RULES FOR CLASSIFICATION

Ships

Edition October 2015

Part 5 Ship types

Chapter 4 Passenger ships
FOREWORD

DNV GL rules for classification contain procedural and technical requirements related to obtaining and retaining a class certificate. The rules represent all requirements adopted by the Society as basis for classification.

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Any comments may be sent by e-mail to rules@dnvgl.com

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CHANGES – CURRENT

This is a new document.
The rules enter into force 1 January 2016.
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SECTION 1 GENERAL

1 Introduction

1.1 Introduction
These rules apply to vessels intended for transportation of more than 12 passengers, with class notations Passenger ship or Ferry A or B.

1.2 Scope
The rules in this chapter give requirements specific to passenger vessels.

1.3 Application

1.3.1 The requirements in this chapter are supplementary to the rules in Pt.2, Pt.3 and Pt.4 applicable for the assignment of the main class.
General reference is made to the Society's document DNVGL-CG-0138 Direct strength analysis of hull structures in passenger ships for general ship type information, design concepts and a description of an acceptable approval procedure.

1.3.2 For passenger vessels with class notations including Ferry A or B, Ch.3 shall be applied for the RO/RO spaces.

2 Class notations

2.1 Ship type notations

2.1.1 Vessels built in compliance with the requirements as specified in Table 1 will be assigned the class notations as follows:

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Qualifier</th>
<th>Design requirements, rule references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger ship</td>
<td>Ship arranged for transport of more than 12 persons</td>
<td>&lt;none&gt;</td>
<td>RU SHIP Pt.5 Ch.4 Sec.1 to Sec.4</td>
</tr>
<tr>
<td>Ferry</td>
<td>Ship arranged for transport of more than 12 persons and arranged for carriage of vehicles on enclosed decks</td>
<td>A</td>
<td>RU SHIP Pt.5 Ch.4 Sec.1 to Sec.4 Ch.3 for RO/RO spaces</td>
</tr>
<tr>
<td></td>
<td>Ship arranged for transport of more than 12 persons and arranged for carriage of vehicles on weather deck only</td>
<td>B</td>
<td>RU SHIP Pt.5 Ch.4 Sec.1 to Sec.4 Ch.3 for RO/RO spaces</td>
</tr>
</tbody>
</table>
2.2 Additional notations

2.2.1 The following additional notations, as specified in Table 2, are typically applied to Passenger ships with ship type notations according to Table 1:

Table 2 Additional notations

<table>
<thead>
<tr>
<th>Class notation</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMF (C,crn)</td>
<td>Comfort class covering requirements for improved indoor climate. crn denotes comfort rating number.</td>
<td>Passenger ships</td>
</tr>
<tr>
<td>COMF (V,crn)</td>
<td>Comfort class covering requirements for noise and vibration. crn denotes comfort rating number.</td>
<td>Passenger ships</td>
</tr>
<tr>
<td>VIBR</td>
<td>Ship meets specified vibrations level criteria measured at pre-defined positions for machinery, components, equipment and structure</td>
<td>Passenger ships</td>
</tr>
</tbody>
</table>

3 Documentation

3.1 Documentation requirements

3.1.1 General

General requirements for documentation, including definition of the Info codes, see Pt.1 Ch.3 Sec.2 and Pt.1 Ch.3 Sec.3.

