</i>
Portable Fire Extinguishers and Sand	5-2-4/1
Firefighters’ Outfit	5-2-4/3

## 7 Other Fire Protection Requirements

### 7.1 Fire Detection and Alarm Systems (1 August 2012)

Fire detectors are to be fitted in machinery spaces which are not intended to be normally manned and which contain fired boilers, internal combustion engines, oil purifiers and similar equipment, and are located so that all potential fire outbreak points are effectively monitored. The fire-detection system is subject to approval in each case. The fire-detection main indicator board is to be at a normally manned station. Accommodation spaces and service spaces are to be covered by automatic fire detection and alarm systems. Smoke detectors are to be the type of fire detection provided in accommodation spaces. A sufficient number of manual fire alarm stations are to be fitted at suitable locations throughout the unit.

### 7.3 General Alarm

Alarm signal devices are to produce a distinctive and loud sound. Attention is directed to the proper governmental authority concerning the requirements for general alarm systems on units.

### 7.5 Ventilation System Alarms

See 4-3-6/7 and 4-3-3/9.3.3 of the *MODU Rules*.



## CHAPTER 5 Fire and Safety – Measures and Features

### SECTION 3 Outfitting

#### 1 General

Means of escape and other fire and safety measures and features for mobile offshore units are to comply with Section 5-3-1 of the *MODU Rules*, as shown in 5-3/Table 1.

**TABLE 1**  
**Outfitting**

	<i>Section of MODU Rules</i>
Means of Escape	5-3-1/1
Means of Access and Egress	5-3-1/3
Guards and Rails	5-3-1/5
Arrangements in Machinery Space	5-3-1/9
Segregation of Fuel Oil Purifiers	5-3-1/11
Fire Precautions for Machinery Spaces	5-3-1/15

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## CHAPTER 6 Equipment and Machinery Certification

### CONTENTS

<b>SECTION 1</b>	<b>Material, Marine Equipment and Machinery Certification .....</b>	<b>55</b>
1	General .....	55
1.1	Application .....	55
1.3	Marine and Propulsion Systems .....	55
1.5	Unit Certification .....	55
1.5	Design Review and Survey of Equipment and machinery .....	55
3	Hull Structure and Outfitting .....	56
5	Prime Movers .....	56
7	Propulsion and Maneuvering Systems .....	57
9	Boilers, Pressure Vessels and Fired Equipment .....	57
11	Piping Systems .....	57
13	Electrical Systems and Control Equipment.....	58
15	Fire and Safety – Equipment and Systems .....	58
17	Jacking and Associated Systems .....	59
19	Anchoring System – Symbol $\text{\textcircled{E}}$ .....	60
TABLE 1	Certification of Machinery .....	55
TABLE 2	Machinery Surveys.....	56
TABLE 3	Hull Structure and Outfitting.....	56
TABLE 4	Prime Movers .....	56
TABLE 5	Propulsion and Maneuvering Systems .....	57
TABLE 6	Prime Movers .....	57
TABLE 7	Piping Systems .....	58
TABLE 8	Electrical Systems and Control Equipment.....	58
TABLE 9	Fire and Safety Equipment and Systems.....	59
TABLE 10	Jacking and Other Elevating Systems .....	59
TABLE 11	Anchoring System .....	60



## CHAPTER 6 Equipment and Machinery Certification

### SECTION 1 Material, Marine Equipment and Machinery Certification (1 August 2012)

#### 1 General

##### 1.1 Application

This Chapter contains the design, testing and survey requirements for the certification of equipment, machinery and system components at vendor's shop. It should be read in conjunction with Chapters 4, 5, and 7 for other design and survey requirements applicable to the mobile offshore unit where the equipment, machinery and systems are to be installed.

##### 1.3 Marine and Propulsion Systems

Boilers, pressure vessels, heat exchangers, internal combustion engines, turbines, propulsion equipment, steering gear and other applicable equipment are to be in accordance with the requirements of the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*, except as modified herein.

##### 1.5 Unit Certification

The certification of machinery for mobile offshore units is to be in accordance with Section 6-1-1 of the *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)*, as shown in 6-1/Table 1.

**TABLE 1**  
**Certification of Machinery (1 August 2012)**

	<i>Section of MODU Rules</i>
Basic Requirements	6-1-1/3.1
Angles of Inclination	6-1-1/3.5
Ambient Temperature	6-1-1/3.7
Skid Mounted Equipment or Machinery	6-1-1/3.9

*Note:* Any reference to "drilling" in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

##### 1.7 Design Review and Survey of Equipment and machinery

###### 1.7.1 Design Review

Plans and data required to be submitted for certification of specific equipment and machinery are described in 6-1/3 through 6-1/19.

###### 1.7.2 Surveys

Surveys for equipment, machinery and/or associated components are to be in accordance with Section 6-1-1 of the *MODU Rules*, as shown in 6-1/Table 2.

**TABLE 2**  
**Machinery Surveys (1 August 2012)**

	<i>Section of MODU Rules</i>
General Survey Requirements	6-1-1/5.3
Prototype Testing	6-1-1/7
Type Approval Program	6-1-1/9
Manufacturer's Guarantee	6-1-1/11
Asbestos	6-1-1/13

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

### 3 Hull Structure and Outfitting

Materials used for hull construction and hull outfitting for which certification is required as indicated in 6-1-2/Table 1 of the *MODU Rules* are to be produced, tested, and certified in accordance with the ABS Rules for Materials and Welding (Part 2), as applicable, and this Section.

Where material other than steel is used, material suitability and test results per the International Code for Application of Fire Test Procedures (FTP Code) is to be acceptable to ABS.

Hull structure and outfitting and/or associated components are to be in accordance with Section 6-1-2 of the *MODU Rules*, as shown in 6-1/Table 3.

**TABLE 3**  
**Hull Structure and Outfitting (1 August 2012)**

	<i>Section of MODU Rules</i>
Material for Hull Structure	6-1-2/3
Material for Foundation Structures	6-1-2/5
Helideck Structure	6-1-2/7
Watertight Doors	6-1-2/9

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

### 5 Prime Movers

Prime movers (diesel engines and their turbochargers, gas turbines, steam turbines) for which certification is required as indicated in 6-1-3/Table 1 of the *MODU Rules* are to be designed, constructed, tested, certified and installed in accordance with Part 4, Chapter 2 of the *Steel Vessel Rules* and this Section.

Prime movers and/or associated components are to be in accordance with Section 6-1-3 of the *MODU Rules*, as shown in 6-1/Table 4.

**TABLE 4**  
**Prime Movers (1 August 2012)**

	<i>Section of MODU Rules</i>
Internal Combustion Engines	6-1-3/3
Survey and Certification	6-1-3/5

## 7 Propulsion and Maneuvering Systems

Propulsion and maneuvering machinery (propulsion shafts and its components, propulsion gears and clutches, propellers, propulsion and positioning thrusters and steering gears) for which certification is required as indicated in 6-1-4/Table 1 of the *MODU Rules* are to be designed, constructed, tested, certified and installed in accordance with Part 4, Chapter 3 of the *Steel Vessel Rules* and this Section.

Propulsion and maneuvering systems and/or associated components are to be in accordance with Section 6-1-4 of the *MODU Rules*, as shown in 6-1/Table 5.

**TABLE 5**  
**Propulsion and Maneuvering Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
Materials for Propulsion Equipment	6-1-4/3
Survey and Certification	6-1-4/5

## 9 Boilers, Pressure Vessels and Fired Equipment

Boilers, fired and unfired heaters, pressure vessels and heat exchangers for which certification is required as indicated in 6-1-5/Table 1 of the *MODU Rules* are to be designed, constructed, tested, certified and installed in accordance with Part 4, Chapter 4 of the *Steel Vessel Rules* and this Section.

All boilers, heaters, pressure vessels and heat exchangers within the scope of 6-1-5/1.1 are to be certified by ABS. Mass-produced pressure vessels, including seamless extruded cylinders and fluid power cylinders, may be certified by alternative means as described in 4-4-1/1.11 of the *Steel Vessel Rules*.

Boilers, pressure vessels and fired equipment and/or associated components are to be in accordance with Section 6-1-5 of the *MODU Rules*, as shown in 6-1/Table 6.

**TABLE 6**  
**Prime Movers (1 August 2012)**

	<i>Section of MODU Rules</i>
Application	6-1-5/1.1
Grouping of Boilers and Pressure Vessels	6-1-5/1.3
Materials for Group I Boilers, Heaters, Pressure Vessels and Heat Exchangers	6-1-5/3
Survey and Certification	6-1-5/5

## 11 Piping Systems

Materials used for piping system components, for which certification is required as indicated in Section 6-1-6 of the *MODU Rules*, are to be produced, tested, and certified in accordance with *ABS Rules for Materials and Welding (Part 2)*, as applicable and this Section.

Piping system components for which certification is required as indicated in 6-1-6/Tables 1 and 2 of the *MODU Rules* are to be designed, constructed, tested, certified and installed in accordance with Part 4, Chapter 2 of the *MODU Rules* and this Section.

Piping systems associated with steering gear systems are to be in accordance with Section 4-3-4 of the *Steel Vessel Rules*.

Piping systems, such as steam, exhaust and feed systems, associated with boilers are to be in accordance with the applicable requirements of Part 4, Chapters 4 and 6 of the *Steel Vessel Rules*.

Class I, II and III piping systems are defined in 4-2-1/Table 1 of the *MODU Rules*.

Piping and/or associated components are to be in accordance with Section 6-1-6 of the *MODU Rules*, as shown in 6-1/Table 7.

**TABLE 7**  
**Piping Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
Pipes	6-1-6/3
Piping Components other than Pipes	6-1-6/5
Survey and Certification	6-1-6/7

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

### 13 Electrical Systems and Control Equipment

Electrical equipment and machinery for which certification is required as indicated in 6-1-7/Table 1 of the *MODU Rules* are to be designed, constructed, tested, certified and installed in accordance with this Section.

