

RULES FOR BUILDING AND CLASSING

SINGLE POINT MOORINGS 2014

Guide to Color Coding Used in Online Version of the Rules

The following summarizes the colors corresponding to Rule Changes, Corrigenda items and editorial changes in the Rules files which are available for download.

Rule Changes:

Changes effective 1 January 2014

Corrigenda:

CORRIGENDA/EDITORIALS – 1 July 2014

CORRIGENDA/EDITORIALS – 1 July 2015

Editorials:

Editorial Changes



RULES FOR BUILDING AND CLASSING

SINGLE POINT MOORINGS 2014

(Updated July 2015 – see next page)

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Updates

July 2015 consolidation includes:

- July 2014 version plus Corrigenda/Editorials

July 2014 consolidation includes:

- January 2014 version plus Corrigenda/Editorials

Foreword

This edition of the *ABS Rules for Building and Classing Single Point Moorings* (SPMs) primarily reflects changes in format and references to ABS and other standards that have occurred since the previous edition was issued.

Changes to the technical criteria include revisions made to other pertinent ABS Rules that are the basis of SPM criteria; such as, the introduction of an adjustment factor (Q) to account for higher strength steels in the determination of buoy scantlings. Also the section on Moorings and Anchoring Section (3-4-1, herein) has been updated to reflect industry practice and to specifically allow the option to use the criteria found in the *ABS Rules for Building and Classing Floating Production Installations* for this topic.

RULES FOR BUILDING AND CLASSING SINGLE POINT MOORINGS

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Introduction

1. The year 2014 edition of the *Rules for Building and Classing Single Point Moorings* consists of the six (6) booklets as shown in Table 1. With regard to two booklets, Part 1 and Part 2:
 - a) The purpose of the generic title *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)* is to reflect the expanded contents of PART 1, as a result of including consolidated requirements for “Classification” applicable to all types of and sizes of units, installations, vessels or systems in offshore service, etc., as specified in the Foreword to Part 1. Additional specific requirements are contained in Part 1 of these *Rules for Building and Classing Single Point Moorings*.
 - b) The purpose of the generic title *ABS Rules for Materials and Welding* of PART 2 is to emphasize the common applicability of the requirements to ABS-classed vessels, other marine structures and their associated machinery, and thereby make PART 2 more readily a common “PART” of various ABS Rules and Guides, as appropriate.
2. The numbering system applied in the Rules is shown in Table 2.
3. The changes contained in the previously published Notices 1 and 2 to the 1996 *Rules for Building and Classing Single Point Moorings* (together with Corrigenda items) have also been incorporated into the text of the 2014 *Rules for Building and Classing Single Point Moorings*.
4. The effective date of each technical change since 1993 is shown in parenthesis at the end of the subsection/paragraph titles within the text of each Part. Unless a particular date and month are shown, the years in parentheses refer to the following effective dates:

(2000) and after	1 January 2000 (and subsequent years)	(1996)	9 May 1996
(1999)	12 May 1999	(1995)	15 May 1995
(1998)	13 May 1998	(1994)	9 May 1994
(1997)	19 May 1997	(1993)	11 May 1993
5. Until the next edition of the *Rules for Building and Classing Single Point Moorings* is published, Notices and/or Corrigenda, as necessary, will be published on the ABS website – www.eagle.org – only, and will be available free for downloading. It is not intended to publish hard copies of future Notices and/or Corrigenda to existing Rules or Guides. The consolidated edition of the *Rules for Building and Classing Single Point Moorings*, which includes Notices and/or Corrigenda using different colors for easy recognition, will be published on the ABS website only when Notices and/or Corrigenda are issued.
6. The listing of CLASSIFICATION SYMBOLS AND NOTATIONS is available from the ABS website www.eagle.org for download.

TABLE 1
Applicable Editions of Booklets Comprising 2014 Single Point Mooring Rules

Rules for Building and Classing Single Point Moorings		
Notices and General Information		2014
Part 1:	Conditions of Classification (Supplement to the ABS <i>Rules for Conditions of Classification – Offshore Units and Structures</i>) ⁽¹⁾	2014
Part 3:	Mooring System Design	2014
Part 4:	Equipment and Systems	2014
Part 5:	Surveys After Construction	2014
Rules for Conditions of Classification – Offshore Units and Structures – not included ^(1,2)		
Part 1:	Rules for Conditions of Classification – Offshore Units and Structures	2014
Rules for Materials and Welding – not included ⁽²⁾		
Part 2:	Rules for Materials and Welding	2014

Notes:

- 1 The requirements for conditions of classification are contained in the separate, generic ABS *Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*.
- 2 The latest edition of these Rules is to be referred to. These Rules may be downloaded from the ABS website at www.eagle.org, Rules and Guides, Downloads or may be ordered separately from the ABS Publications online catalog at www.eagle.org, Rules and Guides, Catalog.

