Rules for Classification of Floating Docks

JANUARY 2012

The electronic pdf version of this document found through http://www.dnv.com is the officially binding version

DET NORSKE VERITAS AS

FOREWORD

DET NORSKE VERITAS (DNV) is an autonomous and independent foundation with the objectives of safeguarding life, property and the environment, at sea and onshore. DNV undertakes classification, certification, and other verification and consultancy services relating to quality of ships, offshore units and installations, and onshore industries worldwide, and carries out research in relation to these functions.

The Rules lay down technical and procedural requirements related to obtaining and retaining a Class Certificate. It is used as a contractual document and includes both requirements and acceptance criteria.

Any comments may be sent by e-mail to *rules@dnv.com*
For subscription orders or information about subscription terms, please use distribution@dnv.com
Computer Typesetting (Adobe Frame Maker) by Det Norske Veritas

CHANGES

General

The present edition of the rules includes additions and amendments approved by the Executive Committee as of November 2011, and supersedes the 1977 edition, including later amendments.

The rule changes come into force as specified below.

These rules are valid until superseded by a revised edition.

- **Main changes coming into force 1 July 2012**

The structure and content of the previous edition of the rules have been kept as far as possible. Nevertheless the rules should be considered completely rewritten as the changes are numerous.

— References and terminology have been reviewed and updated to be in line with the current standard of other rules issued by DNV.

In addition to the above stated rule requirements, a number of corrections and clarifications have been made in the existing rule text.

CONTENTS

CHAPTER 1 CLASSIFICATION

SECTION 1
PRINCIPLES

A. Introduction

A 100 Objective

101 The objective of the Rules for Floating Docks is to define a minimum technical standard for floating docks.

102 The Rules are based on the assumption that the floating dock will be properly handled at all times, and it is assumed that all loading and ballasting will be in compliance with the approved operating manual.

A 200 Scope

201 The following structures, components, systems and properties essential to the operation of the floating dock are covered by the classification and are subject to approval:

— Hull structures and deckhouses, see Ch.2.
— Anchorage attachments, see Ch.2.
— Cranes, see Ch.2.
— Stability and freeboard, see Ch.3.
— Machinery, see Ch.4.
— Arrangements for fire protection, detection and extinction for the dock and facilities for supplying water from the dock pumps to the extinguishing system of the docked ships, see Ch.5.

202 The evaluation of possibilities for vibrations in the dock's hull structures is not covered by the rules and the classification, but the Society may advise on this matter upon request.

A 300 Assignment and application of class

301 In principle the general regulations defined in Part 1 of the Rules for Classification of Ships shall be complied with for floating docks, to the extent the matter in question is not included in the following rules.

302 It will be necessary also to pay attention to governmental regulations of the country in which the floating dock shall be located and operated.

303 A floating dock which is designed, built, surveyed and tested in compliance with the requirements in the following and other relevant rules of the Society, will be assigned the main class notation **1A1 Floating Dock** and entered in the Register of the Society.

304 Floating docks built under supervision of Det Norske Veritas will be given the symbol ✠ before the main class notation.

305 Floating docks which are built under supervision of another classification society and later transferred to class with Det Norske Veritas, will be given the symbol ✠ before the main class notation.

306 The floating dock's port of operation will be specified by adding **For service at (name of port).....**to the class notation.

307 If the floating dock is provided with special appliances or equipment for a particular purpose or has a special feature in the design or construction, approved by the Society, an appropriate additional class notation may be given.

308 The lifting capacity of the floating dock will be specified in the Register of the Society. This lifting capacity will be established when the completion trials of the dock have proved that the dock will have sufficient freeboard in compliance with the Rules when the lifting capacity is added to the light displacement of the dock. The lifting capacity will also depend on the water density in the port for which the dock is classed.

309 If the floating dock is constructed at a port which is remote from the dock's port of operation, the class will not be assigned until the Society has carried out a general examination of the dock after its arrival at its port of operation, and the dock has been found in full operational condition.

310 However, when the supervision during construction and testing is completed, the Surveyor may assign an interim class in accordance with the Rules for Classification of Ships, Pt.1 Ch.1 Sec.2.

311 The floating dock will retain its class as long as it, upon the examinations at the stipulated periodical surveys, is found to be properly maintained.

A 400 Relation to other DNV documents

401 In the following chapters references are made to DNV Rules for Classification of Ships Pt.2, Pt.3 and Pt.4.

B. Definitions

B 100 Definitions

101 A floating dock is a type of pontoon for dry docking vessels, possessing floodable buoyancy chambers and a "U" shaped cross-section to lift a vessel out of the water.

C. Procedural requirements

C 100 Documentation requirements

101 Documentation shall be submitted as required by Table C1.

Table C1 – Documentation requirements

Object	*Documentation type*	*Additional description*	*Info*
General	B100 – Inclining test and light-weight survey procedure	Only required where an inclining test will be conducted in order to determine the light-weight particulars	AP
	B110 – Inclining test or lightweight survey report	Only required where an inclining test will be conducted in order to determine the light-weight particulars	AP
	B120 – Final stability manual	Including stability of the dock when supporting a vessel. Relevant data (vessel weight distribution, position of centre of gravity etc.) shall be given for typical vessels intended to be docked. The most unfavourable vessels shall be specified, if different from those defined in Sec.4 A.	AP
	H070 – Standard details		FI
	H080 – Design analysis	Strength calculations	FI
	H110 – Loading manual		
	H131 – Non-destructive testing (NDT) plan		AP
	H132 – Tank testing plan		FI
	H140 – Welding tables		AP
	Z010 – General arrangement plan		FI
	Z220 – Vessel operation manual	The manual shall contain instructions for: — preparations before docking a vessel — docking operations — precautions before the dock is left by the personnel. If the dock shall be towed in open waters from the port of construction to the port of operation, the corresponding dock condition shall be specified together with route and season of the year for the intended tow.	AP
Hull	H030 – Tank and capacity plan	Height of air pipes, content of each tank	FI
	H050 – Structural drawing	Transverse and longitudinal sections	AP
	H050 – Structural drawing	Transverse and longitudinal bulkheads	AP
	H050 – Structural drawing	Wing walls, upper deck and safety deck	AP
	H050 – Structural drawing	Bottom	AP
	H050 – Structural drawing	Platforms extending from ends of dock	AP
	H050 – Structural drawing	Swing bridges at ends of dock	AP
	Z030 – System arrangement plan	Manholes	FI
Anchoring arrangements	Z030 – System arrangement plan	Including dolphin locks, pipes and other mooring attachments	FI

Table C1 – Documentation requirements (Continued)			
Deckhouses	H050 – Structural drawing		AP
Closing appliances	C030 – Detailed drawing		AP
Supporting structures for heavy or loaded objects	H050 – Structural drawing	E.g. engines, deck machinery and cranes. Including information on loads	AP
Hull monitoring system	I200 – Control and monitoring system documentation		AP
Machinery	Z030 – System arrangement plan		FI
	Z090 – Equipment list		FI
Fire safety general	G040 – Fire control plan		FI
Ventilation system	S013 – System diagram (D&ID)		AP
Escape routes	G120 – Escape route drawing		AP
Fire water system	S011 – System diagram (P&ID)		AP
Fire extinguishing systems in machinery spaces, fixed	G200 – Fixed fire extinguishing system documentation		AP
Structural fire protection arrangements	G060 – Structural fire protection drawing	Accommodation and machinery spaces	AP
Fire detection and alarm systems	I200 – Control and monitoring system documentation		AP
	Z030 – System arrangement plan		AP

102 For general requirements to documentation, including definition of the Info codes, see Rules for Classification of Ships Pt.0 Ch.3 Sec.1.