Electrical systems and control equipment and/or associated components are to be in accordance with Section 6-1-7 of the *MODU Rules*, as shown in 6-1/Table 8.

**TABLE 8**  
**Electrical Systems and Control Equipment (1 August 2012)**

	<i>Section of MODU Rules</i>
Insulation material	6-1-7/1.1
Accessibility	6-1-7/1.3
Plans and Data to be Submitted	6-1-7/3
Rotating Machines	6-1-7/5
Accumulator Batteries	6-1-7/7
Switchboards, Distribution Boards, Controllers, etc.	6-1-7/9
Transformers	6-1-7/11
Other Electric and Electronics Devices	6-1-7/13
High Voltage Systems	6-1-7/15
Electric Propulsion System	6-1-7/17
Survey and Certification	6-1-7/19

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

### 15 Fire and Safety – Equipment and Systems

Safety equipment and systems for which certification is required as indicated in 6-1-8/Table 1 of the *MODU Rules* are to be designed, constructed, tested, certified and installed in accordance with this Section.

Fire and safety equipment and systems and/or associated components are to be in accordance with Section 6-1-8 of the *MODU Rules*, as shown in 6-1/Table 9.



**TABLE 9**  
**Fire and Safety Equipment and Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
Fire Doors	6-1-8/3
Fire-Rated Windows	6-1-8/5
Gas-Tight Doors	6-1-8/7
Fire and Gas Detection Systems	6-1-8/9
Fire Pumps	6-1-8/11
Survey and Certification	6-1-8/13

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 17 Jacking and Associated Systems

Jacking systems are used to elevate and lower the hull of self-elevating units in the elevated condition and to raise and lower the legs in the afloat condition.

The hull of the unit is maintained stationary in the elevated condition by means of a holding mechanism. The same mechanism is used to maintain the legs stationary in the afloat condition.

The jacking system and holding mechanism on self-elevating units are to be designed and constructed with sufficient redundancy so that upon failure of any one component, the system will prevent an uncontrolled descent of the unit. This is to be accomplished either by continuing to jack to a safe position or holding in place. Approved procedures are to be provided to allow emergency raising or lowering of the unit after failure in the case the unit is holding in an unsafe position.

Jacking systems are to be considered as machinery to provide the vertical movement of the legs as well as structural elements transmitting the loads between hull and legs, as applicable to the particular system design.

Jacking and other elevating systems for mobile offshore units are to be in accordance with Section 6-1-9 of the *MODU Rules*, as shown in 6-1/Table 10.

**TABLE 10**  
**Jacking and Other Elevating Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
Definitions	6-1-9/3
Plans and Data to be Submitted	6-1-9/5
Failure Modes and Effects Analysis (FMEA)	6-1-9/7
Material	6-1-9/9
Strength Analysis	6-1-9/11
Mechanical Components	6-1-9/13
Electrical Power System	6-1-9/15
Hydraulic System	6-1-9/17
Control, Monitoring and Alarm System	6-1-9/19
Low Temperature Operation	6-1-9/21
Jacking Systems of Novel Design	6-1-9/23
Survey and Certification	6-1-9/25

### 19 Anchoring System – Symbol Ⓔ

This Section only applies to drilling units that are classed with the Ⓔ symbol.

This Section does not apply to drilling units that are classed with the optional Ⓜ or Ⓟ symbols. For requirements of Ⓜ and Ⓟ, see Appendix 7-1-A1 of the *MODU Rules*.

Anchoring systems for mobile offshore units are to be in accordance with Section 6-1-10 of the *MODU Rules*, as shown in 6-1/Table 11.

**TABLE 11**  
**Anchoring System (1 August 2012)**

	<i>Section of MODU Rules</i>
Anchoring System – Symbol Ⓔ	6-1-10/3
Survey and Certification	6-1-10/5



## CHAPTER 7 Surveys

### CONTENTS

<b>SECTION 1</b>	<b>Surveys During Construction .....</b>	<b>63</b>
1	General .....	63
3	Surveys at Builder's Yard – Hull Structure and Outfitting .....	63
3.1	General.....	63
3.3	Nondestructive Testing (NDT).....	64
3.5	Survey of Spaces (Damage Stability Criteria) .....	64
5	Surveys at Builder's Yard – Machinery, Piping, Pressure Vessels, and Outfitting.....	65
5.1	General.....	65
7	Surveys at Builder's Yard – Mechanical and Piping Systems .....	66
7.1	General.....	66
9	Surveys at Builder's Yard – Electrical Cables and Equipment .....	66
9.1	General.....	66
11	Surveys at Builder's Yard – Electrical Systems .....	67
11.1	General.....	67
13	Surveys at Builder's Yard – Hazardous Areas.....	68
13.1	General.....	68
15	Surveys at Builder's Yard – Fire and Safety .....	69
15.1	General.....	69
17	Surveys at Builder's Yard – Sea Trial .....	69
17.1	General.....	69
17.3	Sea Trial.....	70
TABLE 1	Surveys During Construction .....	63
TABLE 2	Surveys at Builder's Yard – Hull Structure and Outfitting .....	64
TABLE 3	Nondestructive Testing .....	64
TABLE 4	Damage Conditions .....	65
TABLE 5	Surveys at Builder's Yard – Machinery, Piping, Pressure Vessels, and Outfitting .....	65
TABLE 6	Surveys at Builder's Yard – Mechanical and Piping Systems .....	66
TABLE 7	Surveys at Builder's Yard – Electrical Cables and Equipment.....	67
TABLE 8	Surveys at Builder's Yard – Electrical Systems .....	67
TABLE 9	Surveys at Builder's Yard – Hazardous Areas.....	68
TABLE 10	Surveys at Builder's Yard – Fire and Safety .....	69
TABLE 11	Surveys at Builder's Yard – Sea Trial .....	70
TABLE 12	Sea Trial.....	70

<b>SECTION 2</b>	<b>Surveys After Construction</b> .....	<b>71</b>
1	Conditions for Surveys After Construction.....	71
1.1	Prompt and Thorough Repairs .....	71
3	Survey Pre-planning .....	72
3.1	Special Surveys, Drydocking Surveys, and Underwater Inspections in Lieu of Drydocking .....	72
5	Annual Surveys – Hull and Machinery.....	73
7	Special Periodical Surveys – Hull and Machinery .....	73
9	Drydocking Survey or Equivalent.....	73
11	Specific Surveys on Self-Elevating Units After Ocean Transit Tow .....	74
13	Tail Shaft Surveys.....	74
15	Boiler Surveys .....	74
15.1	Survey Interval.....	74
15.3	Parts to be Examined .....	74
17	Electrical Equipment .....	74
17.1	Timing of Survey.....	74
17.3	Parts to be Examined .....	75
17.5	Main Propulsion Apparatus.....	75
17.7	Major Repairs .....	75
19	Automatic and Remote-control Systems .....	75
19.1	Annual Survey .....	75
19.3	Special Periodical Surveys .....	75
19.5	Repairs and Alterations .....	76
21	Lay-up and Reactivation of Mobile Offshore Units .....	76
<b>TABLE 1</b>	<b>Conditions for Surveys After Construction</b> .....	<b>71</b>
<b>TABLE 2</b>	<b>Annual Surveys – Hull and Machinery</b> .....	<b>73</b>
<b>TABLE 3</b>	<b>Special Periodical Surveys – Hull and Machinery</b> .....	<b>73</b>
<b>TABLE 4</b>	<b>Drydocking Survey or Equivalent</b> .....	<b>73</b>



## CHAPTER 7 Surveys

### SECTION 1 Surveys During Construction (1 August 2012)

#### 1 General

This Section pertains to surveys and testing to be carried out during construction of a mobile offshore unit at the builder's yard/facility. The requirements for design review are given in Chapters 3, 4, and 5 of this Guide.

General requirements for surveys during construction are shown in 7-1/Table 1. The requirements for specific surveys are included in subsequent Subsections.

All Rule contents covered by subsequent Subsections of this Chapter and that require visual examination, verification, testing, etc., are to be carried out in presence of and to the satisfaction of the attending Surveyor.

**TABLE 1**  
**Surveys During Construction (1 August 2012)**

	<i>Section of MODU Rules</i>
Survey at Builder's Yard	7-1-1/3
Certification and Classification	7-1-1/5
Onboard Drawings and Manuals	7-1-1/7

*Note:* Any reference to "drilling" in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

#### 3 Surveys at Builder's Yard – Hull Structure and Outfitting

##### 3.1 General

For typical surveys required to be carried out, see 7-1/Table 2. All surveys and testing are to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial, with the exception of testing of the onboard computer, and hull structure testing such as hydrostatic testing and hull structural testing of tanks which may be carried out during the sea trial as referenced in Section 7-1-9 of the *MODU Rules*.

**TABLE 2**  
**Surveys at Builder’s Yard – Hull Structure and Outfitting (1 August 2012)**

	<i>Section of MODU Rules</i>
Survey of Hull Structure and Outfitting	7-1-2/3
Material	7-1-2/5
Qualification of Welders and Welding Specifications	7-1-2/7
Production Welding	7-1-2/9
Corrosion Protection	7-1-2/13
Survey of Load Line	7-1-2/15
Watertight/Weathertight Integrity	7-1-2/19
Onboard Computers for Stability Calculations	7-1-2/21
Hull Testing During Construction	7-1-2/23
Construction Booklet (Construction Portfolio)	7-1-2/25
Hull Inspection and Maintenance Program (HIMP) (Optional)	7-1-2/27

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

### 3.3 Nondestructive Testing (NDT)

Prior to commencement of any NDT, an NDT plan is to be submitted to the attending Surveyor for review and acceptance, and is to conform to 2-4-1/5.17 of the *ABS Rules for Materials and Welding (Part 2)* and 3-2-7/5 of the *MODU Rules*. NDT is to be carried out in accordance with *ABS Guide for Nondestructive Inspection of Hull Welds*.