TABLE 2
Division and Numbering of the Rules

<i>Division</i>	<i>Number</i>
Part	Part 1
Chapter	Part 1, Chapter 1
Section	Section 1-1-1
Subsection (see Note 1)	1-1-1/1
Paragraph (see Note 1)	1-1-1/1.1
Subparagraph	1-1-1/1.1.1
Item	1-1-1/1.1.1(a)
Subitem	1-1-1/1.1.1(a)i
Appendix	Appendix 1-1-A1 or Appendix 1-A1-1

Note:

- 1 An odd number (1, 3, 5, etc.) numbering system is used for the Rules. The purpose is to permit future insertions of even-numbered paragraphs (2, 4, 6, etc.) of text and to avoid the necessity of having to renumber the existing text and associated cross-references, as applicable, within the Rules and associated process instructions, check sheets, etc.

TABLE 3
Comparison of the Numbering System of the 1996 Rules vs. 2014 Rules

In the Table below, the following abbreviations apply:

CC = ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)

MW = ABS Rules for Materials and Welding (Part 2)

SPM 1996	Title	SPM 2014
Part 1	Conditions of Classification	
Whole Part	The requirements for “Conditions of Classification” in Part 1 of the 1996 edition of the <i>Rules for Building and Classing Single Point Moorings</i> were relocated to the generic <i>ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)</i>, which includes consolidated requirements applicable to all offshore units and structures. Those classification requirements specific to single point moorings were retained in a supplemental Part 1 of the <i>SPM Rules</i>. In the list below, references to the <i>ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)</i> are given as “CC 1-1-X/Y.Y.Y” and references to Part 1 of the <i>SPM Rules</i> are given as “1-1-X/Y.Y.Y”.	Part 1
Part 1	Classification, Testing and Surveys	
Section 1	Scope and Conditions of Classification	
1/1.1	Classification	CC 1-1-1
1/1.1.1	Process	CC 1-1-1/1
1/1.1.2	Certificates and Reports	CC 1-1-1/3
1/1.1.2a	---	CC 1-1-1/3.1
1/1.1.2b	---	CC 1-1-1/3.3
1/1.1.2c	---	CC 1-1-1/3.5
1/1.1.3	Representations as to Classification	CC 1-1-1/5
1/1.1.4	Scope of Classification	CC 1-1-1/7
1/1.2	Suspension and Cancellation of Class	CC 1-1-2
1/1.2.1	Termination of Classification	CC 1-1-2/1
1/1.2.2	Notice of Surveys	CC 1-1-2/3
1/1.2.3	Special Notations	CC 1-1-2/5
1/1.2.4	Suspension of Class includes	CC 1-1-2/7
1/1.2.4a	---	CC 1-1-2/7.3
1/1.2.4b	---	CC 1-1-2/7.5ii)
1/1.2.4c	---	CC 1-1-2/7.7
1/1.2.4d	---	CC 1-1-2/7.5iii)
1/1.2.4e	---	CC 1-1-2/7.9
1/1.2.5	Cancellation of Class	CC 1-1-2/11
1/1.2.5a	---	CC 1-1-2/11.1
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1/1.15.1b	Repairs	CC 1-1-8/1.3
1/1.15.1c	Representation	CC 1-1-8/1.7
1/1.15.2	Notification and Availability for Survey	CC 1-1-8/3
1/1.15.3	Attendance at Port State Request	CC 1-1-8/5
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PART

1

Conditions of Classification

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

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PART

1

Foreword (1 January 2008)

For the 2008 edition, Part 1, “Conditions of Classification” was consolidated into a generic booklet, entitled *Rules for Conditions of Classification – Offshore Units and Structures (Part 1)* for all vessels other than those in offshore service. The purpose of this consolidation was to emphasize the common applicability of the classification requirements in “Part 1” to ABS-classed vessels, other marine structures and their associated machinery, and thereby make “Conditions of Classification” more readily a common Rule of the various ABS Rules and Guides, as appropriate.

Thus, this supplement specifies only the unique requirements applicable to single point moorings. This supplement is always to be used with the aforementioned *Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*.