Table 3 Documentation requirements

<table>
<thead>
<tr>
<th>Object</th>
<th>Documentation type</th>
<th>Additional description</th>
<th>Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship hull structure</td>
<td>H081 - Global strength analysis</td>
<td>When required by, Sec.2 [1.2]</td>
<td>FI</td>
</tr>
<tr>
<td></td>
<td>H085 - Fatigue analysis</td>
<td>When required by, Sec.2 [1.2]</td>
<td>FI</td>
</tr>
<tr>
<td>Superstructure</td>
<td>H080 - Strength analysis</td>
<td>Glass roofs</td>
<td>FI</td>
</tr>
<tr>
<td></td>
<td>Z261 - Test report</td>
<td>Prefabricated balconies, see [5.1.2]</td>
<td>FI</td>
</tr>
<tr>
<td></td>
<td>Z261 - Test report</td>
<td>Glassed walls, see [5.1.4]</td>
<td>FI</td>
</tr>
<tr>
<td>Doors</td>
<td>C030 - Detailed drawing</td>
<td>Connections between door frames and bulkheads.</td>
<td>AP</td>
</tr>
<tr>
<td>Propulsion and steering</td>
<td>Z070 - Failure mode description</td>
<td>Shall be submitted prior to detail design plans. See also IACS UR M69.</td>
<td>AP</td>
</tr>
</tbody>
</table>
4 Product certificates

4.1 Certification requirements

4.1.1 General
For products that shall be installed on board, the Builder shall request the Manufacturers to order certification as described in Table 4.

Table 4 Certification requirements

<table>
<thead>
<tr>
<th>Object</th>
<th>Certificate type</th>
<th>Issued by</th>
<th>Certification standard</th>
<th>Additional description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo securing devices, fixed</td>
<td>PC</td>
<td>Society</td>
<td>Standard for Certification No. 2.23</td>
<td></td>
</tr>
<tr>
<td>Cargo securing devices, portable</td>
<td>PC</td>
<td></td>
<td></td>
<td>If certified by DNV GL, Standard for Certification No. 2.23, shall be applied.</td>
</tr>
</tbody>
</table>

For general certification requirements, see Pt.1 Ch.3 Sec.4.
For a definition of the certification types, see Pt.1 Ch.3 Sec.5.

5 Testing

5.1 Survey and testing during newbuilding

5.1.1 General
Survey and testing requirements are given in Pt.2.

5.1.2 Prefabricated balcony module
Prefabricated balcony modules shall be structurally tested with a test load of 0.25 t/m². No visual damage or permanent deflections upon removal of the test load shall occur. A test report (TR), as defined in Pt.1 Ch.1 Sec.4 [2.1.1], signed by the manufacturer, shall be submitted to the Society.

5.1.3 Balcony railing
An impact test according to EN 12600, or equivalent, shall be carried out to demonstrate that the glass pane will not fall out under accidental loading.

5.1.4 Glassed superstructure side
For glassed walls which extend between decks, an impact test shall be carried out as per EN 12600 pendulum test, to demonstrate that the glass pane will not fall out in case of an accidental load. A test report (TR), as defined in Pt.1 Ch.1 Sec.4 [2.1.1], signed by the manufacturer, shall be submitted to the society.
SECTION 2 HULL

1 General

1.1 Arrangement
Passenger ships often have multiple decks and long superstructures with many openings. The side and end bulkheads of the superstructure shall be effectively supported. Adequate transition arrangements shall be fitted at the ends of effective continuous longitudinal strength members in the deck and bottom structures.

1.2 Calculation scope

1.2.1 Global strength
For passenger ships it is often necessary to utilise the load carrying potential of the superstructure for longitudinal strength purpose. In order to determine the effectiveness of the superstructure and the normal and shear stress response of the hull girder, direct strength calculations using a finite element method will be required for some designs as specified in [1.2.2].

1.2.2 Hull girder strength
Hull girder yield and buckling strength assessment shall be carried out as follows:
— for ships with \(L < 150\) m and with effective longitudinal shear members, e.g. ship side and longitudinal bulkheads, evenly distributed along the ship length, a conventional beam stress analysis will be accepted
— for ships not satisfying one or both of the above criteria a direct strength calculation shall be carried out.
The global direct strength model shall also be used for the strength assessment of the pillars.
In the hull girder shear strength assessment, special attention shall be paid to the side shell, the main load carrying longitudinal bulkheads and casings, e.g. stairs and personal lifts, in way of the quarter length of the ship, i.e. \(0.25L\) and \(0.75L\).

1.2.3 Prescriptive analysis
General reference is given to Pt.3 Ch.6 for prescriptive requirements for plate, stiffeners and primary supporting members.