All NDT procedures are to be reviewed and accepted by the Surveyor before commencement of NDT. Radiographic Testing (RT), Ultrasonic Testing (UT), Magnetic Particle Inspection (MPI), Penetrant Testing (PT), Eddy Current (EC) or Alternating Current Field Measurement (ACFM) is to be carried out to the satisfaction of the Surveyor. With the exception of RT, the Surveyor may require to witness the NDT carried out by a qualified technician.

**TABLE 3**  
**Nondestructive Testing (1 August 2012)**

	<i>Section of MODU Rules</i>
Nondestructive Testing (NDT) of Column-Stabilized Units	7-1-1/11.1
Nondestructive Testing (NDT) of Self-Elevating Units	7-1-1/11.3
Type and Extent of NDT	7-1-1/11.7
NDT Personnel and Records	7-1-1/11.9
NDT Acceptance Standards	7-1-1/11.11

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

### 3.5 Survey of Spaces (Damage Stability Criteria)

In assessing the damage stability of mobile offshore units as required by Chapter 3, Section 3, the assumed extent of damage is to be in accordance with the *MODU Rules* as indicated in 7-1/Table 4. If damage of a lesser extent results in a more severe condition, such lesser extent is to be assumed. During the survey of spaces, all piping, ventilating systems, trunks, etc., within the assumed damage area are to be considered damaged. Positive means of closure are to be provided to preclude progressive flooding of other intact spaces. Assumed damage conditions are as follows.

**TABLE 4**  
**Damage Conditions (1 August 2012)**

	<i>Section of MODU Rules</i>
Damage Conditions for Self-Elevating Units	7-1-2/17.1
Damage Conditions for Column-Stabilized Units	7-1-2/17.3

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 5 Surveys at Builder’s Yard – Machinery, Piping, Pressure Vessels, and Outfitting

### 5.1 General

This Subsection pertains to surveys and testing to be carried out on machinery, piping, pressure vessels, and mechanical outfitting items during construction, installation and testing of mobile offshore units at builder’s yard/facility.

The documentation requirements for design review are given in Chapters 3, 4, and 5 of this Guide.

Surveys and testing of mechanical and piping systems are referenced in Section 7-1-4 of the *MODU Rules*, as indicated in 7-1/Table 5. All surveys and testing are to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial as referenced in Section 7-1-9 of the *MODU Rules*.

**TABLE 5**  
**Surveys at Builder’s Yard – Machinery, Piping, Pressure Vessels, and Outfitting (1 August 2012)**

	<i>Section of MODU Rules</i>
Survey of Machinery, Piping, Pressure Vessels, and other Outfitting Items	7-1-3/3
Materials and Operational Conditions	7-1-3/5
Internal Combustion Engines	7-1-3/7
Piping	7-1-3/9
Piping Installation Details	7-1-3/11
Metallic and Plastic Pipes	7-1-3/13
Valves	7-1-3/15
Pipe Fittings	7-1-3/17
Flanges	7-1-3/19
Fluid Power Cylinders	7-1-3/21
Sea Inlets and Overboard Discharges	7-1-3/23
Scuppers and Drains on Self-Elevating Units	7-1-3/25
Cooler Installations External to the Hull	7-1-3/27
Penetrations Through Watertight Boundaries	7-1-3/29

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 7 Surveys at Builder’s Yard – Mechanical and Piping Systems

### 7.1 General

This Subsection pertains to surveys and testing to be carried out on mechanical and piping systems during construction, installation and testing of mobile offshore units at builder’s yard/facility.

The documentation requirements for design review are given in Chapters 3, 4, and 5 of this Guide.

Installation surveys and testing of mechanical and piping systems are referenced in Section 7-1-3 of the *MODU Rules*, as indicated in 7-1/Table 5. ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing are to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial as referenced in Section 7-1-9 of the *MODU Rules*.

**TABLE 6**  
**Surveys at Builder’s Yard – Mechanical and Piping Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
Jacking and Associated Systems	7-1-4/3
Tank Vents and Overflows	7-1-4/5
Sounding	7-1-4/7
Bilge System	7-1-4/9
Ballast System	7-1-4/11
Fuel-Oil System	7-1-4/13
Low Flash Point Fuels	7-1-4/15
Lubricating-Oil Systems	7-1-4/17
Hydraulic Systems	7-1-4/19
Fixed Oxygen-Acetylene Installations	7-1-4/21
Fuel Storage for Helicopter Facilities	7-1-4/23
Starting-air Systems	7-1-4/25
Cooling-Water Systems for Internal Combustion Engines	7-1-4/27
Exhaust System	7-1-4/29
Valves in Atomizing Lines	7-1-4/31
Helicopter Deck Drainage Arrangements	7-1-4/33
Boilers and Associated Piping	7-1-4/35
Steering Gear Piping	7-1-4/37
Gas Turbine Piping	7-1-4/39
Piping System Pressure Test	7-1-4/41

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 9 Surveys at Builder’s Yard – Electrical Cables and Equipment

### 9.1 General

This Subsection pertains to surveys and testing to be carried out on electrical cables and equipment during construction, installation and testing of mobile offshore units at builder’s yard/facility.

The documentation requirements for design review are given Chapters in 3, 4, and 5 of this Guide.

Installation surveys and testing of electrical cables and equipment are referenced in Section 7-1-5 of the *MODU Rules*, as indicated in 7-1/Table 7. ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing are to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial as referenced in Section 7-1-9 of the *MODU Rules*.



For definition of various terms, see 4-3-1/3.5 of the *MODU Rules*.

**TABLE 7**  
**Surveys at Builder’s Yard – Electrical Cables and Equipment (1 August 2012)**

	<i>Section of MODU Rules</i>
Survey of Electrical Cables and Equipment	7-1-5/3
Cable Installation	7-1-5/5
Equipment Installation and Arrangement	7-1-5/7
Earthing	7-1-5/9

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 11 Surveys at Builder’s Yard – Electrical Systems

### 11.1 General

This Subsection pertains to surveys and testing to be carried out on electrical systems during construction, installation and testing of mobile offshore units at builder’s yard/facility.

The documentation requirements for design review are given in Chapters 3, 4, and 5 of this Guide.

Installation surveys and testing of electrical systems are referenced in Section 7-1-6 of the *MODU Rules*, as indicated in 7-1/Table 8. ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing are to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial as referenced in Section 7-1-9 of the *MODU Rules*.

**TABLE 8**  
**Surveys at Builder’s Yard – Electrical Systems (1 August 2012)**

	<i>Section of MODU Rules</i>
Main Source of Power	7-1-6/3
Emergency Source of Power	7-1-6/5
Distribution System	7-1-6/7
Circuit Protection System	7-1-6/9
Systems for Steering Gear Installed in Self-Propelled Units	7-1-6/11
Lighting and Navigation Light Systems	7-1-6/13
Interior Communication Systems	7-1-6/15
Manually Operated Alarms	7-1-6/17
Fire Protection and Fire Detection Systems	7-1-6/19
Electrical System Testing	7-1-6/21

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 13 Surveys at Builder’s Yard – Hazardous Areas

### 13.1 General

For the purpose of this Guide and by definition (see 2-1/3), mobile offshore units are not intended to install drilling or production equipment on board or provide storage of hydrocarbons. However, these units may be temporarily used to store or install equipment in open deck areas from the drilling or production units they support. These storage areas where hydrocarbon vapors may be present during the operation of the unit are to be designated as a hazardous zone appropriate to the expected hazard.

Other areas or spaces of the unit where flammable or explosive gases, vapors or dust are normally present or likely to be present are to be designated hazardous areas. Hazardous areas are to be classified based on the likelihood of presence and the concentration and type of flammable atmosphere, as well as in terms of the extent of the area or space.

For definition of various terms, see 4-1/11.5 of this Guide.

This Subsection pertains to survey of the following items onboard mobile offshore units built at builder’s yard/facility, including required onboard testing and trial. The documentation requirements for design review are given Section 4 of this Guide. Following items are to be surveyed and tested in presence of and to the satisfaction of the attending Surveyor, preferably prior to delivery of the unit, in accordance with Section 7-1-7 of the *MODU Rules* as indicated in 7-1/Table 9.

- i) Arrangement of hazardous areas (zones)
- ii) Openings and penetrations affecting the extent of hazardous areas
- iii) Installation and function of access doors and hatches between hazardous areas and adjoining areas/spaces
- iv) Installation and function of ventilation of hazardous areas and adjoining areas/spaces
- v) Installation of machinery in hazardous areas
- vi) Installation of cables and electrical equipment in hazardous areas
- vii) Installation of cables and electrical equipment in paint stores and battery lockers
- viii) Piping systems serving the hazardous areas

**TABLE 9**  
**Surveys at Builder’s Yard – Hazardous Areas (1 August 2012)**

	<i>Section of MODU Rules</i>
Openings and Penetrations Affecting the Extent of Hazardous Zones	7-1-7/3
Access and Ventilation Conditions Affecting the Extent of Hazardous Zones	7-1-7/5
Machinery Installations	7-1-7/7
Equipment and Installation in Hazardous Area	7-1-7/9
Paint Stores and Battery Lockers	7-1-7/11
Piping and Installation in Hazardous Area	7-1-7/13

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 15 Surveys at Builder’s Yard – Fire and Safety

### 15.1 General

This Subsection pertains to surveys and testing to be carried out on fire and safety features during construction, installation and testing of mobile offshore units at builder’s yard/facility.

The documentation requirements for design review are given in Chapters 3, 4, and 5 of this Guide.

Installation surveys and testing of fire and safety features are referenced in Section 7-1-8 of the *MODU Rules*, as indicated in 7-1/Table 10. ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing are to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial.