PART 1

CHAPTER 1 Scope and Conditions of Classification

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PART

1

CHAPTER 1 **Scope and Conditions of Classification**

SECTION 1 **Classification** (*1 January 2008*)

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

Additional requirements specific to single point moorings are contained in the following portions Sections of this Chapter.

PART

1

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>”.

1 Single Point Moorings Built Under Survey (2014)

1.1 General

SPM’s which have been built under the supervision of the ABS Surveyors to the requirements of these Rules or to their equivalent, where approved by the Classification Committee, will be classed and distinguished in the *Record* by the symbols **⌘ A1 Single Point Mooring**. This document is mainly applicable to SPM systems which are designed for temporarily moored vessels. For vessels which will be permanently moored to a SPM, the ABS *Rules for Building and Classing Floating Production Installations (FPI Rules)* applies. Data as described in 1-1-2/7 will be indicated in the *Record*.

1.3 Modified Scope to Exclude PLEM

When requested by the Owner and agreed to by ABS; the Pipeline End Manifold, PLEM, (or similar equipment) associated with the SPM may be exempted from the scope of Classification. The manner used to control the flow of fluid between a subsea pipeline and the visiting vessel is to be fully described in documentation provided to ABS when requesting this exemption. As appropriate, the Classification Designation used when the PLEM is excluded from the scope of classification is **Single Point Mooring (excl. PLEM)**. The following portions of these Rules will not apply when the PLEM is excluded from the scope of classification: 3-2-2/17, 4-1-4/9 and items pertinent to the PLEM in 5-1-1/Table 2. It is the Owner’s responsibility to verify that the exclusion of the PLEM from ABS design review and survey is acceptable to the governmental authority having jurisdiction over the SPM.

1.5 Unconventional Designs

These Rules apply to conventional SPM designs. A conventional SPM provides temporary offshore mooring to a variety of visiting vessels by means of a hawser or yoke from the buoy or fixed tower. Fluid transfer between the visiting vessel and a sea floor pipeline is performed by an underbuoy hose or riser, and a hose between the buoy or tower and the visiting vessel.

An example of a mooring system design that differs from the above concept is one characterized as a *detachable turret-type* system. In this case the visiting vessel has a unique mating assembly used to join the buoy and the vessel. The mating assembly may be located inside the hull of the visiting vessel, or the assembly may be mounted externally at an end of the vessel. Fluid flow may occur through jumper hoses or piping between the buoy and vessel. The applicability of these Rules to an unconventional design will be decided by ABS on a case-by-case basis. In such a case, the criteria in these Rules may need to be supplemented or replaced by criteria in the *FPI Rules*.

3 Single Point Moorings Not Built Under Survey

SPM's which have not been built under the supervision of the ABS Surveyors, but which are submitted for classification, will be subject to a special classification survey. Where found satisfactory, and thereafter approved by the Classification Committee, they will be classed and distinguished in the *Record* in the manner as described as in 1-1-2/1 but the mark "X" signifying the survey during construction will be omitted.

5 Single Point Mooring as a Part of a Floating Production System (2011)

SPM's built under survey for use as part of the mooring system for a classed floating production system do not require a separate classification under these Rules. Requirements for mooring systems of floating production systems are found in the *FPI Rules*.

7 Classification Data

Data on single point moorings will be published in the *Record* as to the latitude and longitude of the location of the mooring, the length overall and displacement of the ship it is designed to moor, the depth of water at the site, maximum hawser tension where applicable, and general types of cargo and other fluids which the mooring is designed to handle..

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 3 Rules for Classification (1 January 2008)

1 Application of Rules

These Rules are applicable to unmanned SPM's as defined in Section 3-1-1 and are generally intended for temporary moored vessels.

These Rules are applicable to those features of the system that are permanent in nature and can be verified by plan review, calculation, physical survey or other appropriate means. Any statement in the Rules regarding other features is to be considered as a guidance to the designer, builder, owner, et al.

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 4 Plans and Design Data to be Submitted

1 Plans

Plans showing the scantlings, arrangements, and details of the principal parts of the structure, associated piping and equipment of each SPM to be built under survey are to be submitted for review and approved before construction is commenced. These plans are to clearly indicate the scantlings, joint details and welding, or other methods of connection. The number of copies to be submitted is to be in accordance with 1-1-4/11 and 1-1-4/13. In general, plans are to include the following where applicable.