1.2.4 Primary support members
Primary supporting members in RO/RO spaces for Car Ferries, i.e. deck grillage structures, pillars and web frames in ship side, shall be checked using direct analysis. Design load sets for primary supporting members are given in Pt.3 Ch.6 Sec.2 Table 2.

1.2.5 Local FE analysis in way of openings and discontinuities
To obtain a stress distribution in structural elements with discontinuities or geometrical irregularities, e.g. recesses for doors and windows, knuckles, etc., and to evaluate local peak stress and fatigue stress range, local models with fine mesh are required. The local models needed for evaluation will depend on the arrangement of the ship and the level of the global stresses. Pt.3 Ch.7 Sec.4 gives rule requirements for local models and the fatigue scope is defined in [4].

1.2.6 Transverse strength
For passenger ships of unusual form or structural arrangements, special consideration and additional calculations, e.g. transverse strength assessment, may be required.

1.2.7 Bow impact
The bow of ships with large flare angles and operating under medium to high service speeds plates, stiffeners and primary support members are to satisfy Pt.3 Ch.10 Sec.1. Additionally, for unconventional ship designs with extreme flare angle and where decks in the fore ship have large openings and steps, and with limited
continuous longitudinal structure, a direct bow impact analysis may be required, to verify the overall strength of the bow structure.

For bow impact direct analysis, reference is made to Pt.3 Ch.10 Sec.1 [3.3.4], for design loads and acceptance criteria.

1.2.8 Docking
For large Passenger ships that may have large docking weight, special strength calculation of the bottom structure in way of the docking blocks. Reference is made to the Rules Pt.3 Ch.3 Sec.5 [3.4] regarding requirements for docking.

For direct docking analysis, reference is made to:
— beam analysis: Pt.3 Ch.6 Sec.6 [2.3.2], AC-I.
— FE analysis: Pt.3 Ch.7 Sec.3 Table 1, AC-I.

2 Hull girder loads for direct strength assessment

2.1 Application

2.1.1 Design load scenario
Only the design load scenario no.2 ”Normal operation at sea” for load components static + dynamic (S+D), needs to be considered, see Pt.3 Ch.4 Sec.7 Table 1.

2.1.2 Load components
For standard designs, only load components VBM and VSF, as defined in Pt.3 Ch.4 Sec.7, need to be applied. For special designs where torsion response is considered critical for the hull girder strength, static + dynamic design load scenarios HBM and TM, defined in Pt.3 Ch.4 Sec.7 Table 1, will be required in addition to above standard scope.

2.2 Static hull girder loads

2.2.1 General
The envelope curves made by all loading conditions, shall not exceed the permissible still water shear force and bending moment. The permissible still water shear forces and bending moments may be less than the standard rule values specified in Pt.3 Ch.4 Sec.4 [2].

Guidance note:
It is recommended that the permissible still water shear force and bending moment curves have a margin of 5-10% compared to the envelope curves, in order to give allowance for possible design changes.

2.2.2 Minimum stillwater hogging
A minimum still water hogging bending moment will be accepted provided that it can be demonstrated that the vessel will not experience stillwater sagging in any loading condition.

A minimum shear force limit shall be used between 0.4L and 0.6L from AP using the factor fqs equal to 0.5 as defined in Pt.3 Ch.4 Sec.4 [2.4].

2.3 Dynamic hull girder loads
For standard designs, only the dynamic load cases HSM-1, maximum sagging, and HSM-2, maximum hogging, see Pt.3 Ch.4 Sec.2 Table 1, shall be applied for the global hull girder assessment.
For special designs where torsion response is considered critical the dynamic load cases OST-1P, OST-2P, OST-1S and/or OST-2S defined in Pt.3 Ch.4 Sec.2 Table 3, will be required in addition to above standard dynamic load cases.

