



## **GUIDANCE NOTES ON**

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# **THE APPLICATION OF SPECIAL PURPOSE SHIP (SPS) REQUIREMENTS TO OFFSHORE SUPPORT VESSELS**

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**American Bureau of Shipping  
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## Foreword

These Guidance Notes describe the analysis process to evaluate, assess and verify the systems' capabilities for safe return to port (SOLAS regulation II-2/21), orderly evacuation and abandonment (SOLAS regulation II-2/22) and the safety center (SOLAS regulation II-2/23) of an offshore support vessel (OSV) receiving the special purpose class notation (**SPS**) of Section 5-1-2 of the ABS *Rules for Building and Classing Offshore Support Vessels (OSV Rules)*.

Based on International Maritime Organization (IMO) MSC.1/Circ.1422, the provisions of SOLAS regulations II-2/21 and 22 and the appropriate sections of these Guidance Notes are to be applied to OSVs constructed on or after 1 July 2010 which carry more than 240 persons and are 120 meters or more in length or have three or more main vertical zones (MVZ).

Considering paragraph 6.2 of the SPS Code (see 2/5), the provisions of SOLAS regulation II-2/23 and Section 8 of these Guidance Notes are to be applied to OSVs constructed on or after 1 July 2010 which carry more than 60 persons on board.

These Guidance Notes provide an assessment process of the OSV systems' capabilities based on IMO MSC.1/Circ.1369. The design criteria notes, presented in these Guidance Notes, are developed from MSC.1/Circ.1369, MSC.1/Circ.1368 and other related IMO documents. The arrangement of equipment, components or connections of essential systems may be assessed by using these design criteria notes. Also, these Guidance Notes present informative overviews for the following:

- i) A fire or flooding casualty not exceeding the casualty limit
- ii) A fire casualty exceeding the fire casualty limit
- iii) Safe area
- iv) Safety center.

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# THE APPLICATION OF SPECIAL PURPOSE SHIP (SPS) REQUIREMENTS TO OFFSHORE SUPPORT VESSELS

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## SECTION 1 Assessment Process

### 1 Scope and Application

#### 1.1 Scope

These Guidance Notes have been developed to describe the analysis process to evaluate, assess and verify the systems' capabilities for safe return to port (SOLAS regulation II-2/21), orderly evacuation and abandonment (SOLAS regulation II-2/22) and the safety center (SOLAS regulation II-2/23) of an offshore support vessel (OSV) receiving the special purpose class notation (**SPS**) of Section 5-1-2 of the ABS *Rules for Building and Classing Offshore Support Vessels (OSV Rules)*.

Based on IMO MSC.1/Circ.1422, the provisions of SOLAS regulations II-2/21 and 22 and Sections 1 through 7 of these Guidance Notes are to be applied to OSVs constructed on or after 1 July 2010 which carry more than 240 persons and are 120 meters or more in length or have three or more main vertical zones (MVZ).

Considering paragraph 6.2 of the SPS Code (see 2/5), the provisions of SOLAS regulation II-2/23 and Section 8 of these Guidance Notes are to be applied to OSVs constructed on or after 1 July 2010 which carry more than 60 persons on board.

An Administration may determine that additional systems and requirements other than those addressed in these Guidance Notes are vital to damage control efforts.

In the case of potential conflicts between this Section and Sections 4 through 7, this Section will take precedence over the informative overviews presented in Sections 4 through 7.

#### 1.3 Application

##### 1.3.1 Safe Engineering Design

Assessments considering the design criteria notes (DCNs) of Section 3 as applied in Sections 4 through 8 are intended to support safe engineering design with guidance on three scenarios:

- i) Availability of essential systems after a flooding casualty, according to SOLAS regulation II-1/8-1 (see Section 5, 6 and 8)
- ii) Availability of essential systems to support an OSV's safe return to port after a fire casualty, according to SOLAS regulation II-2/21 (see Sections 4, 6 and 8)
- iii) Availability of essential systems to support an OSV's evacuation and abandonment after a fire casualty, according to SOLAS regulation II-2/22 (see Sections 7 and 8).

The outcome of these assessments should confirm the OSV is designed and constructed to provide the capabilities required by the above casualty scenarios.

##### 1.3.2 Approach

- i) The primary assessment is accomplished by performing a system-based approach. Where the system approach identifies potential weaknesses in the design of the system, a compartment or space-by-space based approach also is to be applied. In the latter case, part of or all the spaces subject to individual consideration may be subjected to operational restrictions on access, use and installations when considering the overall system. All such spaces and their restrictions should be identified on drawings or in manuals.

- ii) A prerequisite and starting point for an assessment is for the owner of the OSV to define the intended area of operation of the OSV (for instance, North Sea, Gulf of Mexico, or Atlantic Ocean off of West Africa). This will assist in establishing the capabilities needed to be built into the OSV.
- iii) For an assessment to be successful, all relevant parties, such as the owner or operator, designer, ABS and the Administration should be in continuous communication from the onset of a specific proposal to utilize these Guidance Notes.

**TABLE 1**  
**Applicability Guide**

<i>Subject</i>	<i>SPS Notation Requirements</i>	<i>Code of Safety for Special Purpose Ships</i>	<i>SOLAS Cite</i>	<i>SOLAS Passenger Vessel Criteria</i>	<i>Modifying SPS Code Application Criteria</i>	<i>Resulting OSV Criteria</i>
Safe Return to Port	Section 5-1-2 of the ABS <i>OSV Rules</i>	Chapter 6	II-2/Reg. 21	All passenger ships constructed on or after 1 July 2010 having a length, as defined in regulation II-1/2.5, of 120 m or more or having three or more main vertical zones	Only Special Purpose Ships with more than 240 persons onboard as per IMO MSC.1/Circ. 1422	<ul style="list-style-type: none"> <li>Constructed on or after 1 July 2010, and</li> <li>Having a length, as defined in regulation II-1/2.5, of 120 m or more or having three or more main vertical zones, and</li> <li>Carrying more than 240 persons onboard</li> </ul>
Orderly Evacuation and Abandonment	Section 5-1-2 of the ABS <i>OSV Rules</i>	Chapter 6	II-2/Reg. 22	All passenger ships constructed on or after 1 July 2010 having a length, as defined in regulation II-1/2.5, of 120 m or more or having three or more main vertical zones	Only Special Purpose Ships with more than 240 persons onboard as per IMO MSC.1/Circ. 1422	<ul style="list-style-type: none"> <li>Constructed on or after 1 July 2010, and</li> <li>Having a length, as defined in regulation II-1/2.5, of 120 m or more or having three or more main vertical zones, and</li> <li>Carrying more than 240 persons onboard</li> </ul>
Safety Center	Section 5-1-2 of the ABS <i>OSV Rules</i>	Chapter 6	II-2/Reg. 23	All passenger ships constructed on or after 1 July 2010	Only Special Purpose Ships with more than 60 persons onboard as per Chapter 6 of the SPS Code	<ul style="list-style-type: none"> <li>Constructed on or after 1 July 2010, and</li> <li>Carrying more than 60 persons onboard</li> </ul>