103 For a full definition of the documentation types, see Rules for Classification of Ships Pt.0 Ch.3 Sec.2.

C 200 Certification requirements

201 Certificates for materials shall be issued as required by Table C2.

Table C2 – Material certification requirements		
Object	*Certificate type*	*Additional description*
Hull structural materials	Det Norske Veritas Certificate (NV)	Rolled steel Aluminium alloys Forgings Castings

202 Certification of auxiliary machinery components, boilers / pressure vessels, electrical equipment, instrumentation, fire protection / detection / extinction and piping system items shall be carried out at the same extent as required in the respective chapters of Pt.4 of the Rules for Classification of Ships.

203 Cranes shall be certified in accordance with DNV Standard for Certification 2.22 Lifting Appliances.

CHAPTER 2 STEEL HULL STRUCTURES

SECTION 1
GENERAL REGULATIONS AND DEFINITIONS

A. Classification

A 100 Application

101 The Rules in this Chapter apply to all welded steel structures in floating docks of the following types:

Caisson type: dock in which the bottom pontoon and both dock wings are continuous and inseparable.
Pontoon type: dock in which the dock wings are continuous and the bottom consists of individual non-continuous pontoons. The pontoons are permanently or detachably connected to the dock wings.

Other types of floating docks will be specially considered.

102 The requirements in this Chapter are based on the principles for strength evaluation of ship hull structures given in Pt.3 of the Rules for Classification of Ships, to which references are given where appropriate.

B. Definitions

B 100 General

101 Definitions listed under this heading are valid for this Chapter, and are normally not repeated elsewhere.

102 Unless otherwise stated, the International System of Units (SI) is used as defined in Pt.0 Ch.1 Sec.1 of the Rules for Classification of Ships.

B 200 Symbols

201

L_D = length of the dock in m, defined as the distance between the fore end bulkhead of the forward bottom section and the aft end bulkhead of the aftermost bottom section.
f_1 = material factor depending on material strength group. See Pt.3 Ch.1 Sec.2 B200 and C100 of the Rules for Classification of Ships.
Z_D = Rule requirement in cm^3 to the dock girder section modulus at upper deck with $f_1 = 1$. See Sec.4.
Z_B = Rule requirement in cm^3 to the dock girder section modulus at bottom with $f_1 = 1$. See Sec.4.
$Z_{D\,B}$ = dock girder section modulus in cm^3 at upper deck as built.
$Z_{B\,B}$ = dock girder section modulus in cm^3 at bottom as built.

$f_{2\,D} = \frac{Z_D}{Z_{DB}}$ applicable above the neutral axis.

$f_{2\,B} = \frac{Z_B}{Z_{BB}}$ applicable below the neutral axis.

f_2 = $f_{2\,D}$ or $f_{2\,B}$ within 0.5 L amid length, whichever is applicable.
= 1 at dock ends.

At intermediate positions f_2 is found by linear interpolation.

B 300 Terms

301 *The light displacement of the dock* is its complete weight including all machinery, lifting appliances, equipment, full supply of consumables for operation of the dock (fuel oil, fresh water etc.), compensating ballast water (if necessary) and rest-water.

302 *The rest-water* is remaining ballast water which the pumps cannot discharge.

303 *The compensating ballast water* is ballast water for reduction of stresses and deflections in the dock structures and for adjustment of the trim and heel of the dock.

304 *The pontoon bottom* is the bottom of the pontoon structure.

305 *The pontoon deck* is the deck of the pontoon structure supporting the docking blocks.

306 *The safety deck* is a watertight deck in the wing walls, located at such distance below the upper deck as to provide a satisfactory freeboard to upper deck when all compartments below the safety deck are flooded, but with no load on the docking blocks.

C. Testing

C 100 Cross references

101 For testing of materials, see Pt.2 Ch.1 of the Rules for Classification of Ships.

102 Fabrication and testing of the structures shall be carried out in accordance with Pt.2 Ch.2 of the Rules for Classification of Ships, as far as applicable to floating docks.

C 200 Completion trials

201 *General*

On the completion of the dock, trials shall be carried out in the presence of the Surveyor to ascertain:

— the freeboard to upper deck with the dock flooded
— the light displacement and the lifting capacity of the dock corresponding to the minimum freeboard
— the position of the centre of gravity by an inclining test if necessary, see Ch.3 Sec.1. The test report shall be submitted for approval, and the results shall be included in the Operation Manual for the dock
— any built-in permanent deflection in initial condition
— correct calibration of the deflection meters, by simulating the most severe intended loading condition
— the trials shall generally be in accordance with 202 and 203 unless otherwise agreed with the Society.

202 *Initial condition*

All tanks for consumables (fresh water, fuel oil etc.) shall be completely filled, but all other tanks shall be empty, only rest-water remaining in the ballast tanks. The travelling cranes may only be parked in positions giving equal draughts forward and aft. The deflection of the dock along the top of keel blocks shall be measured. Draughts and water density are recorded. On this basis the light displacement of the dock is established, adding the weight of any compensating ballast water. For definition of terms, see B300.

The deflection meters are checked and calibrated.

203 *Sagging and hogging conditions*

This trial is commenced with the initial condition as specified in 202. Equal quantities of ballast water are then filled on each side of the midlength of the dock to such longitudinal extent and distribution as to produce a sagging moment and then a hogging moment equal to the moments upon which the dock scantlings are based. The deflections are measured.

The deflection meters are checked.

The minimum required freeboard of the dock shall not be exceeded, and will be decisive for determination of the lifting capacity of the dock to be given in the Register of the Society.

SECTION 2
MATERIALS, CORROSION PREVENTION AND WELDING

A. General

A 100 Introduction

101 In this Section requirements regarding the application of various structural materials as well as protection methods and materials are given, either directly or by cross references to the Rules for Classification of Ships.

A 200 Assumptions

201 The Rules are based on the assumption that the material used complies with the requirements in Pt.2 Ch.2 of the Rules for Classification of Ships. If the use of other types of material is desired, full specifications shall be submitted for approval.

B. Steel Materials

B 100 General

101 Where the subsequent Rules for material grade are depending on plate thickness, the requirements are based on the thickness as built.

B 200 Material grades for dock structures

201 In order to distinguish between the material grade requirements for different dock parts, various material classes are defined in Table B1.

In Table B2 it is referred to one of these classes. Where nothing else is stated, grade A may be used.