2.4 Load application
Acceptable methods for load application are described in the Society's document DNVGL-CG-0138Direct strength analysis of hull structures in passenger ships.
The applied loads on the FE model should be controlled against the still water and wave achieved bending moment and shear force curves to ensure agreement with the rule required bending moment and shear force distributions.

3 Hull local scantling

3.1 Deck structure

3.1.1 Door and window openings in longitudinal structure
Corner radius, possibly in combination with a thicker insert plate, shall be provided in order to reduce the stress concentration.

3.1.2 Wheel loading
Decks exposed to trolleys used in the handling of luggage shall satisfy the requirements given in Pt.3 Ch.10 Sec.5. The trolleys shall be regarded as cargo handling vehicles in harbour condition.
If one stiffener is subject to more than one load area, a direct strength analysis shall be used to determine the required section modulus.

3.2 Pillar end connection and through deck continuation

3.2.1 Below deck connection under compressive loads
Smooth transmission of forces between pillars above and below deck shall be provided. The stress in the contact area shall not exceed the yield stress of the material under the pillar loads.

3.2.2 Below deck connection under tension loads
For pillars under tension loads resulting from load cases given in [2.3], the average stress based on the contact area shall not exceed the values given in Pt.3 Ch.6 Sec.6 [3.2]. Full penetration welding shall be used for connections of local elements.
3.3 Glass panels

3.3.1 Glass superstructure side
Glass walls which extend between decks shall satisfy the following requirements:
The thickness of the glass pane shall be calculated according to Pt.3 Ch.12 Sec.6 [4] as for windows. Glass panes shall be made from toughened safety glass.
Hand-railing shall be provided. Alternatively, laminated glass panes shall be used.

3.3.2 Balcony doors
The design pressure for the frames and the glass panes of the external doors in the balcony area of superstructure shall be taken according to Pt.3 Ch.4 Sec.5 [3.3].
Thicknes of the door glass pane shall be calculated according to Pt.3 Ch.12 Sec.6 [4].
The minimum glass thickness for doors located 1.7xCw above scantling draft is 6 mm.
Cw is defined in Pt.3 Ch.1 Sec.4 [2.3].

3.3.3 Balcony railing
Balcony railing made of glass shall be of laminate type. The glass thickness for each glass pane shall not be less than 4 mm.

3.4 Fixed- and movable glass roofs

3.4.1 Design loads
The minimum forces acting on the glass roof and the supporting structure shall normally be taken as:

**Vertical force:**

The pressure $P_{dl}$, in kN/m$^2$, due to this distributed load for the static plus dynamic (S+D) design load scenario shall be derived for each dynamic load case and shall be taken as:

$$P_{dl} = P_{dl-s} + P_{dl-d}$$

where:

- $P_{dl-s}$ = static pressure, in kN/m$^2$, due to the distributed load, shall be defined by the designer.
  Minimum 0.15 t/m$^2$ + self weight of glass roof.
- $P_{dl-d}$ = dynamic pressure, in kN/m$^2$, due to the distributed load, in kN/m$^2$, shall be taken as:
  $$P_{dl-d} = f'_{β} \frac{a_{Z}}{g} P_{dl-s}$$

- $f'_{β}$ = as defined in Pt.3 Ch.4 Sec.4.
- $a_{Z}$ = vertical envelope acceleration, in m/s$^2$, at the centre of gravity of the distributed load, for the considered load case, shall be obtained according to Pt.3 Ch.4 Sec.3 [3.3].

- $P_{V}$ = $P_{dl} A_{H}$
- $A_{H}$ = horizontal projected area of the glass roof in m$^2$.

**Transverse force on side walls in kN:**
\[ \begin{align*}
P_T &= P_{SI} A_T \\
P_{SI} &= \text{side pressure taken from Pt.3 Ch.4 Sec.5 [3.3]} \\
A_T &= \text{transverse projected area of the glass roof in m}^2.
\end{align*} \]

*Loads for horizontal stoppers in kN:*

Combine \( P_{VC} \) with \( P_T \)

\[ \begin{align*}
P_{VC} &= P_{dl} g_0 A_v \\
A_v &= \text{vertical projected area of the glass roof in m}^2.
\end{align*} \]

3.4.2 Operational limitations

If the roof is intended to be operated in at wind speeds exceeding 15 m/s, additional direct calculations may be required.