## 3 Design Information

### 3.1 OSV Description

Any necessary information regarding the design of the OSV should be provided along with a description of the OSV essential systems' design and functionality following a fire or flooding casualty. As a minimum, such information and description should include:

- i) The design criteria to achieve compliance (i.e. redundancy, protection, etc.) for each individual essential system or group of essential systems (see Sections 4, 5 and 7).
- ii) The basic layout of the vessel including boundaries of compartments subject to the appropriate casualty (watertight or "A" class boundaries) in the form of plan views and cross sections – including, but may not be limited to general arrangement plan, capacity plan, watertight subdivision plan, space fire categorization plan (or structural fire protection plan), plan of spaces protected by fixed fire-extinguishing systems, etc.
- iii) Criteria adopted for the selection of safe areas and intended locations (see Section 6).
- iv) A list of all systems intended to be submitted for assessment. It should be noted that although such a list would include, in the first instance and as a minimum, all essential systems referred to in SOLAS regulations II-2/21.4 (see Section 4) and 22.3 (see Section 7), their actual number and identification may vary depending on the size, type, arrangements, design, etc. of the OSV.
- v) Drawings/documents describing the location, arrangement and connections of essential systems (including any of their components) mentioned in SOLAS regulation II-2/21 (see Section 4) or II-2/22 (see Section 7).
- vi) Description of the power supply for the essential systems.
- vii) Data regarding the minimum speed vs. weather and sea conditions (i.e. results of model tank tests in sea keeping conditions including consideration of wind forces).
- viii) Any additional design detail intended to ensure or support the OSV systems' capabilities (see Section 8).

### 3.3 Additional Information

Additional information is to include the intended area of operation and the operating pattern or patterns (which may be used to define any intended speed/maximum distance for safe return to port).

## 5 Assessment of Required OSV Systems' Capabilities

### 5.1 Method

- i) The assessment of OSV systems' capabilities should follow the process described in these Guidance Notes and Figure 1. The assessment should be based on structured methods and should document the intended essential systems functionality after a fire or flooding casualty as defined by SOLAS regulations II-1/8-1, II-2/21 and II-2/22.
- ii) Each assessment should be divided into two steps.
  - a) The first step is an overall systems' assessment. The systems' assessment should address all essential systems and functional requirements mentioned in SOLAS regulations II-2/21 and II-2/22. This step should include a structured assessment of all essential systems after a fire or flooding casualty, as defined in SOLAS regulations II-1/8-1.2 (see Section 5), II-2/21.4 (see Section 4) or II-2/22.3.1 (see Section 7). Propulsion and steering systems are required to remain in operation and may not be identified as "critical systems". However, manual intervention may be accepted in order to make these systems available in the minimum possible time.
  - b) The second step is a detailed assessment of critical systems identified in the systems' assessment. The detailed assessment is only required if any critical system was identified in 1/5.1ii)a).

### **5.3 Area and Condition of Operation**

The ability of an OSV to return to port should be linked to the area and condition of operation. The capability available for each system in the worst case (i.e., minimum propulsion power for return to port, electrical generating capacity, heating capacity, food and water storage/availability, etc.) should be included in the onboard documentation.

## **7 Overall Assessment of Essential Systems**

### **7.1 Assessment of All Essential Systems**

A structured assessment of all essential systems is to be conducted. The systems' assessment can be performed in qualitative terms. Quantitative analysis may be required as part of the detailed systems' assessment as described in Subsection 1/9. A systems' assessment report should be prepared in accordance with Subsection 1/11.

### **7.3 Identification of Critical Systems**

- i)* Essential systems identified to be fully redundant for all fire and flooding casualty cases not exceeding the threshold (i.e. when runs of cables, pipes and equipment are duplicated and adequately separated) need not be further analyzed as described in Subsection 1/9.
- ii)* For the arrangement of equipment, components or connections reference may be made to relevant design criteria notes contained in Section 3. Where other solutions are adopted, equipment, components or connections should be further analyzed according to Subsection 1/9.
- iii)* Manual action by the crew, to provide OSV system's capabilities, may also be possible but should be assessed in detail taking into account the following:
  - a)* Manual action should only be acceptable in connection with an agreed, defined number of fire and flooding casualties and should be clearly described in the documentation.
  - b)* Compliance with the return to port criteria should be based on the assumption any manual action that may be required for the OSV to return to port, or for any essential system to remain operational following a casualty, complies with 2/3.21.
- iv)* Performance requirements applicable to any essential system may be analyzed and documented separately. However, any relevant information should be included in the overall assessment report for the essential systems.

### **7.5 Results of Overall Assessment**

Should no critical systems be identified, the overall assessment can be considered acceptable without the need for a detailed systems' assessment to be carried out.

## **9 Detailed Assessment of Critical Systems**

### **9.1 Information**

When performing a detailed assessment of critical systems, additional information may be necessary. The OSV's description in 1/3.1 should be supplemented for each identified critical system with the following, as applicable:

- i)* Details of pipes, cables or other devices connecting the components of the critical system, or connecting different critical systems including their location within the affected area.
- ii)* Details of any manual action providing the required OSV systems' functionality [see 1/7.3iii)].
- iii)* Details of any operational solution forming part of the design criteria.

### 9.3 Quantitative Analysis

A quantitative analysis can be carried out as a part of the detailed assessment of all critical systems. As an example, the following may be performed:

- i) Quantitative analysis of fire risk within a space, supplemented by fire engineering analysis and/or fire testing where necessary (i.e., to assess consequences of a fire casualty on a system or system component).
- ii) Failure Mode Effect Analysis (FMEA) of a system or system component analyses in accordance with standard IEC 60812 Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FEMA), IMO resolution MSC.36(63), annex 4 Procedure for Failure Mode and Effects Analysis, or equivalent standard, would be acceptable.
- iii) Detailed analysis of possibility of flooding of internal watertight compartments and of consequences of flooding on system components, given the location of the compartment and arrangement of piping within the compartment.