**TABLE 10**  
**Surveys at Builder’s Yard – Fire and Safety (1 August 2012)**

	<i>Section of MODU Rules</i>
Surveys of Fire and Safety Features	7-1-8/3
Passive Fire Protection Systems	7-1-8/5
Active Fire Protection – Fixed Systems	7-1-8/7
Active Fire Protection – Additional Fixed Systems	7-1-8/9
Active Fire Protection – Portable Fire Fighting Systems	7-1-8/11
Fire Detection and Alarm Systems	7-1-8/13
Outfitting	7-1-8/17

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 17 Surveys at Builder’s Yard – Sea Trial

### 17.1 General

A sea trial procedure is to be developed by the builder and submitted to the attending Surveyor for review and comments, well in advance, prior to commencement of the trial.

A pre-planning meeting in presence of the attending Surveyor(s) is to be carried out prior to the sea trial to at least confirm the following:

- Sea trial procedure to be followed
- Sea trial schedule and estimated duration of tests to be carried out during the sea trial
- Key personnel from the builder, owner, operator, and any other representative
- Any specific test to be carried out that may be outside the scope of classification

During sea trial of a mobile offshore unit, the operation of machinery, electrical systems and safety features required by this Guide is to be demonstrated to the satisfaction of the attending Surveyor(s) in accordance with Section 7-1-9 of the *MODU Rules*, as indicated in 7-1/Table 11. Complete function tests are to be carried out, including duration runs and tests for operation of all protective devices and stability tests for control, in presence of and to the satisfaction of the attending Surveyor(s).

If the unit is self-propelled, maneuvering tests which should include a reversal of the drilling unit from full speed ahead to full speed astern, are also to be carried out in presence of and to the satisfaction of the attending Surveyor(s).

**TABLE 11**  
**Surveys at Builder’s Yard – Sea Trial (1 August 2012)**

	<i>Section of MODU Rules</i>
Stability Test	7-1-9/3
Safety	7-1-9/5
Hull Structure Testing	7-1-9/7
Testing on Self-Elevating Units	7-1-9/9
Sea Trial for Self-Propelled Drilling Units	7-1-9/13
Anchoring/Mooring Trial	7-1-9/15
Dynamic Positioning System (DPS)	7-1-9/17

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

**17.3 Sea Trial**

During the sea trial, tests in accordance with Section 7-1-9 of the *MODU Rules* are to demonstrate that each item of plant and the system as a whole is satisfactory for drilling unit’s service after construction, as indicated in 7-1/Table 12.

**TABLE 12**  
**Sea Trial (1 August 2012)**

	<i>Section of MODU Rules</i>
Operation of Machinery and Piping Systems	7-1-9/11.1
Ballast Systems	7-1-9/11.3
Bilge System	7-1-9/11.5
Electrical Installation for Main Services	7-1-9/11.7
Communication Facilities	7-1-9/11.9
Fire Extinguishing System	7-1-9/11.11
Main Source of Power	7-1-9/11.13
Emergency Source of Power	7-1-9/11.15
Distribution System	7-1-9/11.17
Circuit Protection System	7-1-9/11.19
Lighting and Navigation Light Systems	7-1-9/11.21
Public Address (PA) and General Alarm (GA) Systems	7-1-9/11.23
Fire Protection and Fire Detection Systems	7-1-9/11.25

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## CHAPTER 7 Surveys

### SECTION 2 Surveys After Construction

#### 1 Conditions for Surveys After Construction

The conditions for surveys after construction for mobile offshore units are to be in accordance with [Part 7, Chapter 2](#) of the *MODU Rules*, as shown in [7-2/Table 1](#).

**TABLE 1**  
**Conditions for Surveys After Construction (1 August 2012)**

	<i>Section of MODU Rules</i>
Definitions	7-2-1/3
Notification and Availability for Survey	7-2-1/5
Damage, Failure and Repair	7-2-1/7
Alterations/Modifications	7-2-1/9
Welding and Replacement of Materials	7-2-1/11
Lay-up and Reactivation	7-2-1/15
Incomplete Surveys	7-2-1/13
Onboard Drawings and Manuals	7-2-1/15
Survey Intervals	7-2-2/1
Annual Surveys	Section 7-2-4
Special Periodical Surveys	Section 7-2-5
Drydocking Survey or Equivalent	Section 7-2-6
Underwater Inspection in Lieu of Drydocking (UWILD)	7-2-6/3

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

#### 1.1 Prompt and Thorough Repairs

Notwithstanding [7-2-1/7.1](#) and [7-2-1/7.3](#) of the *MODU Rules*, any damage in association with serious wastage over the allowable limits (including buckling, detachment or fracture), or extensive areas of serious wastage over the allowable limits, in way of Special Application or Primary Application structure, which affects or may affect the unit's structural, watertight or weathertight integrity, is to be promptly and thoroughly repaired. See [3-2-3/3.1](#) and [3-2-4/1.7](#) of the *MODU Rules*.

For locations where adequate repair facilities are not available, consideration may be given to allow the unit to proceed directly to a repair facility. This may require temporary repairs for the intended voyage.

Additionally, when a survey results in the identification of structural defects or corrosion, either of which, in the opinion of the Surveyor, will impair the unit's fitness for continued service, remedial measures are to be implemented before the unit continues in service.

### 3 Survey Pre-planning

#### 3.1 Special Surveys, Drydocking Surveys, and Underwater Inspections in Lieu of Drydocking (1 August 2012)

Plans and procedures for Special Surveys, Drydocking Surveys, and Underwater Inspections in Lieu of Drydocking are to be made available onboard for the purpose of carrying out an onboard pre-planning of the survey with the Surveyor. **Plan submissions are to comply with 7-2-3/1.1 and 7-2-3/1.3 of the MODU Rules.**

The planning document is intended to identify critical structural areas and to stipulate the minimum extent, location and means of close up inspection, extent and type of NDT, and thickness measurements with respect to the major structural components as well as to nominated areas.

The document should be worked out by the Owner in co-operation with ABS and submitted for review well in advance of the survey.

The basis for nomination of the critical structural areas is an assessment in consideration of possible deterioration and designated fatigue prone areas where the following elements on a particular unit are taken into account:

- Design feature with relatively low fatigue life
- Former history available at Owner's or ABS offices with respect to corrosion, cracking, buckling, indents and repairs for the particular unit as well as similar units
- Unit's service history since last survey (e.g., area of operation, environmental data, water depth, air gap for SEU's, length of time at each location, etc.)

The degree of criticality should be judged and decided on the basis of the units structural and fatigue analyses and recognized principles and practice.

The planning document should contain:

- Main particulars
- Plans to include details of major brace and column connections on column-stabilized units and details of leg and leg-to-spudcan connections
- Jackhouse/jackcase-to-deck connections, on self-elevating units
- Detailed information on NDT methods and locations
- List of tanks with information on use, protection and condition of coating
- Corrosion risk of tank and other major structural members
- Design risk nomination of major structure
- Nomination of areas for close up surveys and NDT
- Nomination of areas of structure for thickness measurement
- List of acceptable corrosion allowance of different structures
- Method and extent of cleaning inspection points

## 5 Annual Surveys – Hull and Machinery

Annual Surveys of Hull and Machinery for mobile offshore units are to be in accordance with Section 7-2-4 of the *MODU Rules*, as shown in 7-2/Table 2.

**TABLE 2**  
**Annual Surveys – Hull and Machinery**

	<i>Section of MODU Rules</i>
Annual Survey – Hull	7-2-4/1
Annual Survey – Machinery and Electrical Systems	7-2-4/3
Thrusters and Dynamic Positioning Systems	7-2-4/5

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 7 Special Periodical Surveys – Hull and Machinery

Special Surveys of Hull and Machinery for mobile offshore units are to be in accordance with Section 7-2-5 of the *MODU Rules*, as shown in 7-2/Table 3.

**TABLE 3**  
**Special Periodical Surveys – Hull and Machinery**

	<i>Section of MODU Rules</i>
Special Periodical Survey – Hull No. 1	7-2-5/1
Special Survey No. 2 and Subsequent	7-2-5/3
Special Periodical Survey – Machinery	7-2-5/5
Special Periodical Survey – Electrical Equipment	7-2-5/7
Special Periodical Survey – Special Features (All Types)	7-2-5/9
Thrusters and Dynamic Position Systems	7-2-5/11
Units with Retractable Propulsion Thrusters	7-2-5/13

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 9 Drydocking Survey or Equivalent (1 August 2012)

Drydocking Surveys for mobile offshore units are to be in accordance with Section 7-2-6 of the *MODU Rules*, as shown in 7-2/Table 4.

**TABLE 4**  
**Drydocking Survey or Equivalent**

	<i>Section of MODU Rules</i>
Parts to be Examined	7-2-6/1
Underwater Inspection in Lieu of Drydocking (UWILD)	7-2-6/3

*Note:* Any reference to “drilling” in the *MODU Rules* is to be interpreted as referring to the type of operation for which the mobile offshore unit is designed and/or intended.

## 11 Specific Surveys on Self-Elevating Units After Ocean Transit Tow (1 August 2012)

A specific survey is to be carried out on self-elevating units after the completion of an ocean transit tow, either as a wet tow or dry tow, in accordance with Section 7-2-7 of the *MODU Rules*.

## 13 Tail Shaft Surveys

Surveys are to be carried out in accordance with applicable paragraphs of the latest edition of the *ABS Rules for Survey After Construction (Part 7)*, as applicable to vessels constructed in accordance with the *Steel Vessel Rules*. However, due to low running hours on tailshafts of Mobile Offshore units, the interval between tailshaft surveys may be extended based on the following being to the satisfaction of the Surveyor:

- i) Diver's external examination of stern bearing and outboard seal area, including wear-down check as far as is possible.
- ii) Internal examination of the shaft area (inboard seals) in propulsion room(s).
- iii) Confirmation of lubricating oil records (satisfactory oil loss rate, no evidence of unacceptable contamination).
- iv) Shaft seal elements are examined/replaced in accordance with seal manufacturer's recommendations.