Table B1 Material Quality Grades

Thickness in mm	*Class*			
	I		II	
	NS	HS	NS	HS
$t \leq 20.5$	A	A	A	A
$21.0 \leq t \leq 25.5$	A	A	A	A
$26.0 \leq t \leq 30.0$	A	A	B	A
$30.5 \leq t \leq 35.0$	B	A	D	D
$t > 35.5$	B	D	D	D

Table B2 Material Classes

Structural member	*Within 0.4 L amid length*	*Outside 0.4 L amid length*
Pontoon bottom and deck plating, wing walls and upper deck plating	II	I
Flat bar longitudinals, face plates and webs of built shapes for longitudinals and transverses	I	I

C. Alternative Structural Materials

C 100 Aluminium alloys

101 Approved aluminium alloy for marine use may be applied in deckhouses etc., in compliance with Pt.3 Ch.1 Sec.2 and Pt.2 Ch.2 Sec.9 of the Rules for Classification of Ships.

D. Corrosion Prevention and Corrosion Additions

D 100 General

101 All external and internal steel surfaces except in tanks shall be protected against corrosion by paint of suitable composition or other effective coating.

102 If an approved protection system is applied in tanks for water ballast, the corrosion additions may be

dispensed with. Regarding approval of protection systems, see Pt.3 Ch.3 Sec.7 of the Rules for Classification of Ships, as far as relevant to floating docks.

D 200 Primer coatings

201 Shop primers applied over areas which will subsequently be welded shall be of a Type Approved by DNV.

D 300 Corrosion additions

301 Unprotected steel surfaces (plates, stiffeners and girders) in tanks for water ballast shall generally be given a corrosion addition t_k (mm) as stated in Table D1.

Table D1 Corrosion addition t_k in mm in tank areas

Within 1.5 m below top of tanks	One side [1] unprotected	2.0
	Both sides unprotected	3.0
Elsewhere	One side unprotected	1.0
	Both sides unprotected	1.5

1) External underwater and above water surfaces, except pontoon deck, is regarded as protected.

E. Welding and Weld Connections

E 100 General

101 Welding and weld connections shall comply with the requirements in Pt.3 Ch.1 Sec.11 of the Rules for Classification of Ships, as far as relevant to floating docks.

SECTION 3
DESIGN PRESSURES

A. General

A 100 Introduction

101 In this Section the maximum values of the external and internal design pressures are given separately.

A 200 Definitions

201 The load point for which the design pressure shall be calculated is defined for various strength members as follows:

a) For plates:

— midpoint of horizontally stiffened plate field
— half of the stiffener spacing above the lower support of vertically stiffened plate field, or at lower edge of plate when the thickness is changed within the plate field.

b) For stiffeners:

— midpoint of span.

c) For girders:

— midpoint of load area.

202 Symbols:

p_e = external pressure as described in B.
p_j = internal pressure as described in C.

203 Symbols not defined in 202 are defined in connection with given formulae.

A 300 Information to be submitted

301 Information on load data upon which the scantlings shall be based, shall be submitted unless in accordance with standard assumptions in these Rules.

B. External Pressures

B 100 Sea pressure

101 The design pressure p_e acting on the dock's sides, bottom and pontoon deck shall be taken as:

p_e = static pressure in kN/m^2 acting on the docks outer panels at full draught when the dock is submerged.

102 If the dock's port of operation is not sheltered against waves, the expected dynamic sea pressures at a probability level of 10^{-4} shall be taken into account.

103 If the dock shall be towed in open waters from the port of construction to the port of operation, dynamic sea pressures shall be taken into account. The dynamic sea pressure will be considered by the Society in each case, depending on the route and season of the year for the intended tow.

B 200 Load on platforms, decks etc.

201 The design pressure p_e acting on the platforms, decks etc. shall not be taken less than:

p_e = 3.5 kN/m^2 on swing bridges
p_e = 6.0 kN/m^2 on platforms
p_e = 5.0 kN/m^2 on upper deck.

B 300 Load on docking blocks

301 For docking blocks and their supporting structure the design load per unit length of dock shall not be taken less than:

$$\frac{1.5C_D}{L_D} \text{ [t/m]}$$

Based on this design load, the minimum area of docking blocks supporting the ship shall be determined by a design pressure normally not exceeding 2 N/mm^2.

C. Internal Pressures

C 100 Liquids

101 The design pressure p_i in full tanks shall be taken as the greater of:

$$p_{i1} = 6.7\ h_p\ [kN/m^2]$$

$$p_{i2} = 10\ (h_s + 2.5)\ [kN/m^2]$$

h_s = vertical distance (m) from the load point to the top of the tank
h_p = vertical distance (m) from the load point to the top of air pipe.

Provided the tanks can be filled by gravity only, the design pressure p_i may be taken as equal to h_s.

SECTION 4
LONGITUDINAL STRENGTH

A. General

A 100 Introduction

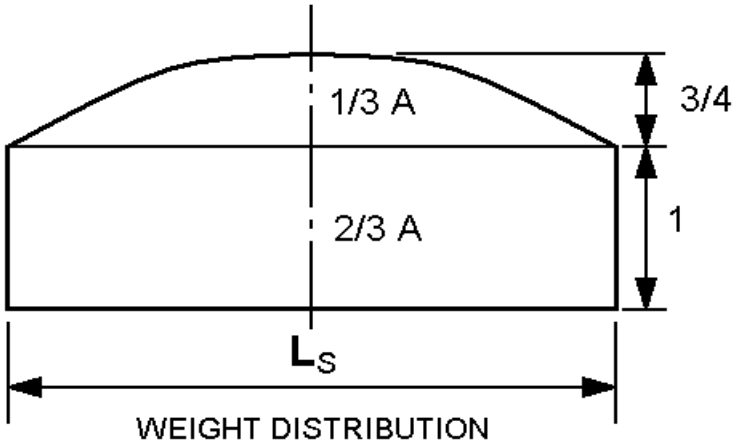
101 In this section minimum requirements to longitudinal strength of floating docks supporting docked ships are given. The strength requirements of the Rules are based on the assumption that the stiffness of the docked ship is not taken into account.

A 200 "The standard sagging ship"

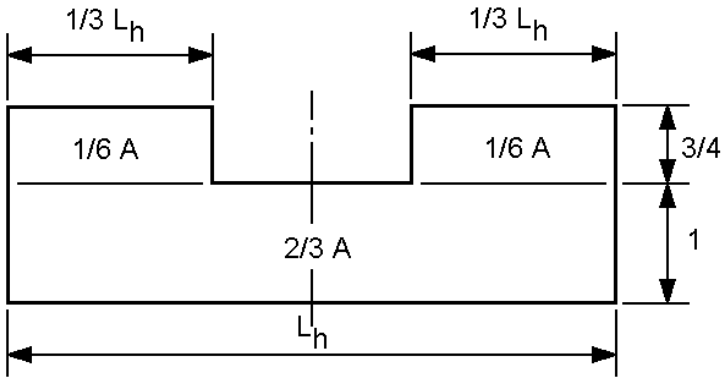
201 If not otherwise specified by the Builders of the dock, the most unfavourable sagging ship to be docked is assumed to have a weight equal to the lifting capacity of the dock with only rest-water remaining in its ballast tanks. The length L_s of the ship is assumed not to exceed:

$$L_s = 0.8\ L_D$$

202 The weight distribution curve of the ship is assumed to be symmetrical and is taken as a rectangle with a parabola on top, each with a length equal to L_s. The area of the rectangle is twice that limited by the parabola above, see figures below.