## 11 Documentation

### 11.1 Design of OSV and OSV Systems

Different design criteria may be followed in the design of the OSV and in the design of the OSV's systems and arrangements to achieve the OSV systems' capabilities after a fire or flooding casualty and to comply with the requirements. The chosen design criteria should be well documented and form the basis for the preparation of all the OSV's operational procedures. These procedures should be adopted by the crew for the case of any such casualty.

### 11.3 Assessment of Required OSV Systems' Capabilities

For OSVs complying with 1/1.1ii), the documentation of the assessment should include the design criteria followed to reach the OSV systems' capabilities and summarize the whole process of the assessment including methods and assumptions. The following information should be provided for approval of the OSV systems' capabilities:

- i) Design information (see Subsection 1/3)
- ii) Overall assessment of essential systems' report [see 1/5.1ii)a) and Subsection 1/7]
- iii) Detailed assessment of critical systems' report [see 1/5.1ii)b) and Subsection 1/9], if any critical system is identified
- iv) Additional information:
  - a) List of manual actions [see 1/7.3iii)]
  - b) Test program (for both testing during construction, and sea trials, as applicable) which should include methods of testing, and test facilities provided, where applicable
  - c) Maintenance plan
  - d) References

## 13 Surveys After Construction

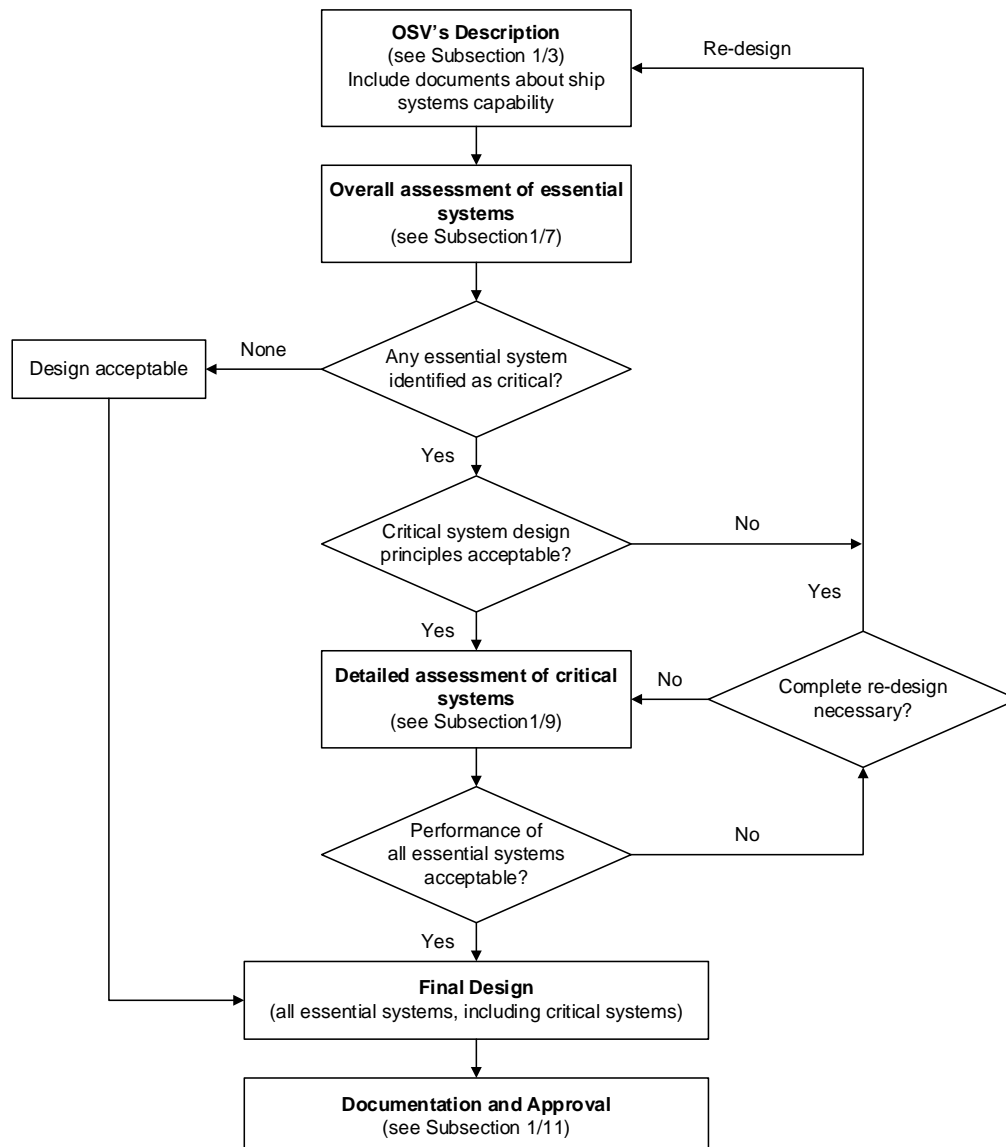
### 13.1 Annual Surveys

To demonstrate the OSV systems' capabilities and maintain the Special Purpose notation, **SPS**, the following documents are to be maintained onboard an OSV complying with 1/1.1ii):

- i) Documentation as per 1/11.3i) to 11.3iii)
- ii) Operational manual for fire and flooding casualty cases and safe return to port operation, including details of any manual action required to ensure operation of all essential systems and availability of safe areas including provision of basic services (i.e., closing/opening of valves, shutting down/start of equipment/fans, etc.)

- iii) Description of operation of essential systems after a fire casualty exceeding the casualty threshold
- iv) List of spaces considered having negligible fire risk (see 3/3.1.4), if any
- v) Test, inspection, and maintenance plan

**FIGURE 1**  
**Assessment of OSV Systems' Capabilities Process Flowchart**





## SECTION 2 Definitions and Abbreviations

### 1 General

General terms related to safe return to port (SRtP) are defined below. Where applicable, the IMO reference source is listed for the term.

For referenced design criteria notes (DCN), see Section 3.