## 15 Boiler Surveys

### 15.1 Survey Interval

Waste-heat or fired auxiliary boilers used for the operation of the unit, excluding those intended solely for hotel load, are to be surveyed at intervals not exceeding 2½ years. However, where requested by the Owner and after an external examination of the boilers and review of operating and feedwater records, an extension of the auxiliary or waste-heat boiler surveys of up to six months may be granted.

### 15.3 Parts to be Examined

#### 15.3.1

At each survey, the boilers, superheaters and economizers are to be examined internally (water-steam side) and externally (fire side).

#### 15.3.2

Boiler mountings and safety valves are to be examined at each survey and opened as considered necessary by the Surveyor.

#### 15.3.3

The proper operation of the safety valves is to be confirmed at each survey.

#### 15.3.4

When considered necessary by the Surveyors, the boilers and superheaters are to be subjected to hydrostatic pressure test.

## 17 Electrical Equipment

### 17.1 Timing of Survey

The entire installation, including auxiliary and emergency equipment, is to undergo Special Periodical Survey every five years at the same time as the Special Survey on the machinery. The requirements of 7-2/17.3 and 7-2/17.5 are to be carried out at each Special Periodical Survey.



### 17.3 Parts to be Examined

#### 17.3.1

Fittings and connections on main switchboards and distribution panels are to be examined, and care is to be taken to see that no circuits are over fused.

#### 17.3.2

Cables are to be examined as far as practicable without undue disturbance of fixtures.

#### 17.3.3

All generators are to be run under load, either separately or in parallel; switches and circuit breakers are to be tested.

#### 17.3.4

All equipment and circuits are to be inspected for possible development of physical changes or deterioration. The insulation resistance of the circuits is to be measured between conductors and between conductors and ground and these values compared with those previously measured. Any large and abrupt decrease in insulation resistance is to be further investigated and either restored to normal or renewed as indicated by the conditions found.

#### 17.3.5

The specified electrical auxiliaries for vital purposes, generators and motors are to be examined and their prime movers opened for inspection. The insulation resistance of each generator and motor is to be measured.

### 17.5 Main Propulsion Apparatus

The windings of generators and motors are to be thoroughly examined and found or made dry and clean. Particular attention is to be paid to the ends of the windings of stator and rotors. After the winding have been cleaned and found dry, they are to be varnished, if necessary, with a standard insulating varnish applied preferably by spraying.

### 17.7 Major Repairs

On the occasion of major repairs, the coils repaired or renewed are to be subjected to a dielectric strain test, as specified under the applicable parts of Chapter 4, Section 3. In addition, the circuits containing the repairs or renewals and coils which have been disturbed during repairs are to be subjected to dielectric strain tests for one minute by application of a potential of 125% of the maximum operating voltage of the circuits to which it is applied. The direct current fields of generators and motors are to be subjected for one minute to a test potential equal to 50% of the value specified under the applicable parts of Chapter 4, Section 3 and the whole apparatus operated under full load conditions.

## 19 Automatic and Remote-control Systems

### 19.1 Annual Survey

At twelve month intervals from the date of installation, a survey is to be carried out during which a general examination of the automatic and remote-control system is to be made. The examination is to be made with a generator in operation and the control system energized to permit random checking of function indicators, alarms and such control actuators as may be operational. The Surveyor is to examine the machinery records to check the performance of the control system throughout the period since the last survey and to establish if there has been any abnormal functioning or failures and what corrective measures had been taken to preclude their recurrence. The machinery-space fire-detecting and bilge water-level alarms are to be checked for performance.

### 19.3 Special Periodical Surveys

Special periodical surveys are to be carried out at intervals of five years from the date of installation and are to include compliance with all requirements for Annual Surveys and with those that follow.

#### 19.3.1 Control Actuators

All mechanical, hydraulic and pneumatic control actuators and their power systems are to be examined and tested as considered necessary.

#### 19.3.2 Electrical

The insulation resistance of the windings of electrical control motors or actuators is to be measured, with all circuits of different voltages above ground being tested separately, and is to be on the order of one-half to one megohm.

#### 19.3.3 Unattended Plants

Control systems for unattended machinery spaces are to be subjected to dock trials at reduced power on the propulsion engine to check the proper performance of all automatic functions, alarms, and safety systems.

### 19.5 Repairs and Alterations

Major repairs or alterations to the automatic and remote-control systems are to be made, in accordance with approved plans, under the supervision and to the satisfaction of the Surveyor.

## 21 Lay-up and Reactivation of Mobile Offshore Units

Surveys for lay-up and reactivation of mobile offshore units are to be carried out in accordance with the requirements for "Lay-up and Reactivation of Laid-up Mobile Offshore Drilling Units" included in Appendix 7-2-A1 of the *MODU Rules*, discarding those requirements related to the drilling systems, equipment and operations.



## CHAPTER 8 Specific Unit Types

### CONTENTS

<b>SECTION 1</b>	<b>Accommodation Units</b> .....	<b>79</b>
1	General .....	79
3	Definitions .....	79
3.1	Accommodation Unit .....	79
3.3	Accommodation Spaces .....	79
3.5	Industrial Personnel .....	79
3.7	Crew .....	79
5	Passive Fire Protection .....	79
5.1	Structural Fire Protection .....	79
7	Active Fire Protection .....	80
7.1	Arrangement of Fire Water Supply .....	80
7.3	Fixed Fire Detection and Fire Alarm Systems, and Fixed Automatic Sprinkler, Fire Detection and Fire Alarm Systems .....	81
9	Life-Saving Appliances and Equipment .....	81
<b>SECTION 2</b>	<b>Crane Units</b> .....	<b>82</b>
1	General .....	82
3	Definitions .....	82
3.1	Crane Unit .....	82
5	Certification of Cranes .....	82
7	Crane Pedestal and Supporting Structure .....	82
8	Supporting Structure for Deck Cargo .....	83
9	Stability .....	83
9.1	Overturning Moment .....	83
9.3	Deck Cargo .....	83
<b>SECTION 3</b>	<b>Construction and Maintenance Units</b> .....	<b>84</b>
1	General .....	84
3	Definitions .....	84
3.1	Construction and Maintenance Unit .....	84
5	Certification of Cranes .....	84
7	Crane Pedestal and Supporting Structure .....	84
8	Supporting Structure for Deck Cargo .....	85
9	Stability .....	85
9.1	Overturning Moment .....	85
9.3	Deck Cargo .....	85

<b>SECTION 4</b>	<b>Drilling Tenders .....</b>	<b>86</b>
1	General .....	86
3	Definitions .....	86
3.1	Drilling Tender .....	86
5	Pipe Racks .....	86
7	Hazardous Areas .....	86
9	Passive Fire Protection .....	87
9.1	Structural Fire Protection .....	87
<b>SECTION 5</b>	<b>Pipe and Cable Laying Units .....</b>	<b>88</b>
1	General .....	88
3	Definitions .....	88
3.1	Pipe Laying Unit.....	88
3.3	Cable Laying Unit .....	88
5	Supporting Structure for Pipe or Cable Laying Devices .....	88
7	Pipe Racks and Cable Reel Support Structure.....	88
9	Stability.....	89
9.1	Overturning Moment .....	89
9.3	Pipe Racks and Cable Reels .....	89
11	Conventionally Moored Units .....	89
13	Dynamically Positioned Units.....	89
<b>SECTION 6</b>	<b>Wind Turbine Installation, Maintenance, and Repair Units.....</b>	<b>90</b>
1	General .....	90
3	Definitions .....	90
3.1	Wind Turbine IMR Unit .....	90
3.3	Deck Cargo.....	90
5	Certification of Cranes .....	90
7	Crane Pedestal and Supporting Structure .....	90
9	Supporting Structure for Pile Driving Equipment .....	91
11	Supporting Structure for Deck Cargo.....	91
13	Stability.....	91
13.1	Overturning Moment.....	91
13.3	Deck Cargo.....	91
15	Surveys .....	92
<b>SECTION 7</b>	<b>Multipurpose Units .....</b>	<b>93</b>
1	General .....	93
<b>APPENDIX 1</b>	<b>Stability Criteria for Counter-Ballasted Crane Units .....</b>	<b>94</b>
1	Intact Stability after Loss of Crane Load.....	94
3	Damage Stability .....	94
<b>FIGURE 1</b>	<b>Criteria for CSU after Accidental Loss of Crane Load:</b>	
	$A_1 \geq 1.3 * A_2$ .....	95



## CHAPTER 8 Specific Unit Types

### SECTION 1 Accommodation Units

#### 1 General

Accommodation units, as defined in 8-1/3.1, built to the requirements of this Section and other relevant sections of this Guide, will be assigned the notation of **Accommodation Service** after the classification notations described in 1-2/1.

#### 3 Definitions

For the purpose of this Guide, the terms have the following meaning unless stated otherwise.

##### 3.1 Accommodation Unit

Within the application of this Guide, an *Accommodation Unit* is a mobile offshore unit primarily intended for the accommodation of more than 36 persons who are industrial personnel, engaged in some aspect of offshore or related employment, excluding members of the crew. It is intended that during jacking or towing operations, a self-elevating unit will have on board only those crew members necessary for these operations.

##### 3.3 Accommodation Spaces

*Accommodation Spaces* are those used for public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, games and hobbies rooms, pantries containing no cooking appliances and similar spaces. Public spaces are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

##### 3.5 Industrial Personnel

*Industrial Personnel* are individuals from the offshore or similar industry who are temporarily housed on the unit. These persons do not include members of the crew of the accommodation unit, but may include crew members or industrial personnel from other vessels, drilling units, offshore fixed platforms, etc.

##### 3.7 Crew

*Crew* means all persons carried on board the accommodation unit to provide maintenance and operation of the unit, its machinery, systems and arrangements or to provide services for other persons onboard the unit.

#### 5 Passive Fire Protection

##### 5.1 Structural Fire Protection

In addition to complying with the requirements of Chapter 5, Section 1 of this Guide, the following requirements apply to accommodation units.