WEIGHT DISTRIBUTION
STANDARD SAGGING SHIP



WEIGHT DISTRIBUTION
STANDARD SAGGING SHIP

A 300 "The standard hogging ship"

301 If not otherwise specified by the Builders of the dock, the most unfavourable hogging ship to be docked is assumed to have a weight as stipulated in 201. The length L_h is assumed to be not less than $L_h = 1.2\ L_D$.

302 The weight distribution of the ship is assumed to be symmetrical (e.g. machinery aft and ballast forward). The weight distribution curve is taken as a basic rectangle with length L_h upon each end of which is placed a smaller rectangle with length 1/3 L_h. The area of the larger rectangle is twice the sum of the areas of the smaller. See figure.

B. Loading Conditions

B 100 Docking conditions

101 The longitudinal strength of the dock shall be based on the most severe expected docking and transient conditions.

102 The most unfavourable sagging and hogging ships with symmetrical weight distribution, as defined in A, are considered supported on the docking blocks, the centre of the ship's length being positioned at the mid-length of the dock. The freeboard of the dock to the pontoon deck shall be as given in Ch.3.

103 Other typical ships with concentrated or uneven weight distribution, if such ships are specified by the Builders, are considered supported on the docking blocks. Compensating ballast water is used if necessary to adjust the trim and/or reduce the sagging or hogging moments in the dock. The freeboard of the dock to the pontoon deck is as given in Ch.3. Conditions shall be specified by the Builders.

104 If the dock's port of operation is not sheltered against waves, the expected wave bending moments at a probability level of 10^{-4} shall be taken into account when calculating the longitudinal strength.

105 If a reduced bending moment is achieved by compensating ballast water giving unequal water levels in the bottom tanks, the condition with ballast water evenly distributed over the entire length of the dock shall also be evaluated.

B 200 Sea-going conditions

201 If the dock shall be towed in open waters from the port of construction to the port of operation for which it shall be classified, the total expected bending moments en route at a probability level of 10^{-4} shall be taken into account. The bending moments will be considered by Society in each case, depending on the route and season of the year for the intended tow.

Wave conditions which shall be considered for design purposes may be described either by means of directional wave energy spectra or deterministic design waves having appropriate shape and size. The selection of suitable parameters shall in both cases be based upon wave statistics.

B 300 Operating Manual

301 The Operating Manual containing information on the docking operations, the docking conditions and the maximum permissible deflections, shall be kept in the control room of the dock.

The Operating Manual is subject to approval by the Society.

C. Allowable stresses

C 100 General

101 The total maximum permissible stresses related to the loading conditions as given in B, are given by:

Condition specified in	*Maximum longitudinal Bending stress*	*Mean shear stress*
B 101 to 104 B 105	140 f_1 N/mm^2 200 f_1 N/mm^2	100 f_1 N/mm^2 120 f_1 N/mm^2
B 200	Will be specially considered	Will be specially considered

D. Section Modulus and Buckling Strength

D 100 Basis for calculation

101 When calculating the section modulus of the dock hull, the net sectional area of all effective continuous longitudinal strength members shall be included.

D 200 Region of required section modulus

201 The section modulus of the dock hull at its mid-length shall be maintained within 0.4 L_D amid length of the dock, unless a larger extension or special strengthening is made necessary due to the bending moment curve.

D 300 Buckling strength

301 The longitudinal strength members shall be adequately stiffened to prevent buckling.

E. Deflection Monitoring

E 100 General

101 Two completely independent systems for measuring the deflection of the dock over its length L_D shall be installed. The deflection values shall be readable from the control room of the dock.

For docks with length L_D not exceeding 50 m, alternative arrangements for ensuring a limitation of the stresses in the dock may be accepted upon special consideration.

102 For docks with lifting capacity exceeding 40 000 t, the deflection monitoring systems shall include arrangements for visual and audible signals, readily distinguishable from other signals, and for automatic stopping of ballast pumps before the maximum permissible deflection, corresponding to the permissible bending stress, is reached.

SECTION 5
TRANSVERSE STRENGTH

A. General

A 100 Introduction

101 In this Section minimum requirements to transverse strength of floating docks supporting docked ships are given.

B. Loading Conditions

B 100 Docking conditions

101 The transverse strength of the dock shall be based on the most severe expected docking and transient conditions.

102 The transverse strength of the dock shall be evaluated at least for the conditions as described in Sec.4 B100.

103 It is assumed that the docked ship normally is supported by the keel blocks only.

104 The following transient conditions shall be examined:

The dock emerging out of water with a typical ship fully supported on the blocks and the pontoon deck subjected to a water head just below top of docking blocks, with corresponding ballast water in the tanks.

B 200 Sea-going condition

201 If the dock shall be towed in open waters from the port of construction to the port of operation, the total static and dynamic pressures en route shall be taken into account.

202 The dynamic sea pressure is taken at a probability level of 10^{-4} and will be considered by the Society in each case, depending on the route and season of the year for the intended tow.

C. Permissible Stresses

C 100 Transverse girders

101 For transverse strength members maximum permissible stresses are as given in the following table:

Condition specified in	*Permissible transverse bending stresses*	*Mean shear stresses*	*Combined stresses*
B 101 to 104 B 201	170 f_1 N/mm^2 160 f_1 N/mm^2	100 f_1 N/mm^2 100 f_1 N/mm^2	200 f_1 N/mm^2 200 f_1 N/mm^2

D. Section Modulus and Buckling Strength

D 100 Section Modulus

101 When calculating the section modulus of a transverse girder system, the net effective cross-sectional area of all effective transverse strength members of the girder system may be included.

102 The transverse strength shall be calculated for a sufficient number of cross sections, applying the weight curves of typical ships.

D 200 Buckling strength

201 The transverse strength members shall be adequately stiffened to prevent buckling. Refer to Pt.3 Ch.1 Sec.13 C of the Rules for Classification of Ships.

SECTION 6
PLATING AND STIFFENERS

A. General

A 100 Introduction

101 In this Section formulae and requirements not related to specific structures are given.

102 The relevant values of lateral design pressure, nominal stress and other parameters dependant on structure and position are given in the Sections dealing with specific structures.

A 200 Definitions

201 General symbols and terms are defined in Sec.1 B.

202 Other symbols:

t = thickness in mm of plating
Z = section modulus of stiffener in cm^3
s = stiffener spacing measured along the plating in m
l = stiffener span measured along the top flange of the member in m
The depth of stiffener on crossing panel may be deducted when deciding the span
p = design pressure in kN/m^2
m = bending moment factor
σ = nominal bending stress due to lateral pressure in N/mm^2
t_k = corrosion addition in mm, as specified in Sec.2 D300
w_k = corrosion factor, see Rules for Classification of Ships Pt.3 Ch.1 Sec.1 C1004.

B. Strength Evaluation

B 100 Plating

101 For principles for evaluation of bending, shear and buckling strength see Pt.3 Ch.1 Sec.3 B400 and B500 of the Rules for Classification of Ships.