### 3 Definitions

#### 3.1 Casualty Threshold (CT) – Fire [SOLAS II-2/21.3]

- i) Includes loss of space of fire origin up to the nearest "A" class boundaries, which may be a part of the space of origin, if the space is protected by a fixed fire extinguishing system; or
- ii) Includes loss of the space of origin and adjacent spaces up to the nearest "A" class boundaries, which are not part of the space of origin. See 2/3.5.
- iii) The rating of "A" class boundaries does not affect the application of the casualty threshold [MSC.1/Circ.1369 - Inter 5]. See 2/3.7 and 3/3.1.3.

#### 3.3 Casualty Threshold (CT) – Flooding [SOLAS II-1/8-1.2 {MSC.325(90)}]

Flooding casualty threshold includes flooding of any single watertight compartment.

#### 3.5 Space of Origin [MSC.1/Circ.1369 – Inter 7]

For a space of origin not protected by a fixed fire-extinguishing system, the nearest "A" class boundaries which are not part of the space can be determined:

- i) By considering only the spaces within the same Main Vertical Zone (MVZ) and
- ii) The casualty threshold includes spaces one deck upwards.

See 3/3.1.4 and 3/3.1.5.

#### 3.7 "A" Class Boundaries [MSC.1/Circ.1369 – Inter 4]

"A" class boundaries refer to both bulkheads and decks.

#### 3.9 Fire Casualty [MSC.1/Circ.1369 – 2.4]

Fire casualty is any possible fire case on board the OSV which may or may not exceed the casualty threshold for fire. See 2/3.1 and 3/3.1.2.

#### 3.11 Flooding Casualty [MSC.1/Circ.1369 – 2.5]

Flooding casualty is any possible flooding case on board the OSV which may not exceed the casualty threshold for flooding. See 2/3.3 and 3/3.1.2.

#### 3.13 Essential Systems [MSC.1/Circ.1369 – 2.6]

Essential systems are all systems and those sections of systems in spaces not directly affected by the casualty that need to remain operational after a fire or flooding casualty.

**3.15 Critical Systems [MSC.1/Circ.1369 – 2.7]**

Critical systems are essential systems that are identified in the overall assessment of essential systems to have a possibility to fail to operate adequately as a consequence of one or more fire casualty case, each not exceeding the fire casualty threshold, or as a consequence of one or more flooding case, each not exceeding a single watertight compartment (see 2/3.3). The failure of the system may be caused by a failure of the whole system, of one component or a connection between system components or by any other failure causing unsatisfactory operation of the essential system under consideration.

**3.17 Fully Redundant [MSC.1/Circ.1369 – 5.2.1]**

Runs of cables, pipes and equipment of a system are duplicated and adequately separated for all fire and flooding cases not exceeding the threshold.

**3.19 Protection**

Runs of cables, pipes and equipment of a system are appropriately enclosed or comply with special standards such that the system remains operational for all fire and flooding cases not exceeding the threshold.

A detailed assessment of the system is required when using the protection criterion.

**3.21 Manual Actions [MSC.1/Circ.1369 – 5.2.3.2 and 5.2.3.3]**

Following a casualty, a repair or crew action to maintain the operability of an essential system after a loss:

- i) Is pre-planned, pre-set and instructions as well as necessary materials are available on board.
- ii) Is performed on systems designed to ensure the required manual action, can be completed within one hour from the time the action is started.
- iii) Emergency lighting and a means of communication is demonstrated available in the area where manual actions are to be taken.
- iv) Feasibility of manual actions are to be demonstrated by tests or drills.

A detailed assessment of the system is required when using the manual action criterion.

**3.23 Safe Area [SOLAS II-2/3.51 (MSC 82/24/add.1, Annex 2)]**

From the context of a casualty, a safe area is any area which is not flooded or which is outside the MVZ(s) in which a fire has occurred such that it can safely accommodate all persons onboard to protect them from hazards to life or health and provide them with basic services.

**3.25 Safety Center [SOLAS II-2/3.52 (MSC 82/24/add.1, Annex 2)]**

The safety center is a control station dedicated to the management of emergency situations. Safety systems' operation, control and/or monitoring are an integral part of the center.

**5 Abbreviations**

CT	Casualty threshold
E&A	Evacuation and abandonment
Inter	Interpretation
MVZ	Main vertical zone
OSV	Offshore support vessel
SPS Code	IMO <i>Code of Safety for Special Purpose Ships, 2008</i>
SRtP	Safe return to port



## SECTION 3 Design Criteria Notes

### 1 General

Design criteria notes (DCNs) are intended to be of assistance when carrying out the OSV description and when performing assessments of the OSV systems capabilities after a fire or flooding casualty (see Section 1). Where applicable, the IMO reference source is listed for the DCN.

For referenced definitions, see Section 2.

### 3 DCN Terms

#### 3.1 Generic

##### 3.1.1 SOLAS Alternative Design and Arrangements [MSC.1/Circ.1369 – Inter 2]

Where electrical or machinery installation, fire safety, or lifesaving appliances of an OSV have been approved following the methodology of SOLAS regulations II-1/55, II-2/17 or III/38 respectively, the effect on the OSV essential system capability should be explicitly included in the analysis required by the above regulations.

Special attention is to be given to the determination and assignment of safe areas and compliance with the requirements of SOLAS regulation II-2/22.

##### 3.1.2 Systems' Capabilities [MSC.1/Circ.1369 – Inter 3]

For the purpose of assessing the OSV systems' capabilities, fire casualties and flooding casualties may be considered as not occurring at the same time.

##### 3.1.3 Protection – Enclosed Trunk [MSC.1/Circ.1369 – Inter 5 and SOLAS II-2/22.3.3]

A trunk closed at all boundaries constructed to "A-60" standard and containing ducts, cabling and/or piping is considered operational when passing through a space of origin or an unserviceable MVZ.

##### 3.1.4 Space of Origin – Negligible Fire Risk [MSC.1/Circ.1369 – Inter 8]

Spaces in which the risk of starting a fire is negligible need not be considered as spaces of origin for a fire.

Examples are:

- i) Spaces with restricted accessibility for inspection and/or maintenance only
- ii) Tanks and chain lockers
- iii) Ventilation ducts except those containing ducts presenting fire hazards
- iv) Cross flooding ducts connecting void spaces
- v) Certain vertical escape trunks
- vi) Storerooms for gaseous fixed fire-extinguishing systems
- vii) Busbars enclosed in "A" class divisions
- viii) Certain "A" class enclosures within spaces of SOLAS Category 1, 2 or 4 only
- ix) Shaft tunnel only

A fire/risk assessment may be requested to determine whether a space other than those listed in the above can be considered as being “space in which the risk of a fire originating is negligible”.