###### 5.1.1 Main Vertical Zones

Hull, superstructure and deckhouses are to be subdivided into two or more main vertical zones by "A" Class divisions having insulation values in accordance with 5-1-1/3.7 of the *MODU Rules*.

5.1.1(a) The length or width of the main vertical zone is the maximum distance between the furthestmost points of the bulkheads bounding it.

5.1.1(b) In general, the mean length and width of the main vertical zone on any deck is not to exceed 40 m (131 ft 3 in.).

5.1.1(c) The length and width of main vertical zones may be extended to a maximum of 48 m (157 ft 5<sup>3</sup>/<sub>4</sub> in.) in order to bring main vertical zone bulkheads into line with subdivision bulkheads below or to accommodate a large public space extending for the entire length of the zone provided the total area of the main vertical zone on any deck is not greater than 1600 m<sup>2</sup> (17220 ft<sup>2</sup>).

5.1.1(d) As far as practicable, bulkheads forming the boundaries of the main vertical zones above the bulkhead deck are to be in line with watertight subdivision bulkheads immediately below the bulkhead deck.

5.1.1(e) Main vertical zone boundary bulkheads are to extend from deck to deck and to the shell or other zone boundaries.

### 5.1.3 Corridor Bulkheads

All corridor bulkheads not required to be “A” class divisions are to be “B” class divisions extending from deck to deck except:

- i) When continuous ceilings and linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining is to be of material which, in thickness and composition, is acceptable in the construction of a “B” class division, but which may be required to meet “B” class integrity standards only insofar as considered reasonable and practicable by the Administration;
- ii) In the case of a unit protected by an automatic sprinkler system complying with Chapter 7 of the *International Code for Fire Safety Systems (FSS Code)*, the corridor bulkheads of “B” class material may terminate at a ceiling in the corridor provided the ceiling is of material which, in thickness and composition, is acceptable in the construction of “B” class divisions. Such corridor bulkheads and ceilings are to meet “B” class integrity standards insofar as considered reasonable and practicable by the Administration. All doors and frames in such bulkheads are to be of noncombustible materials and constructed and erected to provide substantial fire resistance to the satisfaction of the Administration.

### 5.1.5 Exterior Boundaries of Accommodation Block

The exterior boundary of superstructures and deckhouses enclosing accommodations, including any overhanging decks supporting such accommodations, is to be an “A-60” Class boundary for the whole of the portion which faces and is within 30 m (98 ft) of any area in the adjacent drilling or production platform served by the accommodation unit where a hydrocarbon fire may arise. If the distance is more than 30 m (98 ft), but less than 100 m (328 ft), an “A-0” Class boundary is required.

Where “A-60” Class boundary is required, an “A-0” Class boundary used in conjunction with a water curtain system designed to provide a density of at least 6.1 liters/min/m<sup>2</sup> (0.15 gpm/ft<sup>2</sup>) of the exposed surface area may be used as an equivalent means of meeting the “A-60” class rating.

The ventilation inlets and outlets and other space openings in the deckhouse and superstructure exterior boundaries are to be located as far away from the adjacent drilling and production platform as practicable.

## 7 Active Fire Protection

In addition to complying with the requirements of Chapter 5, Section 2 of this Guide, the following requirements apply to accommodation units.

### 7.1 Arrangement of Fire Water Supply

The arrangements for the ready availability of water supply are to be such that at least one effective jet of water is immediately available from any hydrant in an interior location and so as to ensure the continuation of the output of water by the automatic starting of one required fire pump. At interior locations, fire hoses are to be connected to the hydrants at all times.

If fitted with periodically unattended machinery spaces, provisions for fixed water fire-extinguishing arrangements for such spaces, equivalent to those required for normally attended machinery spaces, are to be provided.

### 7.3 Fixed Fire Detection and Fire Alarm Systems, and Fixed Automatic Sprinkler, Fire Detection and Fire Alarm Systems

There is to be installed throughout each separate vertical fire zone, in all accommodation and service spaces and, where it is considered necessary also in control stations, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc., either:

- i) A fixed fire detection and fire alarm system of an approved type and complying with the requirements of 4-7-3/11 of the *Steel Vessel Rules* and so installed and arranged as to detect the presence of fire in such spaces and provide smoke detection in corridors, stairways and escape routes within accommodation spaces; or
- ii) An automatic sprinkler, fire detection and fire alarm system of an approved type and complying with the requirements of 4-7-3/9 of the *Steel Vessel Rules* or equivalent and so installed and arranged as to protect such spaces, and in addition a fixed fire detection and fire alarm system of an approved type complying with the requirements of 4-7-3/11 of the *Steel Vessel Rules* and so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within accommodation spaces.

## 9 Life-Saving Appliances and Equipment

Life-saving appliances and equipment are to comply with Chapter 10 of the *IMO Code for the Construction and Equipment of Mobile Offshore Drilling Units (IMO MODU Code)* and the relevant sections of the *International Life-Saving Appliance (LSA) Code*.

## CHAPTER 8 Specific Unit Types

### SECTION 2 Crane Units

#### 1 General

Crane units, as defined in 8-2/3.1, built to the requirements of this Section and other relevant sections of this Guide, will be assigned the notation of **Crane Service** after the classification notations described in 1-2/1.

#### 3 Definitions

For the purpose of this Guide, the terms have the following meaning unless stated otherwise.

##### 3.1 Crane Unit

Within the application of this Guide, a *Crane Unit* is a mobile offshore unit primarily intended for the lifting of heavy loads in oil drilling and production operations, offshore construction and/or salvage operations, with a lifting capacity of 160 metric tons and above.

#### 5 Certification of Cranes

Any crane permanently installed on board the crane unit and intended for operations other than supply of provisions and maintenance of the unit is to be certified by ABS in accordance with Chapter 2 of the *ABS Guide for Certification of Lifting Appliances* or API Spec. 2C.

Mobile cranes not permanently attached to the unit structure, such as crawler cranes, are not required to be certified.

#### 7 Crane Pedestal and Supporting Structure

The crane pedestal, when not covered by the crane certification, is to be designed in accordance with the recognized standard to which the crane is certified. Details and calculations are to be submitted for review.

In addition, crane pedestals are to be designed to resist motion-induced loads in severe storm, normal operating and transit conditions using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*, considering the operating limits of the crane.

Detail drawings of the foundation and supporting structure on which the crane and boom rest or other stowage arrangements are installed are to be submitted for review. The hull supporting structure is also to be designed to resist the design static and dynamic loading conditions of the crane, using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*. The boom rest or other stowage arrangements and their foundation and supporting structure are to be designed for the out-of-service loads as defined in 2-2/5.1.2 of the *ABS Guide for Certification of Lifting Appliances* or the recognized standard that the crane is certified to.



## 8 Supporting Structure for Deck Cargo (1 August 2012)

Foundations and supporting structure in way of deck cargo and permanently attached cargo-carrying structures are to be designed to adequately resist the load effects of the cargo in severe storm, normal operating and transit conditions using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*.

Consideration is also to be given to the unit in damaged conditions, where the structures above are to withstand the load effects of the cargo caused by the trim and heel of the unit in these damaged conditions, using the allowable stresses defined in 3-2-1/3 of the *MODU Rules* in association with a factor of safety of 1.0.

Tie-down or other securing arrangements are not included in the scope of Classification.

## 9 Stability

In addition to complying with the requirements of Chapter 3, Section 3 of this Guide, the following requirements apply to crane units.

### 9.1 Overturning Moment (1 August 2012)

In calculating overturning moments for crane units, the effect of the crane loads acting simultaneously with the maximum design wind force associated to the operation of the crane is to be determined. The full range of crane positions, elevations and weights is to be considered in order to investigate the most critical scenarios. **The wind area of the deck cargo is to be considered in the calculation of the overturning moment.**

When the crane unit is equipped to counter-ballast while lifting, the unit is to be able to withstand the sudden loss of the hook load in each condition of loading and operation. The free surface effects are to be considered for those tanks which are ballasted. Specific reference may be made to Chapter 8, Appendix 1, "Stability Criteria for Counter-Ballasted Crane Units".

### 9.3 Deck Cargo (1 August 2012)

Loading conditions in the operations manual are to include the effect of the deck cargo for each operating condition, using the estimated weight and the height of the center of gravity of the cargo based on the most severe loading assumptions. The loading conditions are to cover the full range of operating configurations, from no deck cargo on board to the maximum design deck load.

If the unit is intended to carry deck cargoes that may accumulate water, such as open cargo bins or open pipes, a free surface correction is to be applied to afloat conditions.

## CHAPTER 8 Specific Unit Types

### SECTION 3 Construction and Maintenance Units

#### 1 General

Construction and maintenance units, as defined in 8-3/3.1, built to the requirements of this Section and other relevant sections of this Guide, will be assigned the notation of **Construction and Maintenance Service** after the classification notations described in 1-2/1.

#### 3 Definitions

For the purpose of this Guide, the terms have the following meaning unless stated otherwise.

##### 3.1 Construction and Maintenance Unit

Within the application of this Guide, a *Construction and Maintenance Unit* is a mobile offshore unit primarily intended for construction and maintenance activities in support of offshore mineral exploration and production operations.

#### 5 Certification of Cranes

Any crane permanently installed on board the crane unit and intended for operations other than supply of provisions and maintenance of the unit is to be certified by ABS in accordance with Chapter 2 of the *ABS Guide for Certification of Lifting Appliances* or API Spec. 2C. Alternatively, a certification of compliance with API Spec. 2C issued by a recognized certifying body is considered acceptable.

Mobile cranes not permanently attached to the unit structure, such as crawler cranes, are not required to be certified.

#### 7 Crane Pedestal and Supporting Structure

The crane pedestal, when not covered by the crane certification, is to be designed in accordance with the recognized standard to which the crane is certified. Details and calculations are to be submitted for review.