- General arrangement
- An arrangement plan of watertight compartmentation, including the location, type and disposition of watertight and weathertight closures
- Structural arrangement showing shell plating, framing, bulkheads, flats, main and bracing members, joint details, as applicable
- Details of watertight doors and hatches
- Welding details and procedures
- Corrosion control arrangements
- Type, location and amount of permanent ballast, if any
- Bilge, sounding and venting arrangements
- Hazardous areas
- Electrical system one line diagrams
- Location of fire safety equipment
- Mooring arrangement
- Mooring components including anchor legs, associated hardware, hawser(s), and hawser load-deflection characteristics
- Foundations for mooring components, industrial equipment, etc. showing attachments to hull structure
- Anchoring system showing the size of anchor, holding capacity of piles, pile sizes, and capacity, etc.
- Pipe Line End Manifold (PLEM) as applicable
- SPM main bearing
- Cargo or product swivel including swivel driving mechanism, swivel bearings, and electrical swivel details
- Product or cargo system piping schematic drawing with bill of materials

- Design data of equipment, piping and related components including minimum and maximum design pressure and temperature
- Ancillary piping systems schematic drawings with bills of material
- Floating and underbuoy hoses/flexible risers
- Telemetry/Control system
- Navigation aids
- Methods and locations for nondestructive testing (NDT)
- Plans for conducting underwater inspections in lieu of drydocking
- Test and inspection plan for all major load carrying or pressure retaining components including cargo or product swivel, electrical swivel, bearings.
- Test Procedures

3 Site Chart

To demonstrate that navigational considerations have been taken into account in establishing the mooring location, a site chart of the mooring area is to be submitted in accordance with Section 3-1-2 which shows the location of the mooring, potential navigation hazards and existing and planned navigation aids, bottom contour elevations, maneuvering area and swing circle.

5 Site Condition Reports

To demonstrate that site conditions have been ascertained and taken into consideration in establishing design criteria, reports on subjects including the following are to be submitted in accordance with Section 3-1-2.

- i) Environmental conditions of wind, waves, current, seiche, tide, visibility, temperature, and ice.
- ii) Water depth, at berth and throughout the maneuvering area, bottom soil conditions, and subsurface hazards.

7 Model Tests

When model tests are used to determine the design loads or to demonstrate that the established design loads have been based on the results of physical dynamic model tests, a report is to be submitted describing the design loads, calculations, description of model test facilities and procedures, and a summary of the results. It is recommended that the designer consult with ABS concerning model testing, procedures, methods and data analysis to ensure the investigation is adequate.

9 Calculations

In general, where applicable, the following calculations are to be submitted:

- i) Structural design in accordance with Section 3-2-2
- ii) Stability calculations in accordance with Section 3-2-2
- iii) Mooring and anchorage in accordance with Section 3-4-1
- iv) Piping in accordance with Part 4, Chapters 1 and 2
- v) Calculations for all pressure retaining and load bearing components in accordance with Part 4
- vi) Swivel stack static and dynamic analysis in accordance with Part 4

Calculations when submitted are to be footnoted indicating references.

11 Additional Plans

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

13 Submissions (2011)

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

Additional copies may be required when the required attendance of the Surveyor is anticipated at multiple locations.

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

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 5 Information Booklet and Maintenance Manual

For each SPM, a document is to be submitted. This document is to include recommendations regarding operation and maintenance of the SPM facility, the design criteria for the SPM, information regarding the mooring area, and the components of the SPM.

1 Items Included in Information Booklet and Maintenance Manual

The document is to include the following information.

- i) Site chart as described in 1-1-4/3
- ii) Design vessel data, including deadweight, length, draft and distance from bow to manifold.
- iii) Environmental design criteria with various sizes of vessels, including the operating wind, wave, current and tides.
- iv) Design cargo transfer criteria, including type of cargo and design maximum. working pressure, temperature, flow rate, and minimum valve closing times including the vessel's manifold valves.
- v) Plans showing the general arrangement of the single point mooring components and details of those components required to be handled during operation or inspected during maintenance, including details of access to these components.
- vi) Description of navigation aids and safety features.
- vii) Recommended procedure for the mooring and disconnecting a vessel at the SPM.
- viii) Recommended procedure for connecting and disconnecting floating hose to a tanker's manifold.
- ix) Recommended maintenance schedule and procedures for the SPM facilities, including a check list of items recommended for periodic inspection. Where applicable, procedures for adjusting anchor leg tension, removal and reinstallation of hoses, inspection of flexible risers, adjustment of buoyancy tanks, and replacement of seals in the cargo swivel are to be included.
- xi) Recommended cargo system pressure testing.