**3.1.5 Concealed Spaces [MSC.1/Circ.1369 – Inter 9]**

Spaces above ceilings and behind bulkheads' linings are considered as part of the space of origin. Lack of a fixed fire-extinguishing system above ceilings or behind linings need not be considered under SOLAS regulation II-2/21.3.2.

**3.1.6 Manual Action [MSC.1/Circ.1369 – Inter 10]**

In case of manual actions, equipment and systems the controls of which cannot be reached without accessing the space affected by the casualty should not be considered operational.

**3.3 Pipes and Vents****3.3.1 Fire Casualty – Pipes [MSC.1/Circ.1369 – Inter 12]**

Steel pipes other than those carrying flammable liquids and passing through (not serving) spaces affected by a fire casualty may be considered to remain operational provided they are of substantial thickness (refer to ICLL 66 regulation 22(3), as amended by IACS UI LL36/Rev.2 paragraph (b)) or "A-60" insulated. In both cases the pipes are to be adequately supported.

In order to be considered as remaining operational after a fire casualty, steel pipes are to be joined by welding otherwise mechanical joints are to be tested according to IACS UR P2.11.5.5.6 fire test or equivalent.

Temperature increase of liquids carried may need to be considered, and measures taken where necessary, so the intended performance and purpose of the affected systems can be maintained after the casualty has occurred.

Plastic pipes can be considered to remain operational after a fire casualty if tested to SOLAS resolution A.753(18), Level 1.

*Note:* As defined by paragraph (b) of IACS UI LL36/Rev.2, substantial thickness for pipes is the following:

- For external diameter of pipes equal to or less than 80 mm (3.2 in.), thickness is not less than 7.0 mm (0.28 in.);
- For external diameter of pipes equal to 180 mm (7.2 in.), thickness is not less than 10.0 mm (0.4 in.); and
- For external diameter of pipes equal to or more than 220 mm (8.8 in.), thickness is not less than 12.5 mm (0.5 in.).

Intermediate sizes are to be determined by liner interpolation.

**3.3.2 Flooding Casualty – Pipes and Vent Ducts [SOLAS II-2/21.4 {MSC.1/Circ.1437}]**

All pipes and vent ducts passing through (not serving) a compartment affected by a flooding casualty are considered to remain operational provided they, together with relevant fittings, are capable of withstanding the head of water expected at their location.

**3.5 Electrical Power****3.5.1 Fire Casualty – Electrical Cables [MSC.1/Circ.1369 – Inter 13]**

Fire-resistant cables complying with standards IEC 60331-1 and IEC 60331-2 (see also IACS UR E15) passing through (not serving) spaces may be considered to remain operational after a fire casualty provided they have no connections, joints and equipment connected to them, etc. within the space affected by the casualty.

Installation of these cables should be made to support their survival in a fire casualty and during firefighting efforts.

*Note:* Systems or components controlled by data bus systems during normal operations, are to be designed to operate locally or by a redundant bus system when the data connection is lost as a result of a casualty not exceeding the casualty threshold (see 2/3.1, 2/3.9, and 2/3.11).



### 3.5.2 Flooding Casualty – Electrical Cables [SOLAS II-2/21.4 {MSC.1/Circ.1437}]

Electrical cables complying with standard IEC 60092-359 may be considered to remain operational in a space affected by a flooding casualty provided they have no connections, no joints, no equipment connected to them, etc., within such space or such connections, joints and devices have a degree of protection IPX8 in accordance with standard IEC 60539 (the head of water expected at their location is for a time period not less than the estimated period for the safe return to port).

*Note:* See note of 3/3.5.1.

### 3.5.3 Electrical Balance [MSC.1/Circ.1369 – Inter 14]

An electrical balance should be submitted for each of the following return to port scenarios:

- i) Minimum electrical-generating capacity available and
- ii) Any other scenario of reduced power that would cause any essential system to run at reduced capacity due to lack of electrical generating capacity.

In connection with the above, all essential systems and their auxiliaries and systems needed to support safe areas should be accounted according to their use in these particular conditions.

### 3.5.4 Emergency Generator [MSC.1/Circ.1369 – Inter 15]

Emergency generator, fitted for compliance with SOLAS regulation II-1/42, may be used to meet the requirements for SRtP and OSV's orderly evacuation and abandonment providing its ability to supply emergency services as referred to in SOLAS regulation II-1/42.2, is not impaired (i.e. availability of fuel, etc.). In the evaluation of the emergency generator capacity, the most demanding condition between regulations II-1/42, II-2/21 and 22 is to be considered.

### 3.5.5 Electrical Power Availability [MSC.1/Circ.1369 – Inter 16]

Electrical power is to be available and sustainable for all essential services specified in SOLAS regulations II-2/21.4 and II-2/21.5.1.2, with due regard being paid to such services as may be operated simultaneously. The application of regulation II-2/21.4 requires other systems (i.e., engine room ventilation, lighting, etc.) to remain operational in order to support the functionalities listed therein.

*Notes:*

- 1 At least two independent sources of electrical power with the appropriate auxiliaries are to be separated by watertight, "A" class boundaries. With the loss of any one electrical power source as a result of a casualty not exceeding the casualty threshold (see 2/3.1, 2/3.9, and 2/3.11), the remaining power source is to provide adequate power for the electrical loads needed throughout the operational range of the SRtP conditions. The emergency generator can be considered one independent source of electrical power provided it complies with 3/3.5.4.
- 2 The design of the electrical system is to include measures to minimize the effects of multiple short circuits and earth faults which can be the results of a fire or flooding casualty (see 2/3.9 or 2/3.11).

## 3.7 Propulsion

### 3.7.1 Propulsion and Auxiliary Machinery [MSC.1/Circ.1369 – Inter 17]

Propulsion and auxiliary machinery essential for the propulsion of the ship should remain operable.

*Note:* At least one independent propulsion system which includes the appropriate auxiliaries is to remain operational and provide adequate power to comply with the operational conditions of 3/3.7.2. This independent propulsion system can be fulfilled either by the main propulsion arrangement or by an alternative emergency propulsion arrangement.