In addition, crane pedestals are to be designed to resist motion-induced loads in severe storm, normal operating and transit conditions using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*, considering the operating limits of the crane.

Detail drawings of the foundation and supporting structure on which the crane and boom rest or other stowage arrangements are installed are to be submitted for review. The hull supporting structure is also to be designed to resist the design static and dynamic loading conditions of the crane, using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*. The boom rest or other stowage arrangements and their foundation and supporting structure are to be designed for the out-of-service loads as defined in 2-2/5.1.2 of the *ABS Guide for Certification of Lifting Appliances*.

## 8 Supporting Structure for Deck Cargo (1 August 2012)

Foundations and supporting structure in way of deck cargo and permanently attached cargo-carrying structures are to be designed to adequately resist the load effects of the cargo in severe storm, normal operating and transit conditions using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*.

Consideration is also to be given to the unit in damaged conditions, where the structures above are to withstand the load effects of the cargo caused by the trim and heel of the unit in these damaged conditions, using the allowable stresses defined in 3-2-1/3 of the *MODU Rules* in association with a factor of safety of 1.0.

Tie-down or other securing arrangements are not included in the scope of Classification.

## 9 Stability

In addition to complying with the requirements of Chapter 3, Section 3 of this Guide, the following requirements apply to construction and maintenance units.

### 9.1 Overturning Moment (1 August 2012)

In calculating overturning moments for construction and maintenance units, the effect of the crane loads acting simultaneously with the maximum design wind force associated with the operation of the crane is to be determined. The full range of crane positions, elevations and weights is to be considered in order to investigate the most critical scenarios. *The wind area of the deck cargo is to be considered in the calculation of the overturning moment.*

When the construction and maintenance unit is equipped to counter-ballast while lifting, the unit is to be able to withstand the sudden loss of the hook load in each condition of loading and operation. The free surface effects are to be considered for those tanks which are ballasted. Specific reference may be made to Chapter 8, Appendix 1 “Stability Criteria for Counter-Ballasted Crane Units”.

### 9.3 Deck Cargo (1 August 2012)

*Loading conditions in the operations manual are to include the effect of the deck cargo for each operating condition, using the estimated weight and the height of the center of gravity of the cargo based on the most severe loading assumptions. The loading conditions are to cover the full range of operating configurations, from no deck cargo on board to the maximum design deck load.*

If the unit is intended to carry deck cargoes that may accumulate water, such as open cargo bins or open pipes, a free surface correction is to be applied to afloat conditions.

## CHAPTER 8 Specific Unit Types

### SECTION 4 Drilling Tenders

#### 1 General

Drilling tenders, as defined in 8-4/3.1, built to the requirements of this Section and other relevant sections of this Guide, will be assigned the notation of **Drilling Tender** after the classification notations described in 1-2/1.

#### 3 Definitions

For the purpose of this Guide, the terms have the following meaning unless stated otherwise.

##### 3.1 Drilling Tender

Within the application of this Guide, a *Drilling Tender* is a mobile offshore unit primarily intended as support to an offshore drilling platform. It may contain the power supply, circulating pumps (connected to the platform by hoses) and storage tanks, drill pipe racks, casing, cement, storage space, living quarters and generally, helicopter landing platform.

#### 5 Pipe Racks

Pipe racks including the reinforcements for the hull are to be designed to adequately resist the load effects of drill pipes or risers imposed on the pipe rack supports in the severe storm, normal operating and transit conditions with the allowable stresses defined in 3-2-1/3 of the *MODU Rules*. Considerations should also be given to the unit in damaged conditions, where the pipe racks are to withstand the load effects caused by the trim and heel of the unit with the allowable stresses defined in 3-2-1/3 of the *MODU Rules* in association with a factor of safety of 1.0.

#### 7 Hazardous Areas

Drilling tenders may temporarily install equipment on deck which creates hazardous areas. If any of the tender's intended modes of operation include hazardous equipment, arrangements are to be made to accommodate and operate such equipment safely. To this end, the area where such equipment will be installed is to be considered hazardous and electrical equipment, ventilation and access to adjacent spaces in this area are to be in accordance with this Guide. Alternatively, if the area where temporary hazardous equipment will be installed is not in compliance with this Guide, a procedure for making this area suitable for such equipment is to be developed. See also 4-3/11.3 of this Guide.

## 9 Passive Fire Protection

### 9.1 Structural Fire Protection

In addition to complying with the requirements of Chapter 5, Section 1 of this Guide, the following requirements apply to drilling tenders.

#### 9.1.1 Exterior Boundaries of Accommodation Block

The exterior boundary of superstructures and deckhouses enclosing accommodations, including any overhanging decks supporting such accommodations, is to be an “A-60” Class boundary for the whole of the portion which faces and is within 30 m (98 ft) of any area in the adjacent drilling platform served by the drilling tender where a hydrocarbon fire may arise. If the distance is more than 30 m (98 ft), but less than 100 m (328 ft), an “A-0” Class boundary is required.

Where “A-60” Class boundary is required, an “A-0” Class boundary used in conjunction with a water curtain system designed to provide a density of at least 6.1 liters/min/m<sup>2</sup> (0.15 gpm/ft<sup>2</sup>) of the exposed surface area may be used as an equivalent means of meeting the “A-60” class rating.

The ventilation inlets and outlets and other space openings in the deckhouse and superstructure exterior boundaries are to be located as far away from the adjacent drilling platform as practicable.

## CHAPTER 8 Specific Unit Types

### SECTION 5 Pipe and Cable Laying Units

#### 1 General

Pipe and cable laying units, as defined in 8-5/3.1 and 8-5/3.3, built to the requirements of this Section and other relevant sections of this Guide, will be assigned the notation of **Pipe Laying Service** or **Cable Laying Service** after the classification notations described in 1-2/1.

#### 3 Definitions

For the purpose of this Guide, the terms have the following meaning unless stated otherwise.

##### 3.1 Pipe Laying Unit

Within the application of this Guide, a *Pipe Laying Unit* is a mobile offshore unit primarily intended for subsea pipeline installation.

##### 3.3 Cable Laying Unit

Within the application of this Guide, a *Cable Laying Unit* is a mobile offshore unit primarily intended for subsea cable installation.

#### 5 Supporting Structure for Pipe or Cable Laying Devices

Detail drawings of the foundation and supporting structure on which the J-lay rig, stinger or other laying devices are installed are to be submitted for review. The hull supporting structure is also to be designed to resist the design static and dynamic loading conditions of the pipe or cable laying devices, using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*.

In addition, the foundation and supporting structure are to be designed to resist motion-induced loads in severe storm, normal operating and transit conditions using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*.

#### 7 Pipe Racks and Cable Reel Support Structure

Pipe racks and cable reel support structure including the reinforcements for the hull are to be designed to adequately resist the load effects of drill pipes, risers or cable reels imposed on the supports in the severe storm, normal operating and transit conditions with the allowable stresses defined in 3-2-1/3 of the *MODU Rules*. Considerations should also be given to the unit in damaged conditions, where the pipe racks and cable reel support structure are to withstand the load effects caused by the trim and heel of the unit with the allowable stresses defined in 3-2-1/3 of the *MODU Rules* in association with a factor of safety of 1.0.

## 9 Stability

In addition to complying with the requirements of Chapter 3, Section 3 of this Guide, the following requirements apply to crane units.

### 9.1 Overturning Moment

In calculating overturning moments for pipe or cable laying units, the effect of the loads for the pipe or cable laying devices acting simultaneously with the maximum design wind force or maximum design current force, when submerged, is to be determined. When the pipe or cable laying device is movable from stowage to operating condition, the full range of laying device positions is to be considered in order to investigate the most critical scenarios.

### 9.3 Pipe Racks and Cable Reels (*1 August 2012*)

Loading conditions in the operations manual are to include the effect of the pipe racks and cable reels for each operating condition using the estimated weight and the height of the center of gravity of the cargo based on the most severe loading assumptions. The loading conditions are to cover the full range of operating configurations.

If the unit is intended to carry deck cargoes that may accumulate water, such as open cargo bins or open pipes, a free surface correction is to be applied to afloat conditions.

## 11 Conventionally Moored Units

Class notations **M** or **P**, as defined in 1-2/9, are required for units using position mooring equipment during pipe or cable laying operations.

## 13 Dynamically Positioned Units

An appropriate class notation for dynamic positioning systems, as defined in 1-2/15, is required for units using dynamic positioning during pipe or cable laying operations.

## CHAPTER 8 Specific Unit Types

### SECTION 6 Wind Turbine Installation, Maintenance, and Repair Units (1 May 2010)

#### 1 General

Wind Turbine Installation, Maintenance and Repair units, as defined in 8-6/3.1, built to the requirements of this Section and other relevant sections of this Guide may be assigned the notation of **Wind IMR** after the classification notations described in 1-2/1.

#### 3 Definitions

For the purpose of these requirements, the terms have the following meaning unless stated otherwise.

##### 3.1 Wind Turbine IMR Unit (1 June 2011)

Within the application of this Guide, a *Wind Turbine IMR Unit* is a mobile offshore unit primarily intended for the installation, maintenance, and repair of offshore wind turbines, including pile driving, tower installation, and nacelle and blade installation. Units may include various equipment to perform or support functions such as pile driving, installation, maintenance and repair of jacket, tower, nacelle and/or blade.

##### 3.3 Deck Cargo

*Deck Cargo* includes wind turbine nacelles, towers, blades, and any other items which are installed in association with a wind power generation structure. It also includes any temporary structures such as racks, stands, or cradles which are not permanently attached to the unit.

#### 5 Certification of Cranes

Any crane permanently installed on board the Wind Turbine IMR unit and intended for operations other than supply of provisions and maintenance of the unit is to be certified by ABS in accordance with Chapter 2 of the *ABS Guide for Certification of Lifting Appliances* or API Specification 2C.