102 The thickness of plating subjected to lateral pressure shall not be less than:

$$t = 15.8 k_a s \sqrt{\frac{p}{\sigma}} + t_k \, [mm]$$

k_a = correction factor for aspect ratio of plate field
= $(1.1 - 0.25\ s/\ l)^2$
= maximum 1.0 for $s/\ l = 0.4$
= minimum 0.72 for $s/\ l = 1.0$

Corresponding values of p and σ normally applicable are given in the Sections dealing with specific structures. Between specified regions p and σ shall be linearly varied.

103 For plating not covered by the Sections dealing with specific structures, the formula given in 102 may be applied provided satisfactory combinations of p and σ can be established. The stress level σ may normally be considered satisfactory if the equivalent stress σ_e calculated as indicated in the reference given in 101 is not exceeding 245 f_1 N/mm^2. However, the σ -value shall normally not be taken greater than 160 f_1 N/mm^2.

B 200 Stiffeners

201 For principles for evaluation of buckling strength, see Pt.3 Ch.1 Sec.3 B500 of the Rules for Classification of Ships.

202 The section modulus for longitudinals, beams, frames and other stiffeners subjected to lateral pressure shall not be less than:

$$Z = \frac{1000}{\sigma m} \ l^2 \ s \ p \ w_k \ [cm^3]$$

Corresponding values of p and σ as also m-values normally applicable are given in the Sections dealing with specific structures. Between specified regions of p and σ shall be linearly varied.

204 For stiffeners not covered by the Sections dealing with specific structures, the formula in 202 may be applied provided satisfactory combinations of p and σ as also m-values can be established. The stress level σ may normally be considered satisfactory if the sum of hull girder, local girder and stiffener bending stresses is not exceeding 225 f_1 N/mm^2. However, the σ -value shall normally not be taken greater than 160 f_1 N/mm^2.

205 For brackets, stiffeners and plating of different strength groups and other details etc., the requirements in Pt.3 Ch.1 Sec.3C of the Rules for Classification of Ships shall be complied with as far as applicable to floating docks.

SECTION 7
LOCAL STRENGTH

A. General

A 100 Introduction

101 In this Rule Section the requirements applicable to pontoon and wing wall structures are stated. The requirements are given either directly or by proper references to other Sections of the Rules.

102 Deviation from these requirements may be accepted upon special consideration based on the principle of equivalent overall strength.

A 200 Definitions

201 Symbols:

y_n = vertical distance in m from the pontoon bottom to the neutral axis of the dock hull
x_l = transverse distance in m from the centreline to the load point in question
h_d = height of pontoon at centreline in m
h_b = height of pontoon bottom longitudinal in m
h_i = height of pontoon deck longitudinal in m
y_i = vertical distance in m from the pontoon bottom to the flange of pontoon deck longitudinals.

Symbols not defined in 201 are defined in connection with given formulae or in the cross-references.

A 300 Design pressure

301 Relevant external design pressure p_e and internal design pressure p_i shall be determined in accordance with Sec.3.

302 For pontoon bottom and wing walls, the design pressure shall not be taken less than the greater of the internal and the external pressure head.

303 Provided it can be documented that some of the panels will not be subjected to pressure from one side only, 50% of the lesser of the external or the internal pressure may be deducted from the greater. The design pressure head shall be stated in the Operating Manual.

304 If the pontoon deck is intended for wheel loads, the scantlings are also to comply with the requirements in Pt.5 Ch.2 Sec.4 C of the Rules for Classification of Ships.

B. Pontoon Strength, Docks of the Caisson Type

B 100 Plating

101 The plate thickness shall not at any place be less than

$$t = s\sqrt{\frac{L_D}{f_1}} \quad [\text{mm}]$$

s = stiffener spacing in m.

102 The thickness of pontoon bottom plating shall not be less than according to the requirements given in Sec.6 B100 when:

σ = $70 f_1 + 100 (f_1 - f_2)$ within $0.4L_D$ amid length, max. $120 f_1$ N/mm^2 longitudinal stiffeners
σ = $50 f_1 + 120 (f_1 - f_2)$ within $0.4L_D$ amid length, max. $160 f_1$ N/mm^2 transverse stiffeners
σ = $160 f_1$ N/mm^2 within $0.1L_D$ from the dock ends.

103 The thickness of pontoon deck plating shall not be less than according to the requirements given in Sec.6 B100 when:

σ = $110 f_i + 100 (f_1 - f_2)$ within $0.4L_D$ amid length, max. $160 f_1$ N/mm^2 for longitudinal stiffeners
σ = $90 f_1 + 110 (f_1 - f_2)$ within $0.4L_D$ amid length, max. $160 f_1$ N/mm^2 for transverse stiffeners
σ = $160 f_1$ N/mm^2 within $0.1L_D$ from the dock ends.

B 200 Longitudinals

201 The section modulus of pontoon bottom longitudinals shall not be less than according to the requirements given in Sec.6 B200 when:

m = 12

$\sigma = 225\ f_1 - 135\ f_2 \left(\frac{y_n - h_b}{y_n} \right) - 20\ f_1 \left(\frac{h_d - 2h_b}{h_d} \right)$,

max. 160 f_1 N/mm^2 within 0.4L_D amid length.

σ = 160 f_1 N/mm^2 within 0.1 L_D from the dock ends.

The local stress level in pontoon bottom longitudinals in the middle region may be increased if the maximum sum of longitudinal stress in dock hull and bending stress in pontoon bottom is less than

$$135\ f_2 + 20\ f_1$$

according to given loading conditions and direct stress calculations.

202 The section modulus of pontoon deck longitudinals shall not be less than according to the requirements given in Sec. 6 B 200 when:

m = 12

$\sigma = 225\ f_1 - 135\ f_2 \left(\frac{y_n - h_b}{y_n} \right) - 20\ f_1 \left(\frac{h_d - 2h_b}{h_d} \right)$,

max. 160f_1 N/mm^2 within 0.4L_D amidships;

σ = 160f_1 N/mm^2 within 0.1L_D from the dock ends.

The local stress level in pontoon deck longitudinals in the middle region may be increased if the maximum sum of longitudinal stress in dock hull and bending stress in pontoon deck is less than

$$135\ f_2\ \frac{h_d}{y_n} + 20 f_1$$

according to given load conditions and direct stress calculations.

B 300 Frames in pontoon bottom and deck

301 The section modulus shall not be less than according to the requirements given in Sec.6 B200 when:

m = 10

σ = 160 f_1 [N/mm^2]

The m-value may be adjusted after special consideration.