The Information Booklet and Maintenance Manual is to be submitted for review by **ABS** solely to ensure the presence of the above information which is to be consistent with the design information and limitations considered in the SPM's classification. ABS is not responsible for the operation of the SPM.

The Information Booklet and Maintenance Manual required by these Rules may contain information required by flag and coastal Administrations. These Administrations may require that additional information be included in the Operation and Maintenance Manual.

PART

2

Materials and Welding

The independent booklet, *ABS Rules for Materials and Welding (Part 2)* for steels, irons, bronzes, etc. is to be referred to. This booklet consists of the following Chapters:

1 General (2014)

Rules for Testing and Certification of Materials

CHAPTER 1 Materials for Hull Construction

CHAPTER 2 [Equipment](#)

CHAPTER 3 Materials for Machinery, Boilers, Pressure Vessels, and Piping

APPENDIX 1 List of Destructive and Nondestructive Tests Required for Materials and Responsibility for Verifying

APPENDIX 4 [Procedure](#) for the Approval of Manufacturers of Hull Structural Steel

APPENDIX 5 [Procedure](#) for the Approval of Manufacturers of Hull Structural Steels Intended for Welding with High Heat Input

APPENDIX 6 [Nondestructive Examination of Marine Steel Castings](#)

APPENDIX 7 [Nondestructive Examination of Hull and Machinery Steel Forgings](#)

APPENDIX 8 [Additional Approval Procedure for Steel with Enhanced Corrosion Resistance Properties](#)

Rules for Welding and Fabrication

CHAPTER 4 Welding and Fabrication

APPENDIX 2 Requirements for the Approval of Filler Metals

APPENDIX 3 Application of Filler Metals to ABS Steels

APPENDIX 9 [Welding Procedure Qualification Tests of Steels for Hull Construction and Marine Structures](#)

3 Offshore Structures (2014)

For structure and connections that are typical of offshore structures (e.g., towers, jackets, and similar steel non-buoyant structures); instead of Part 2, Chapter 1 above, reference should be made to Part 2, “Materials and Welding” of the *ABS Rules for Building and Classing Offshore Installations*.

Mooring System Design

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PART 3

CHAPTER 1 General

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PART

3

CHAPTER 1 General

SECTION 1 Definitions and Abbreviations

1 Definitions (2014)

Anchor Leg. Mooring element connecting the single point mooring structure to the seabed at the anchor point, and is essential for station keeping of the system.

Buoyancy Element. A buoyancy member provided to support the weight of mooring equipment or risers, and designed to resist differential pressure from submergence and internal pressure.

Hawser. Mooring line between SPM structure and moored vessel.

Hose. Conduit designed to convey fluids between supply and delivery points with significant relative movement and able to tolerate large deflections. Typically, a hose is comprised of a string or series of short hose segments joined together at flanged ends.

Hose, Floating. Hose or hose string located between the SPM structure and the moored vessel for the purpose of conveying fluid. When not connected to a moored vessel, it remains connected to the SPM structure and floats on the sea water surface.

Hose, Underbuoy. Hose or hose string located between the SPM structure and the pipeline end manifold (PLEM) for the purpose of conveying fluids.

Main Bearing. The bearing which supports the load from the mooring and hawser and provides a mechanism for the moored vessel to rotate or weathervane about the mooring structure

Product. Any fluid transferred between the moored vessel and the pipeline end manifold (PLEM) such as crude oil, petroleum product, petroleum gas, slurry, and bunkers.

Product Swivel. A mechanism which provides for passage of cargo or product while allowing the main structure to weathervane freely with respect to the fixed or anchored structure without significant leakage at the rated design pressure.

Recognized Consultant. A person or organization recognized by ABS as being capable of providing specialized knowledge or assistance.

Riser, Flexible. Conduit designed to convey fluids between supply and delivery points with or without significant relative movement and able to tolerate large deflections. A flexible riser usually comprises one continuous length, used for relatively greater water depths and constructed to be used totally submerged.

Single Point Mooring (SPM). A system which permits a vessel to weathervane while the vessel is moored to a fixed or floating structure anchored to the seabed by a rigid or an articulated structural system or by catenary spread mooring. Examples of such system are CALM, SALM, tower mooring, etc.

SPM, Fixed. A tower mooring and a Single Anchor Leg Mooring (SALM) which are gravity based (fixed or pinned) system are defined here as fixed SPMs.

SPM, Floating. A Catenary Anchored Leg Mooring (CALM) is an example of a floating SPM.

Swing Circle. The swing circle is the area swept by the moored vessel as it revolves about the mooring point.