Mobile cranes not permanently attached to the unit structure, such as crawler cranes, are not required to be certified.

Lifting appliances of types not considered in the above referenced standards will be subject to special consideration.

#### 7 Crane Pedestal and Supporting Structure

The crane pedestal, when not covered by the crane certification, is to be designed in accordance with the recognized standard to which the crane is certified. Details and calculations are to be submitted for review.

In addition, crane pedestals are to be designed to resist motion-induced loads in severe storm, normal operating and transit conditions using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*, considering the operating limits of the crane.



Detail drawings of the foundation and supporting structure on which the crane and boom rest or other stowage arrangements are installed are to be submitted for review. The hull supporting structure is also to be designed to resist the design static and dynamic loading conditions of the crane, using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*. The boom rest or other stowage arrangements and their foundation and supporting structure are to be designed for the out-of-service loads as defined in 2-2/5.1.2 of the *ABS Guide for Certification of Lifting Appliances* or the recognized standard to which the crane is certified.

## 9 Supporting Structure for Pile Driving Equipment (1 June 2011)

If pile driving equipment is installed, detailed drawings of the foundation and supporting structure on which the pile driving rig and supporting equipment are installed are to be submitted for review. The hull supporting structure is also to be designed to resist the design static and dynamic loading conditions of the pile driving equipment using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*.

In addition, the foundation and supporting structure are to be designed to resist motion-induced loads in severe storm, normal operating and transit conditions using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*.

## 11 Supporting Structure for Deck Cargo

Foundations and supporting structure in way of deck cargo and permanently attached cargo-carrying structures such as blade racks are to be designed to adequately resist the load effects of the cargo in severe storm, normal operating and transit conditions using the allowable stresses defined in 3-2-1/3 of the *MODU Rules*.

Consideration is also to be given to the Wind Turbine IMR unit in damaged conditions, where the structures above are to withstand the load effects of the cargo caused by the trim and heel of the unit in these damaged conditions, using the allowable stresses defined in 3-2-1/3 of the *MODU Rules* in association with a factor of safety of 1.0.

Tie-down or other securing arrangements are not included in the scope of the Wind Turbine IMR Classification.

## 13 Stability

In addition to complying with the requirements of Chapter 3, Section 3 of this Guide, the following requirements apply to Wind Turbine IMR units.

### 13.1 Overturning Moment

In calculating overturning moments for Wind Turbine IMR units, the effect of the operational loads acting simultaneously with the maximum design environmental force is to be determined. The full range of crane positions, elevations and weights is to be considered in order to investigate the most critical scenarios. The wind area of the deck cargo is to be considered in the calculation of the overturning moment.

When the Wind Turbine IMR unit is equipped to counter-ballast while lifting, the unit is to be able to withstand the sudden loss of the hook load in each condition of loading and operation. The free surface effects are to be considered for those tanks which are ballasted. Specific reference may be made to Chapter 8, Appendix 1, "Stability Criteria for Counter-Ballasted Crane Units".

### 13.3 Deck Cargo

Loading conditions in the operations manual are to include the effect of the deck cargo for each operating condition, using the estimated weight and the height of the center of gravity of the cargo based on the most severe loading assumptions. The loading conditions are to cover the full range of operating configurations, from no deck cargo on board to the maximum design deck load.

If the unit is intended to carry deck cargoes that may accumulate water, such as open cargo bins or open pipes, a free surface correction is to be applied to afloat conditions.

## 15 Surveys

For survey requirements, refer to applicable sections of Chapter 6 of this Guide.

In addition, surveys of cranes after construction are to be carried out in accordance with Chapter 2, Section 7 of the *ABS Guide for Certification of Lifting Appliances*.



## CHAPTER **8** **Specific Unit Types**

### SECTION **7** **Multipurpose Units**

#### **1** **General**

Mobile offshore units intended for several operational purposes covered by Chapter 8, Sections 1 to 6 of this Guide may be granted a combined notation (e.g., **Crane Service, Pipe Laying Service**) to the discretion of ABS, provided that the specific requirements for each intended service are complied with.

## CHAPTER 8 Specific Unit Types

### APPENDIX 1 Stability Criteria for Counter-Ballasted Crane Units

#### 1 Intact Stability after Loss of Crane Load

The following recommended criteria are based on crane operations taking place in favorable weather conditions on counter-ballasted column-stabilized crane units. The analysis should be carried out for the counter-ballast case when the unit is floating on even keel.

The maximum heeling moment developed by multiplying the weight of the hook load and boom by the horizontal distance from center of floatation at the selected draft to the hook load and boom center of gravity, considering the full range of crane elevations and weights, is to be determined. The resulting heeling moment is to be converted to a heeling arm at zero degrees by dividing it by the rig displacement. The heeling arm thus achieved is to be assumed constant with the inclination.

The righting arm curve is to be corrected for the increase in the vertical center of gravity due to the load. (The increase in the VCG is due to the boom being in the elevated position, and the hook load acting at the elevated end of the boom.)

- i) For any condition of loading, the first intercept of the heeling arm curve with the righting arm curve (equilibrium point) is to occur prior to submergence of the deck edge.

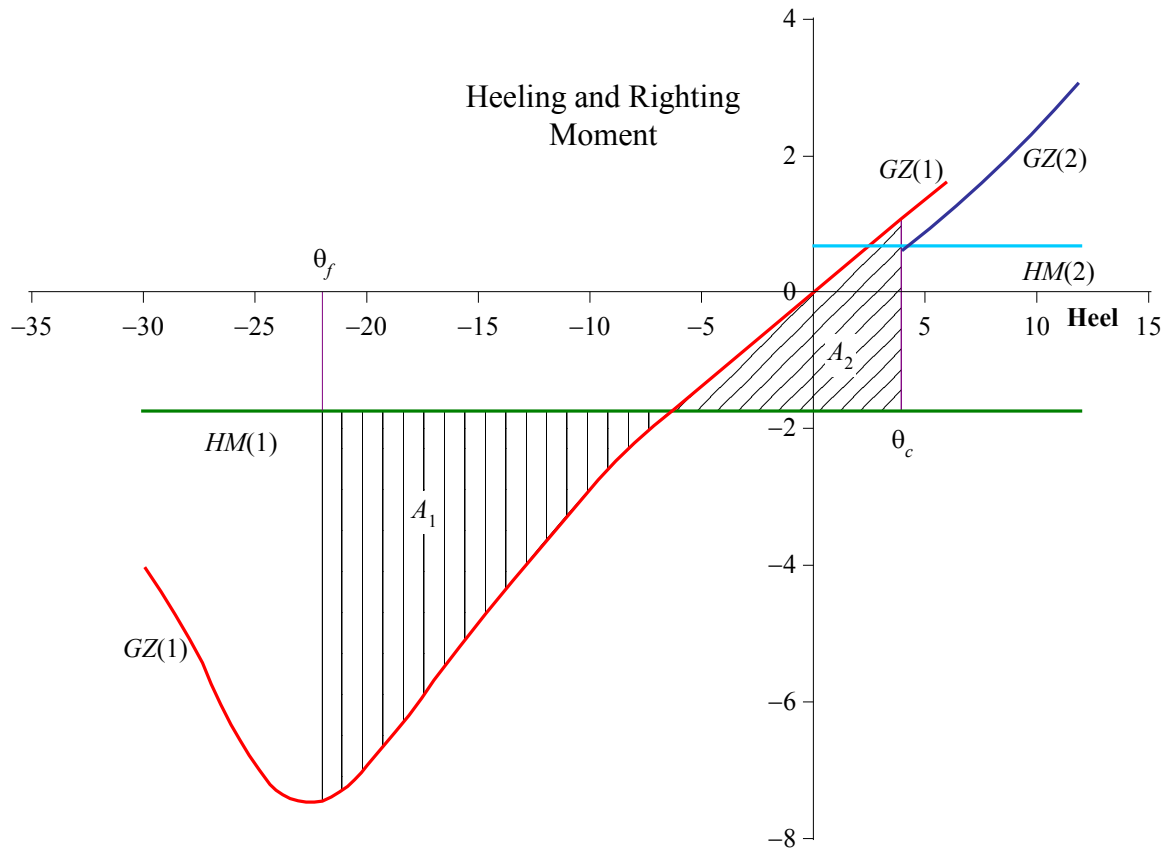
The following requirements are also to be met, with the unit at the maximum allowable vertical center of gravity in operation mode, to provide adequate stability in case of sudden loss of crane load:

- ii) The residual area between the first intercept and the angle of downflooding, the second intercept, or 30°, whichever occurs first, (area  $A_1$  in 8-A1/Figure 1) is not to be less than 30% in excess of area  $A_2$  in 8-A1/Figure 1.
- iii) The angle of the first intercept between the righting lever curve after loss of crane load and the maximum permissible counter ballast lever curve is not to exceed 15° (angle of equilibrium after loss of crane load).

#### 3 Damage Stability

The unit must also meet the damage stability criteria in the *MODU Rules* for Column-Stabilized Units. The crane overturning moment is to be used concurrent with the wind overturning moment for the limiting environmental criteria established in the operations manual.

**FIGURE 1**  
**Criteria for CSU after Accidental Loss of Crane Load:**  
 $A_1 \geq 1.3 \cdot A_2$



- $GZ(1)$  = The righting moment curve at the displacement corresponding to the vessel without hook load.
- $GZ(2)$  = The righting moment curve at the displacement corresponding to the unit with hook load.
- $HM(1)$  = The heeling moment curve due to the heeling moment of the counter-ballast at the displacement without hook load.
- $HM(2)$  = The heeling moment curve due to the combined heeling moments of the hook load and the counter-ballast at the displacement with hook load.
- $\theta_f$  = Limit of area integration to the downflooding angle or second intercept (or  $30^\circ$ ) on the counter-ballasted side of the unit.
- $\theta_c$  = Limit of area integration to the angle of static equilibrium due to the combined hook load and counter-ballast heeling moment.