C. Pontoon Strength, Docks of the Pontoon Type

C 100 Plating

101 The plate thickness shall not at any place be less than

$$t = s \sqrt{\frac{L_D}{f_1}} \quad [\text{mm}]$$

102 The thickness of pontoon bottom and deck plating shall not be less than according to the requirements given in Sec. 6 B 100 when

$$\sigma = 160\ f_1\ [\text{N/mm}^2]$$

C 200 Longitudinals and transverses

201 The section modulus of pontoon bottom and deck longitudinals and transverses shall not be less than according to the requirements given in Sec.6 B200 when:

m = 10

σ = 160 f_1 [N/mm^2]

D. Dock Wings

D 100 Side wall strength

101 The scantlings are determined in accordance with Pt.3 Ch.1 Sec.7 C of the Rules for Classification of Ships.

102 The plate thickness shall not be less than:

$t = s \sqrt{\frac{L_D}{f_1}}$ [mm]

D 200 Upper deck

201 Within $0.4L_D$ amid length the thickness of plating shall be as required for the longitudinal strength of the dock.

202 As a minimum requirement the plate thickness shall not be less than:

t = 7.5+(s-0.6)7.5 [mm]
s = stiffener spacing in m.

203 Between the amid length region and $0.1L_D$ from each end there shall be a gradual transition in the plate thicknesses as required by 201 and 202. If the maximum bending moment is located outside $0.4L_D$ amid length, special consideration will be given to the longitudinal distribution of the material.

204 The upper deck shall normally be stiffened longitudinally. The scantlings of longitudinals will generally be determined by the required longitudinal strength of the dock. The scantlings shall in no case be less than required for the minimum design pressure on the upper deck, when:

m = 12
σ = 160 f_1 [N/mm^2]

205 Additional stiffening and support shall be fitted below cranes, warping winches etc.

E. Bulkheads

E 100 Design pressure

101 Relevant internal design pressure p_i shall be determined for each side of the bulkhead in accordance with Sec.3.

E 200 Bulkhead strength

201 Bulkhead scantlings are determined in accordance with Pt.3 Ch.1 Sec.9 of the Rules for Classification of Ships.

F. Anchorage Attachments

F 100 General

101 The strength of anchorage attachments, such as dolphin locks etc., will be considered in each case, depending on the expected wind, current and wave conditions in the dock's port of service. For calculation of wind forces, see Ch.3 Sec.I.

CHAPTER 3 STABILITY AND FREEBOARD

SECTION 1
STABILITY

A. General

A 100 Stability Manual

101 The required Stability Manual for the dock (see Ch.1 Sec.1 Table C1), shall contain information sufficient to give the Dock Master such guidelines as will enable him to ensure adequate stability and floatability in all operating modes of the dock. It is assumed that the Dock Master will take into consideration the effect of free surface of liquids in the tanks in the dock as well as in the ship to be docked.

102 Inclining tests shall be undertaken as stated in Ch.2 Sec.1 C200, if necessary for establishing the position of the centre of gravity of the dock.

103 The stability requirements as specified in A300, shall be complied with.

A 200 Loading conditions

201 Particulars on the following design conditions shall be included in the Stability Manual:

a) Floating dock fully submerged to the minimum freeboard to the upper deck.

b) Floating dock with pontoon immersed to just below top of docking blocks, with the most unfavourable typical ship supported by the blocks, and restoring waterplane for the combination dock/ship provided only by the side walls of the dock.

c) Floating dock in final working condition with typical ships on the blocks, including the most unfavourable ship.

A 300 Intact stability requirements

301 Proof of compliance with the stability criteria according to 311 and 313 shall be established for the relevant design conditions as specified in 200.

302 Intact stability curves in stillwater shall be included in the Stability Manual for design condition c) as specified in 200.

303 The intact stability curves for the dock and typical ships shall be corrected for the effect of free surface of liquids in the tanks. The corrections shall be calculated realistically with due regard to liquid level and angle of heel.

304 The static stability curves may be based on the assumption that air pipes to tanks are closed watertight, provided the pipes are arranged with permanently attached, automatic means of closing.

305 Wind heeling moment curves shall be included in the Stability Manual for design condition c) as specified in 200, calculated from the following formula:

$$F = 0.5 \Sigma C_H \rho V^2 A$$

where:

F = the wind force in N (= Newton)
C_H = the height coefficient
ρ = the air mass density in kg/m^3
V = the wind velocity in m/s
A = the projected area (normal to the wind direction) of the exposed surface considered, including exposed areas of docked ship in m^2

The value of the coefficient C_H is given by the following formula:

$$C_H = \left(\frac{z}{10} \right)^{0,17}$$

where:

z = height above the waterline of the centre of gravity of the exposed member (e.g. wing wall, deck house) in m.

306 The wind heeling moments shall be corrected to include any exposed major equipment, such as cranes running on top of side walls.

307 The values of the wind velocity will depend on the service location and the mode of operation of the

floating dock, and will be considered in each case. Wind forces shall be considered as acting at right angles to the floating dock.

308 When calculating the wind heeling moments, the lever of the wind overturning force should be taken vertically from the centre of pressure of all surfaces exposed to the wind to the centre of the lateral resistance of the underwater body of the dock. The dock shall be assumed floating free of mooring restraint.

309 The wind heeling moment curve for the floating dock may be assumed to vary as the cosine function of the heel of the dock.

310 Wind heeling moments derived from wind tunnel tests on a representative model of the floating dock, may be considered as an alternative to the method given in 305.

311 The initial metacentric height after correction for free surface effect shall not be less than 1.00m in any condition of loading as referred to in 200. For transient conditions of short duration, however, a smaller metacentric height may be accepted upon special consideration.

312 The intact stability curves of 302 and wind heeling moment curves of 305 shall be shown in the same diagram and included in the Stability Manual for the loading condition c) as specified in 200.

313 For load condition c), the point of intersection between the intact stability curve and the wind heeling moment curve shall under no circumstance exceed the angle where any part of the pontoon deck submerges.

SECTION 2
FREEBOARD

A. General

A 100 Freeboard to the upper deck

101 When all compartments below the safety deck are flooded, but with no load on the docking blocks, the freeboard to the upper deck shall generally not be less than 1.0m.

102 In any case the freeboard shall be sufficient to ensure adequate reserve buoyancy to withstand accidental flooding of any one compartment above the safety deck.

103 Openings for access, equipment, cables etc. shall be fitted with effective means of closure to prevent seawater from passing into buoyant spaces in the dock wings.

A 200 Freeboard to the pontoon deck

201 The freeboard to the pontoon deck with the dock in its final working condition with a ship corresponding to the lifting capacity of the dock on the blocks shall not be less than 300mm at the centreline and not less than 75mm at the inner wing walls. The dock cranes may be positioned so as to produce no trim. However, the freeboard shall be such that the simultaneous movement of the dock cranes from one dock end to the other, carrying loads equal to their maximum lifting capacity, under no circumstance will submerge any part of the pontoon deck.

202 If the dock's port of operation is not sheltered against waves, greater freeboards than given by 201 may be required.

CHAPTER 4 MACHINERY INSTALLATIONS

SECTION 1
GENERAL

A. Scope

A 100 General

101 As far as relevant and applicable the requirements in Pt.4 (Machinery and Systems – Main Class) in the Rules for Classification of Ships shall be complied with unless otherwise specified in the following.

102 Installations for the functions listed in 103 and others with potential safety hazards, regardless of function, according to 104 are covered by the classification of the floating dock and are subject to approval.