**3.7.2 Adequate OSV Speed [MSC.1/Circ.1369 – Inter 18 modified by FP 54/8/Add.1 – comments to Inter 23]**

Following a fire casualty within the threshold, the OSV is to be able to maintain an adequate speed for sufficient time to permit the OSV's planned SRtP in acceptable sea and wind conditions taking into account the intended area of operation. A minimum speed of 6 knots or one half of the design speed, whichever is greater, is to be maintained while heading into minimum wind and sea conditions of Beaufort force 5 and sea state 4. Configuration for power generation and propulsion in the worst case scenario in terms of casualty should be verified during normal sea trials.

For fire casualty within the threshold, see 2/3.1.

*Note:* The quantity of fuel oil needed for the journey to a port of refuge is to be established by using the prime mover and the power source, providing the load for the necessary systems, with the highest fuel consumptions.

**3.7.3 Protection – Steel Shaft Line [MSC.1/Circ.1369 – Inter 19]**

A steel shaft line including relevant bearings passing through a space affected by a flooding or a fire casualty (see also 3/3.1.4), may be considered operational if it is enclosed in a watertight and “A” class tunnel or alternatively if:

- i) In the flooding case it can be shown the shaft can operate under water and
- ii) In the fire case the shaft is protected by a dedicated water spray system capable of delivering not less than 5 l/m<sup>2</sup>/min on the protected area or equivalent.

See 2/3.1, 2/3.3, 2/3.9 and 2/3.11; and 3/3.1.3.

*Note:* In the flooding case, the bearing and seals used in the shaft line are not to allow progressive flooding.

**3.7.4 Manual Actions – Manual Control [MSC.1/Circ.1369 – Inter 20]**

Manual control at local positions can be accepted provided adequate communication and emergency lighting are arranged and it is demonstrated that the loss of any control and monitoring system does not prevent or impair any such manual/local control of the propulsion and electrical power generation systems (including, but may not be limited to engines, electric motors, fuel systems, etc.). Vital alarms for machinery associated with essential systems are to be provided locally when operating in this manner. (See 2/3.21.)

*Note:* For adequate communications, see 3/3.15.1 and 3/3.15.2.

**3.9 Steering Systems and Controls****3.9.1 Steering Systems and Controls [MSC.1/Circ.1369 – Inter 21]**

When documenting the steering system is operable the following should be taken into consideration:

- i) Local control of remaining steering system is acceptable provided adequate communication and emergency lighting are arranged, see 2/3.21, 3/3.15.1, and 3/3.15.2.
- ii) Emergency means of steering (i.e. azimuth thrusters, pump jets, rudder and propeller arrangement) may be considered.
- iii) In general, tunnel thrusters should not be considered adequate for emergency steering.

*Note:* For the weather conditions stated in 3/3.7.2, sufficient steering capacity is available to provide adequate maneuverability throughout the operational range of the SRtP conditions.

**3.11 Navigational Systems****3.11.1 Navigational Systems [MSC.1/Circ.1369/Add.1 – Inter 22]**

Equipment essential for navigation, position fixing and detection of risk of collision should be available. The following equipment should be available as a minimum:

- i) Properly adjusted standard magnetic compass
- ii) A receiver for a global navigation satellite system or a terrestrial radio navigation system
- iii) A 9 GHz radar

- iv) Electronic chart display and information system (ECDIS) or an appropriate folio of paper nautical charts and publications
- v) Ship whistle
- vi) Navigation lights
- vii) Internal communications with engine control room and steering gear (see 3/3.15.1 and 3/3.15.2)
- viii) A pelorus or compass bearing device to take bearings
- ix) A means of correcting heading and bearing to true at all times.

The OSV is to be capable of displaying the proper light configuration in compliance with the International Regulations for Preventing Collisions at Sea in force.

*Notes:*

- 1 After a fire casualty not exceeding the fire casualty threshold (see 2/3.1 and 2/3.9) but includes the loss of the navigation bridge, the above navigation equipment which can be either fixed or portable is to be operational in another location such as an emergency navigation bridge.
- 2 A properly adjusted gyro compass is also an acceptable means to satisfy 3/3.11.1i).
- 3 For SRtP operations requiring more than 24 hours to accomplish, the following additional equipment should remain operational:
  - a) Automatic Identification System (AIS)
  - b) Echo sounding device, or other electronic means, to measure and display the available depth of water
  - c) Daylight signal lamp, or other means to communicate by light during day and night.

### 3.13 Systems for Fill, Transfer and Service of Fuel Oil

#### 3.13.1 Fuel Oil Fill, Transfer and Service Systems – Capability [MSC.1/Circ.1369 – Inter 23]

Systems for internal fill, transfer and service of fuel oil are to be capable of fuel transfer to active propulsion and power generation equipment.

*Notes:*

- 1 For quantity of fuel oil, see 3/3.7.2.
- 2 Any remotely operated valve which needs to remain operational after a fire or flooding casualty is to comply with 2/3.21, 3/3.1.6 and 3/3.7.4.

#### 3.13.2 Fire Casualty – Fuel Oil Fill, Transfer and Service Systems [MSC.1/Circ.1369 – Inter 24]

Systems for internal fill, transfer and service of:

- i) Fuel,
- ii) Other flammable hydrocarbons, or
- iii) Any fluid that may be flammable or dangerous if heated to a very high temperature (both within the pipe and ongoing through pumps, orifices or other equipment),

are not to be considered operational within spaces affected by a fire casualty. (See 2/3.9.)

#### 3.13.3 Flooding Casualty – Fuel Oil Fill, Transfer and Service Systems [SOLAS II-2/21.4.4 {MSC.1/Circ.1437}]

Systems for internal fill, transfer and service of:

- i) Fuel,
- ii) Other flammable hydrocarbons, or
- iii) Any fluid that may be flammable or dangerous if heated to a very high temperature (both within the pipe and ongoing through pumps, orifices or other equipment),

should be established as being capable of remaining operational when crossing flooded watertight compartments, considering in particular consequences of low sea water temperature on the liquids behavior. (See 2/3.11.)

### **3.15 Internal Communications**

#### **3.15.1 Internal Communications [SOLAS II-2/21.4.5]**

Internal communication is defined as between the bridge/emergency conning station, engineering spaces, safety center, firefighting and damage control teams, as required for special personnel and crew notification and mustering, all stations on board which require manual control of essential systems, and necessary lookout positions for navigation.