The restriction shall be stated in the operation manual for the vessel.

3.4.3 Stoppers and locking devices

The stoppers and locking devices shall be provided such that in the event of failure of the hydraulic system, the roof will remain in open or closed position, respectively.

4 FE analysis

4.1 Hull girder yield criteria

Stresses in plating of all effective hull girder structural members shall not exceed the permissible values as given in :

<table>
<thead>
<tr>
<th>Table 1 Permissible stresses for global finite element analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible axial &amp; principal stress</td>
</tr>
<tr>
<td>175/k</td>
</tr>
</tbody>
</table>

4.2 Peak and shear stress control

4.2.1 Control of peak stresses

In order to control the plastic deformation in corners of deck, bulkhead and wall openings, the peak stresses must be calculated with the use of fine mesh local models. Peak stresses shall be calculated based on the loads described in [2].

Reference is made to Pt.3 Ch.7 Sec.4 [4.2] for acceptable stress criteria for peak stresses.

4.2.2 Shear stress control

To calculate shear stresses in areas with door and window openings or cut-outs, e.g. due to ventilation, piping cable ducts, in longitudinal bulkheads and side and vertical walls, local models with fine mesh shall be made.

Reference is made to Pt.3 Ch.7 Sec.4 [4.2] for acceptable stress criteria for peak stresses.
5 Fatigue strength

5.1 General
For detailed description of the fatigue assessment, reference is made to Pt.3 Ch.9 and the Society’s document DNVGL-CG-0129 Fatigue assessment of ship structure. This sub-section describes the scope. An acceptable and simplified fatigue assessment procedure for passenger vessel is defined in the Society’s document DNVGL-CG-0138 Direct strength analysis of hull structures in passenger ships.

5.2 Structural details to be assessed using prescriptive check
End connections of longitudinal stiffeners in the outer shell below the freeboard deck shall be assessed according to Pt.3 Ch.9, for all ships with \( L > 150 \text{ m} \). Relative deflections may be ignored.

5.3 Structural details to be assessed
For vessels, for which direct hull girder strength calculation is required according to [1.2.2], the following critical areas shall be assessed by hot spot fatigue analysis according to the Society’s document DNVGL-CG-0129 Fatigue assessment of ship structure, based on local FE models:

— corner details of door and window openings in longitudinal bulkheads and side walls
— corners of large deck openings
— corners of openings in side shell
— critical details for racking response, described in Ch.3 Sec.2 [6.3], for combined passenger and RO/RO vessels, i.e. Ferry class notation, with multiple decks and limited transverse bulkheads above bulkhead deck. Loads and methods according to Ch.3 apply.

Number of details and possible fatigue assessment for other details will be determined on a case by case basis, depending on the nominal stress level from the global FE analysis.
SECTION 3 SYSTEMS AND EQUIPMENT

1 Emergency source of electrical power and emergency installations

1.1 Electrical systems

1.1.1 General
Passenger vessels shall have an electrical installation complying with the requirements in Pt.4 Ch.8 with the clarifications and additions given in this sub-chapter.

1.1.2 Fire zones
Electrical distribution systems shall be so arranged that fire in any main vertical zone, as defined in Pt.4 Ch.11, will not interfere with services essential for safety in any other such zone. This requirement will be met if main and emergency feeders passing through any such zone are separated both vertically and horizontally as widely as is practicable.

1.1.3 Emergency generator
Where the emergency source of electrical power is a generator, it shall be started automatically.
The emergency power supply system shall have capacity to supply the services listed in Pt.4 Ch.8 Sec.2 Table 1 for a period of 36 hours. In a ship engaged regularly on voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 36 hour period specified, but not less than 12 hours. Except when shorter periods are specified in these rules.