103 Machinery installations for the following functions shall comply with the Rules:

— bilge pumping
— ballasting
— power supply, if a power generating system is installed in the dock
— emergency power supply
— positioning of the ships in the dock (provision of warping winches and capstans etc.).

Requirements to machinery necessary for the performance of these functions are aimed at safety against hazards for dock personnel, environment and reliability in the performance of the functions and their related auxiliary functions.

104 For some machinery installations, regardless of their contribution to the functions listed in 103, requirements aiming at the safety against hazards for dock personnel and environment apply. This comprises the following machinery items:

— boilers and pressure vessels
— air compressors
— piping for gas, steam or vapours subject to pressures above atmospheric pressure
— piping for fluids with temperature above 220°C
— firing- and combustion installations
— other machinery installations especially stated by the Rules
— electrical installations.

105 Installations solely intended for dock labour and repair work on docked ships are not covered by the classification of the dock, except for installations which may be expected to represent a risk of danger to the dock, the docked ship or the personnel.

A 200 Assumptions

201 The Rules are based on the assumption that the machinery is operated and maintained by competent personnel.

B. Basic Requirements

B 100 Safety

101 The machinery shall be so designed, installed and protected so that is subject to a low risks of fire, explosions, accidental pollution, leakages and accidents thereof.

B 200 Reliability

201 Reliability and availability of the machinery shall be adapted according to considerations of the consequences from machinery failures and disturbances.

C. Survey during Construction

C 100 General.

101 Machinery covered by the classification of the dock shall be manufactured and tested under the supervision of the Society, unless otherwise specified by the relevant Rules for each particular product.

102 The Surveyor will examine each individual product during manufacturing, upon completion for satisfactory workmanship, for compliance with Rule requirements, approved plans and specifications. Testing required by the Rules shall be carried out in the presence of the Surveyor.

D. Functional Testing

D 100 General

101 All machinery shall be thoroughly tested after installation onboard in the presence of the Surveyor. Data shall be recorded to the extent considered necessary by the Surveyor.

102 A test programme shall be worked out by the builder to the satisfaction of the attending Surveyor.

The programme shall specify components and systems to be tested and testing procedures.

103 The tests shall give evidence as to satisfactory operation and fulfilment of capacity requirements.

104 When testing control and safety equipment, failure modes shall be simulated as realistically as possible.

E. Operating Manual

E 100 General

101 The approved operating manual for the dock shall be kept onboard, see also Ch.2 Sec.4 B300 and Ch.3 Sec.1 A100.

SECTION 2
PIPING SYSTEMS

A. Ballast and Bilge System

A 100 General

101 The floating dock shall have adequate means for ballasting and de-ballasting of tanks to ensure a safe operation of the dock.

102 The dock shall have a ballast system so arranged that any tank can be ballasted by either of at least 2 pumps or by controlled free flow.

103 The arrangement for de-ballasting of tanks shall be such that any tank can be de-ballasted by at least 2 pumps.

104 The dock shall have a bilge system for dry compartments. The arrangement shall be such that seawater cannot unintentionally enter dry compartments or pass from one compartment to another.

105 Means for operation of pumps and valves and for sounding of tank sections shall be arranged from a central control station with visual contact to the ship(s) being docked.

A 200 Bilge and ballast pipes

201 The internal diameter of branch suction pipes from any compartment or tank shall not be less than

$$d = 2.15\sqrt{A} + 25 \text{ [mm]}$$

202 A = area in m^2 of the boundaries of that part of the compartment or tank which is below the level corresponding to maximum draught of the dock with minimum freeboard to upper deck.

203 The internal diameter shall not in any case be less than 50 mm.

204 The sectional flow area of the main bilge line shall not be less than the combined area of the two largest branch suctions.

A 300 Pumps and valves

301 Valves operated by remote control shall be arranged also for manual local operation.

302 Power failure to remotely controlled valves shall not result in any critical situation for the dock (e.g. excessive heel, trim and/or deflection).

303 The capacity of each bilge and ballast pump shall be sufficient to give the water, under normal working conditions, a velocity not less than 122 m/min, through the main bilge line of size as required by 202.

B. Cooling Water System

B 100 Sea water inlets

101 If a seawater cooling system is arranged, the dock shall be provided with at least two sea chests. One of the sea chests shall be arranged as a "high suction".

CHAPTER 5 FIRE PROTECTION, DETECTION AND EXTINCTION

SECTION 1 GENERAL

A. Scope

A 100 General

101 Arrangements and equipment for fire protection, detection and extinction for the dock itself are covered by the classification and are subject to approval. Arrangement for supplying water from the dock pumps to the fire extinguishing system of the docked ships in event of a ship fire is also a condition for assignment of class, see B 308.

102 The requirements in Pt.4 Ch.10 of the Rules for Classification of Ships shall be complied with as far as applicable to floating docks and with the additions and modifications specified in the following.

B. Water Extinguishing Systems

B 100 General

101 All floating docks shall be provided with fire pumps, fire main, hydrants and hoses so arranged that a fire at any place onboard, except in tanks for water ballast only, can be effectively covered.

B 200 Fire pumps

201 Floating docks of less than 1000 t lifting capacity shall have one fire pump. Floating docks of 1000 t lifting capacity and above shall have two fire pumps

202 Floating docks of 2000 t lifting capacity and above shall in addition be provided with an independently driven emergency fire pump. The emergency fire pump shall be arranged and located in a readily accessible position not likely being inaccessible by a fire in the compartments where the main fire pumps are located.

203 Each of the fire pumps required by 201 and 202 shall be capable of supplying two fire hose stations located furthest from the pumping station, with sufficient quantity of water.

204 Each of the fire pumps required by 201 and 202 shall be capable of maintaining a pressure head of at least 60 m, when the floating dock is in the highest floating condition. Under the same floating condition each of the fire pumps shall be capable of maintaining a pressure of not less than 4 bar when two nozzles are in action.

205 The fire pumps shall be provided with at least two sea chests, normally arranged separately one on each side of the dock.

206 Where centrifugal fire pumps are used, a non-return valve (with loose cone) shall be fitted to the pump.

B 300 Fire main, hydrants and hose stations

301 A fire main shall be installed on the upper deck of each dock wing from front to aft. The arrangement shall be such that all the fire pumps will be able to supply water to the fire main port and starboard.

302 The fire main on each dock wing shall be provided with hydrants at intervals of maximum 30 m.

303 At least two hydrants shall be provided in machinery spaces for combustion engines, oil fired boilers, oil tanks or other oil consuming machinery.

304 Within the accommodation areas hydrants shall be so arranged that any place in the accommodation can be reached simultaneously by a spray from at least two combined water and fog nozzles not connected to the same hydrant. One of the fire hoses shall not exceed 15 m and the other not 30 m in length.

305 All hydrants required in the engine room and accommodations shall be provided with complete fire hose equipment.

306 At least 50% of the hydrants required by 302 shall be provided with complete fire hose equipment.

307 The arrangement of fire main, hydrants and fire hose stations shall be in accordance with Pt.4 Ch.10 of the Rules for Classification of Ships.

308 A coupling of the international shore connection type, as specified in the International Code for Fire Safety Systems Chapter 2, shall be provided and placed on upper deck of each dock wing for supplying water from the dock pumps to the extinguishing system of the docked ship, in event of fire in the ship.