#### **3.15.2 Internal Communication between Vital Spaces – Effective Means [MSC.1/Circ.1369 – Inter 25]**

Internal communications should be achieved by any effective portable or fixed means of communications. However, portable equipment may be accepted provided a repeater system or equivalent remains operational after the fire or flooding casualty and charging capability is available in more than one MVZ.

*Note:* For portable means of communications, sufficient units are to be provided and stationed in more than one MVZ.

#### **3.15.3 Internal Communication between Vital Spaces – PA Systems [MSC.1/Circ.1369 – Inter 26]**

PA systems, arranged as general alarm systems, are to remain operational in the MVZs not affected by the fire or flooding casualty.

*Note:* PA systems are to comply with the requirements of SOLAS Regulation III/6.5. After any fire or flooding casualty (see 2/3.9 or 2/3.11), the system is to remain connected to a source of electrical power and is to function properly with at least one loop and one amplifier in the MVZs not affected by the casualty.

### **3.17 External Communications**

#### **3.17.1 External Communications [MSC.1/Circ.1369/Add.1 – Inter 27]**

The OSV is to be capable of communicating via the GMDSS or the VHF Marine and Air Band distress frequencies even if the main GMDSS equipment is inoperable.

The external communication may be achieved by additional fixed means or portable means (i.e. portable radio communication equipment) installed in the same area as the navigation and maneuvering equipment. The charging capability for any portable devices should be available in more than one MVZ. [SOLAS II-2/21.4.6.2 {MSC.1/Circ.1437}]

### **3.19 Fire Main System**

#### **3.19.1 Fire Main [MSC.1/Circ.1369 – Inter 28]**

Automatic start of remaining pumps may not be required (manual local start may be accepted after a casualty, see 2/3.21). The system should be arranged so that SOLAS regulation II-2/10.2.1.5.1 is fulfilled in all other MVZs of the OSV not affected by the casualty. Isolating valves should be arranged as appropriate. The remaining part of the affected deck in a MVZ may be served from hydrants of an adjacent zone or watertight compartment. Fire hoses may be extended for firefighting within the affected MVZ; however, for complying with this requirement, two lengths of hoses from each hydrant may be accepted.

*Notes:*

- 1 After any fire or flooding casualty (see 2/3.9 or 2/3.11), any fire pump not affected by the casualty is to remain connected to a source of electrical power.
- 2 Any remotely operated valve which needs to remain operational after a fire or flooding casualty is to comply with 2/3.21, 3/3.1.6 and 3/3.7.4.

### 3.21 Fixed Fire-extinguishing Systems

#### 3.21.1 Fixed Fire-extinguishing Systems – Located Outside Protected Space [MSC.1/Circ.1369 – Inter 29]

When a gaseous based system located outside the protected space is the sole fixed fire-extinguishing system as defined in SOLAS regulations II-2/10.4.1 and 10.7.1 and it is designed to protect more than one space:

- i) There should be enough capacity to protect the two largest spaces.
- ii) Where the application of the fire casualty threshold (see 2/3.1) leads to the loss of the storage room due to fire in an adjacent space, there should be two rooms, not being lost by the result of the same casualty, each holding a quantity of gas, capable of protecting the largest space.
- iii) The system should be arranged so a casualty in one protected space does not impair the operation of the system in another protected space.

When a gaseous-based system located outside the protected space is the sole fixed fire-extinguishing system as defined in SOLAS regulation II-2/10.4.1 and 10.7.1 and it is designed to protect a single space, where the application of the fire casualty threshold (see 2/3.1) leads to the loss of the storage room due to fire in an adjacent space, there are to be two rooms, not being lost by the result of the same casualty, each holding the quantity of gas required for the protected space.

#### 3.21.2 Fixed Fire-extinguishing Systems – Operation Loss [MSC.1/Circ.1369 – Inter 30]

Sprinkler or equivalent fixed fire-extinguishing systems may be considered to be lost only in spaces directly affected by the fire casualty (see 2/3.9) and in other spaces protected by the same section (i.e. are controlled by the same section valve) provided each section does not serve more than one deck area in one MVZ. However, all levels of a stairway enclosure may be protected by the same section.

*Note:* Applies to fire-extinguishing arrangements in control stations, accommodation and service spaces in accordance with SOLAS regulation II-2/10.6.1.1.

#### 3.21.3 Fixed Fire-extinguishing Systems – Section Valve Protection [MSC.1/Circ.1369 – Inter 31]

Section valves (as referenced in FSS Code, Chapter 8, paragraph 2.4.2.2) located within the space affected by the fire casualty (see 2/3.9) should be considered to be not operational unless they are suitably fire rated or fire protected (i.e. contained within a solely dedicated enclosure having "A" class boundaries, or protected by a water nozzle, etc.). (See 2/3.19.)

*Note:* For any piping arrangement associated with the systems listed in SOLAS regulations II-2/21.4 and II-2/22.3, this DCN applies to valves acting as section valves.

#### 3.21.4 Fixed Fire-extinguishing Systems – Machinery Spaces [MSC.1/Circ.1369 – Inter 32]

Equivalent water based fire-extinguishing systems intended for the protection of machinery spaces (total flooding, as referenced in MSC/Circ. 1165, as amended) are to be designed so in case of loss of any section valve, it would still be possible to supply the entire system at the required performance, except where another fixed fire-extinguishing system is provided for the protection of such spaces (i.e. gaseous based systems). Duplication, fire protection of valves (i.e., contained within a solely dedicated enclosure having "A" class boundaries, or protected by a water nozzle, etc.), fire rated valves or location of valves in spaces as identified by 3/3.1.4 may be considered.

#### 3.21.5 Fixed Fire-extinguishing Systems – Indication of Activated Sections [MSC.1/Circ.1369 – Inter 33]

In the continuously manned central control station, indication of activated sections for sprinkler or equivalent fixed fire-extinguishing systems, located outside the MVZ, where the space affected by the casualty is located, should continue to function after a fire or flooding casualty. (See 2/3.9 or 2/3.11.)

**3.21.6 Fixed Fire-extinguishing Systems – Piping Arrangement [MSC.1/Circ.1369 – Inter 34]**

Arrangement of piping distribution for sprinkler systems or equivalent, or for water based fixed fire-extinguishing systems for machinery spaces, may include isolation valves so that the system can be reconfigured so as to remain operational after a casualty. The isolation valves are to be kept to a minimum, clearly marked and easily accessible. Valves whose uncorrected status may jeopardize the operation of the system under normal condition should be provided with status indication in the continuously manned control station.