1.1.4 Additional emergency consumers
In addition, the following systems shall be supplied by the emergency power supply system:

1) For a period of 36 hours:
   — in alleyways, stairways and exits giving access to the muster and embarkation stations, as required by regulation III/11.5
   — the public address system or other effective means of communication which is provided throughout the accommodation, public and service spaces
   — the means of communication which is provided between the navigating bridge and the main fire control station;
     — the fire door holding and release system
     — the automatic sprinkler pump, if any
     — the emergency bilge pump, and all the equipment essential for the operation of electrically powered remote controlled bilge valves.

2) For a period of half an hour:
   — the emergency arrangements to bring the lift cars to deck level for the escape of persons. The passenger lift cars may be brought to deck level sequentially in an emergency.

1.2 Lighting

1.2.1 General
Passenger ships shall be provided with lighting systems as required by Pt.4 Ch.8. In addition, low-location lighting and supplementary lighting shall be installed as follows:

1.2.2 Low-location lighting
Passenger ships shall be provided with low-location lighting (LLL) complying with IMO Res. A.752(18).
1.2.3 Supplementary lighting general
In passenger ships, supplementary lighting shall be provided in all cabins to clearly indicate the exit so that occupants will be able to find their way to the door. Such lighting, which may be connected to an emergency source of power or have a self-contained source of electrical power in each cabin, shall automatically illuminate when power to the normal cabin lighting is lost and remain on for a minimum of 30 min. (SOLAS Ch. II-1/41.6)

1.2.4 Supplementary lighting Passenger RORO vessels
For RO-RO passenger ships (Reg. 11-1/42-1), in addition to the emergency lighting required by regulation 42.2 (200), on every passenger ship with ro-ro cargo spaces or special category spaces as defined in regulation 11-213 (F101):
1) All passenger public spaces and alleyways shall be provided with supplementary electric lighting that can operate for at least three hours when all other sources of electric power have failed and under any condition of heel. The illumination provided shall be such that the approach to the means of escape can be readily seen. The source of power for the supplementary lighting shall consist of accumulator batteries located within the lighting units that are continuously charged, where practicable, from the emergency switchboard. Alternatively, any other means of lighting which is at least as effective may be accepted by the Administration. The supplementary lighting shall be such that any failure of the lamp will be immediately apparent. Any accumulator battery provided shall be replaced at intervals having regard to the specified service life in the ambient conditions that they are subject to in service; and
2) A portable rechargeable battery operated lamp shall be provided in every crew space alleyway, recreational space and every working space which is normally occupied unless supplementary emergency lighting, as required by sub paragraph.1, is provided.

1.3 Services to be supplied
1.3.1 General
The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation, as stated in the following items [1.3.2] to [1.3.7].
In a ship engaged regularly on voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 36 hour period specified in items [1.3.2] to [1.3.5] but not less than 12 hours.

1.3.2 Emergency lighting
For a period of 36 hours, emergency lighting:
1) at every muster and embarkation station and over the sides as required by regulations III/11.4 and III/16.7;
2) in alleyways, stairways and exits giving access to the muster and embarkation stations, as required by regulation III/11.5;
3) in all service and accommodation alleyways, stairways and exits, personnel lift cars;
4) in the machinery spaces and main generating stations including their control positions;
5) in all control stations, machinery control rooms, and at each main and emergency switchboard;
6) at all stowage positions for firemen's outfits;
7) at the steering gear; and
8) at the fire pump, the sprinkler pump and the emergency bilge pump referred to in [1.3.4] and at the starting position of their motors.
1.3.3 Navigation and communication
For a period of 36 hours:

1) The navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force;
2) The VHF radio installation required by regulation IV/7.1.1 and IV/7.1.2; and, if applicable:
   — 2.1 the MF radio installation required by regulations IV/12.1.1, IV/12.1.2, IV/10.1.2 and IV/10.1.3;
   — 2.2 the ship earth station required by regulation IV/10.1.1.; and
   — 2.3 the MF/HF radio installation required by regulations IV/10.2.1, IV/10.2.2 and IV/11.1.
3) All internal communication equipment required in an emergency shall include:
   — the means of communication which is provided between the navigating bridge and the steering gear compartment
   — the means of communication which is provided between the navigating bridge and the position in the machinery space or control room from which the engines are normally controlled
   — the means of communication which is provided between the bridge and the radio telegraph or radio telephone stations
   — the means of communication which is provided between the officer of the watch and the person responsible for closing any watertight door which is not capable of being closed from a central control station
   — the public address system or other effective means of communication which is provided throughout the accommodation, public and service spaces
   — the means of communication which is provided between the navigating bridge and the main fire control station;
4) The shipborne navigational equipment as required by regulation V/12;
5) The fire detection and fire alarm system, and the fire door holding and release system; and
6) For intermittent operation of the daylight signalling lamp, the ship's whistle, the manually operated call points and all internal signals that are required in an emergency;

unless such services have an independent supply for the period of 36 hours from an accumulator battery suitably located for use in an emergency.

1.3.4 Fire pumps and bilge systems
For a period of 36 hours:
1) one of the fire pumps required by SOLAS II-2/10.2.2.2 and 10.2.2.3;
2) the automatic sprinkler pump, if any; and
3) the emergency bilge pump, and all the equipment essential for the operation of electrically powered remote controlled bilge valves.

1.3.5 Steering gear
For the period of time required by regulation 29.14 (Pt.4 Ch.10 Sec.1 [5.3]) the steering gear if required to be so supplied by that subsection.

1.3.6 Watertight doors
For a period of half an hour:
— any watertight doors required by SOLAS Reg. II-1/15 to be power operated together with their indicators and warning signals.
1.3.7 Lift cars
For a period of half an hour:
— the emergency arrangements to bring the lift cars to deck level for the escape of persons. The passenger lift cars may be brought to deck level sequentially in an emergency.

1.3.8 Generator as emergency source of electrical power
Where the emergency source of electrical power is a generator, it shall be:
1) Started automatically upon failure of the electrical supply from the main source of electrical power and shall be automatically connected to the emergency switchboard; those services referred to in 400 shall then be transferred automatically to the emergency generating set. The automatic starting system and the characteristic of the prime-mover shall be such as to permit the emergency generator to carry its full rated load as quickly as is safe and practicable, subject to a maximum of 45 seconds; unless a second independent means of starting the emergency generating set is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and
2) Provided with a transitional source of emergency electrical power according to [1.3.9].

1.3.9 Transitional source of emergency power
The transitional source of emergency electrical power required by item [1.3.8] 2) shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12 per cent above or below its nominal voltage and be of sufficient capacity and so arranged as to supply automatically in the event of failure of either the main or emergency source of electrical power at least the following services, if they depend upon an electrical source for their operation:
For half an hour:
1) The lighting required by items [1.3.2] and [1.3.3] 1);
2) All services required by items [1.3.3] 3), [1.3.3] 5) and [1.3.3] 6), unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

Power to operate the watertight doors, as required by SOLAS Reg. II-1/15, but not necessarily all of them simultaneously, unless an independent temporary source of stored energy is provided. Power to the control, indication and alarm circuits as required by SOLAS Reg. II-1/15, for half an hour.
SECTION 4 STABILITY

1 Stability

1.1 Application
Ships with class notation Passenger ship and Ferry shall comply with the requirements according to [1.2].

1.2 Intact stability

1.2.1 Intact stability criteria
Passenger ships shall comply with Pt.3 Ch.15 with the supplementing requirements as given in IMO 2008 Intact Stability Code (IMO Res. MSC.267(85)) Part A Ch. 3.1.1 and 3.1.2.

1.2.2 Loading conditions
Compliance with the stability requirements shall be documented for the standard loading conditions given in IMO 2008 Intact Stability Code (IMO Res. MSC.267(85)) Part B Ch. 3.4.1.1.
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