C. Extinguishing Systems in Engine and Boiler Rooms

C 100 General

101 Engine and boiler rooms with combustion engines, oil fired boilers, oil tanks or other oil consuming machinery shall be protected by a fixed main fire extinguishing system

102 The fixed main fire extinguishing system shall be so arranged that it will not be put out of action by an outbreak of fire in the protected area.

C 200 Main extinguishing systems

201 The main extinguishing system shall be one of the following:

— fixed pressure water spraying system
— CO_2 Total Flooding System
— High Expansion Foam System.

202 The main fire extinguishing system as specified in 201 shall be as required for ships of 500 gross tonnage and above, as given in SOLAS Ch. II-2/10.4, supplemented by requirements in the International Code for Fire Safety Systems Chapters 5, 6 and 7.

D. Accommodation

D 100 General

101 Accommodation, control stations and service spaces shall be arranged and built so that the risk of fire is reduced to a minimum.

D 200 Structural fire protection

201 Deckhouses shall be of steel or aluminium alloy.

202 Internal bulkheads and doors shall be of non-combustible B-class materials

203 The arrangement of the structural fire protection and requirements to exposed surfaces, deck coverings, ventilation and insulation shall be in accordance with Pt.4 Ch.10 of the Rules for Classification of Ships.

E. Portable Extinguishers

E 100 General

101 Portable extinguishers shall be placed onboard at locations with risk of fire.

102 One spare charge shall be provided for each of the required extinguishers placed onboard.

E 200 Number and location

201 Within the accommodation portable extinguishers shall be so located that at least one extinguisher will be accessible from any part of the accommodation. The total number of extinguishers required within the accommodation area will depend on its size and arrangement.

202 Portable extinguishers shall be provided in engine and boiler rooms as well as rooms with electric motors and switchboards etc. for pumps, warping capstans etc. Number and location will depend on the rooms' size and arrangement, in general accordance with Pt.4 Ch.10 Sec.2 B300 of the Rules for Classification of Ships.

F. Fireman's Outfit

F 100 Number and location

101 At least 2 complete fireman's outfit shall be placed onboard, one set on upper deck of each dock wing.

102 The fireman's outfit shall be in accordance with Pt.4 Ch.10 Sec.2 B600 of the Rules for Classification of Ships, supplemented by requirements given in the International Code for Fire Safety Systems Ch.3.

CHAPTER 6 SURVEY REQUIREMENTS

SECTION 1
PERIODICAL SURVEYS

A. General

A 100 General

101 To retain its class with Det Norske Veritas a floating dock in normal service shall be subjected to periodical surveys and survey of damage repairs modifications in general accordance with Pt.7 Ch.1 of the Rules for Classification of Ships, as far as applicable to floating docks and to the extent the matter in question is not included in the following rules. Floating docks will be subject to periodical surveys as per Rules for Classification of Ships Pt.7 Ch.1 Sec.1 A200, with exception of Intermediate surveys, which are not applicable.

B. Annual Surveys

B 100 Hull and machinery

101 The floating dock shall be subjected to annual surveys to ascertain the general condition of the items listed in 102 to 105.

102

— steel structures, externally above light waterline
— keel blocks and their foundations
— platforms at dock ends
— swing bridges.

103

— hatchways, manholes and their closing appliances
— casings, skylights and companionways and their closing appliances
— openings in dock sides and their closing appliances
— ventilators and other deck openings
— overboard scuppers and discharges
— means of escape from machinery spaces, crew's accommodation and working spaces.

104

— pump rooms and machinery and boiler spaces with particular attention to fire and explosion hazards
— boilers, see Pt.7 Ch.1 Sec.1 C600 of the Rules for Classification of Ships
— monitoring system for deflections and stresses in the dock.

105

— crane foundations.

C. Other Periodical Surveys

C 100 Machinery

101 The following items shall be examined as per requirements in the Rules for Classification of Ships:

— Boilers as per Pt.7 Ch.1 Sec.1 A609 and Pt.7 Ch.1 Sec.4 F in the Rules for Classification of Ships.
— Machinery items comprising ballast pumps, hydraulic system for control of ballast tank valves equipment for fire protection, detection and extinction, etc.

C 200 Bottom Surveys

201 Survey of the outer bottom below the light waterline shall be carried out at intervals as per Rules for Classification of Ships Pt.7 Ch.1 Sec.1 A605 a), b) and c).

202 The inspection may be carried out by some combination of:

— heeling of the dock for partial examination of the bottom
— ultrasonic measurement of plate thicknesses
— underwater photography
— underwater television
— examination by diver.

The methods and extent of the examination shall be agreed with the Society.

Cleaning of the bottom may be required to the extent found necessary for ascertaining the condition of the bottom.

203 The condition of all underwater parts of the dock shall be satisfactorily ascertained. The bottom shell plating and its corrosion protection shall be examined. Grids for sea connections shall be removed. Valves and cocks with their fastenings shall be examined externally. If considered necessary by the Surveyor, valves and cocks shall be dismantled for internal inspection.

D. Renewal Surveys

D 100 Hull and machinery

101 Renewal survey shall be carried out according to Rules for Classification of Ships Pt.7 Ch.1 Sec.1 A.

102 Each renewal survey shall comprise examination of the items listed for annual surveys in B 100 and for bottom surveys in C 200. In addition, survey according to the items specified in Rules for Classification of Ships Pt.7 Ch.1 Sec.1 B100 and Sec.4 in 103 to109 in the following, shall be carried out for each renewal survey.

Guidance note:
It is advised that the floating dock is dry-docked, if this is practicable.

---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---

103 All sea inlets and discharges, above and below the light waterline, with valves and cocks shall be dismantled, and their fastenings to the hull shall be examined.

Guidance note:
At the occasion of the renewal survey, valves that can be internally inspected without dismantling may be specially considered by the attending surveyor.

---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---

104 Internal steel structures shall be cleared and cleaned as necessary for examination by the Surveyor. It is up to the attending Surveyor to require thickness measurements of parts showing signs of reduced strength.

105 Spaces between the upper deck and the safety deck shall be inspected. Linings shall be removed if found necessary by the Surveyor.

106 Where the inner surface of the bottom plating is covered by cement, asphalt or other composition, the removal of this covering may be dispensed with, provided it is carefully examined by hammering or chipping and found sound and adhering to the steel.

107 All ballast water tanks in pontoons and dock wings shall be cleaned for examination by the Surveyor. Normally, all tanks shall be hydraulically tested to the maximum pressure the tank in question may be subjected to in service. If the tanks by internal examination are found to be in good condition, the testing of only typical tanks may be accepted. The pump suctions shall be inspected. The tightness of the bottom of pontoon tanks is checked by internal inspection of the empty tank.

108 For tanks which are protected against corrosion by an approved protection system, where corrosion additions to the material scantlings have been dispensed with, the protection system shall be surveyed. For cathodic protection systems, the potential differences shall be measured, and consumption of anode material shall be checked.

109 Anchoring and mooring arrangements shall be inspected as found necessary by the Surveyor.