*Notes:*

- 1 Normally open valves required to be closed for the operations of the systems following a casualty (see 2/3.9 and 2/3.11) are to be provided with status indication in the continuously manned control station.
- 2 Manual valves only required for emergency operations of the systems after an occurrence of a casualty (see 2/3.9 and 2/3.11) are to be kept locked shut during normal operations of the systems. These valves do not need to have status indication in the continuously manned control station provided they are accessible and clearly marked.
- 3 Any remotely operated valve which needs to remain operational after a fire or flooding casualty is to comply with 2/3.21, 3/3.1.6 and 3/3.7.4.

**3.21.7 Fixed Fire-extinguishing Systems – Hydraulic Calculations [MSC.1/Circ.1369 – Inter 35]**

When sprinkler or equivalent water based, fixed fire-extinguishing systems include one or more emergency feed, risers, connection, or other emergency means for regulation compliance, then hydraulic calculations (as referenced in the FSS Code, Chapter 8, paragraph 2.3.3.2) should take this into account.

*Note:* For low pressure systems, a second system pump is not required if a back-up arrangement through the fire pumps provides a pressure head not less than the required pressure head of the system pump.

**3.21.8 Fixed Fire-extinguishing Systems – Local Application [MSC.1/Circ.1369 – Inter 36]**

Local application systems need not remain operational following a casualty unless they form part of a system for the protection of machinery spaces (total flooding, as referenced in MSC/Circ. 1165, as amended).

**3.23 Fire and Smoke Detection Systems****3.23.1 Fire and Smoke Detection Systems [MSC.1/Circ.1369 – Inter 37]**

Fire and smoke detection systems may be considered to be lost only in spaces directly affected by the fire casualty (see 2/3.9) and in other spaces on the same deck that are part of the same section, as defined by the FSS Code, Chapter 9, paragraph 2.4.1, provided all other detectors remain operational in any other deck served by that section.

**3.25 Bilge and Ballast Systems****3.25.1 Bilge and Ballast Systems [MSC.1/Circ.1369 – Inter 38]**

The bilge and ballast pumping systems and all associated essential equipment are to be operational in all spaces served by the systems and not directly affected by the fire or flooding casualty. (See 2/3.9 or 2/3.11.) Manual control at local positions may be accepted provided fixed or portable means of communication are available from those positions to the safety center or the engine control room. (See 2/3.21 and 3/3.15.2.)

*Notes:*

- 1 After any fire or flooding casualty, any bilge and ballast pumps not affected by the casualty are to remain connected to a source of electrical power.
- 2 For any piping arrangement associated with the systems listed in SOLAS regulations II-2/21.4 and II-2/22.3, this DCN applies to the pumping arrangement and associated essential equipment.
- 3 Any remotely operated valve which needs to remain operational after a fire or flooding casualty is to comply with 2/3.21, 3/3.1.6 and 3/3.7.4.

### 3.27 Power-operated Watertight and Semi-watertight Doors

#### 3.27.1 Power-operated Watertight and Semi-watertight Doors [MSC.1/Circ.1369 – Inter 39]

Indication displaying door status (opened or closed) is to be provided for any fire casualty (see 2/3.9) not exceeding the casualty threshold (see 2/3.1) except for those doors in the boundary of spaces directly affected by the casualty.

*Notes:*

- 1 The above indication of doors is to be provided in a continuously manned control station located outside the casualty threshold.
- 2 Doors located outside the boundaries of the casualty threshold (see 2/3.1 and 2/3.3) are to open and close after a casualty (see 2/3.9 and 2/3.11). As a minimum, these doors are to be operated in manual controls at the local positions (see 2/3.21, 3/3.1.6 and 3/3.7.4).
- 3 Doors located in the boundaries of a flooding casualty threshold (see 2/3.3) are able to close during the flooding casualty (see 2/3.11).

### 3.29 Flooding Detection Systems

#### 3.29.1 Flooding Detection Systems [MSC.1/Circ.1369 – Inter 40]

Flooding detection systems may be considered to be lost only in spaces directly affected by the fire casualty (see 2/3.9) and in other spaces in the same compartment that are part of the same section provided all other detectors remain operational in any other compartment served by that section.

Indication of flooding is to be displayed in the appropriate continuously manned control station.

### 3.31 Safe Area Support Systems

#### 3.31.1 Safe Areas – General [MSC.1/Circ.1369 – Inter 41]

When considering a fire casualty (see 2/3.9) in a certain MVZ, only spaces within the casualty threshold (see 2/3.1) are to be considered lost. Food, water and equipment for the support of the basic services to the safe areas, stored in spaces not directly affected by the fire casualty and belonging to the same MVZ, could be considered still available.

#### 3.31.2 Safe Areas – Arrangement and Sizing [SOLAS II-2/21.5.1.1 & 21.5.1.2 and MSC.1/Circ.1369 – Inter 42]

The safe area(s) is/are to provide the basic services which are needed to maintain the health of all onboard personnel.

Safe areas are generally internal spaces and can be a number of spaces distributed on board and should preferably be arranged in accommodation spaces. Sizing of safe areas where persons are accommodated is to be based on the time needed for SRtP operation. For SRtP operations longer than 12 hours, a minimum space of 2 m<sup>2</sup> per person, calculated on the basis of the gross deck surface of the space(s) being considered, should be provided. For SRtP operations shorter than 12 hours, a minimum space of 1 m<sup>2</sup> per person should be provided.

The use of an external space as a safe area may be allowed provided any restriction due to the area of operation and relevant expected environmental conditions are taken into account.

#### 3.31.3 Safe Areas – Sanitation [MSC.1/Circ.1369 – Inter 43]

As a minimum one toilet for every 50 persons or fraction should remain operational. Grey and black water can be disposed of into the sea, allowed by MARPOL (refer to MARPOL Annex IV, regulation 3).

*Note:* If the time to complete SRtP operations be greater than 24 hours, then water and facilities for basic hygienic necessities are to be provided.

**3.31.4 Safe Areas – Water [MSC.1/Circ.1369 – Inter 44]**

As a minimum 3 liters per person per day drinking water is to be available. Additional water for food preparation and hygiene may need to be provided. The total water needed to meet the requirements for SRtP is to take into account the intended area of operation of the OSV.

*Notes:*

- 1 The drinking water is to be accessible from the safe area.
- 2 For SRtP operations requiring more than 24 hours to accomplish, at least 4 liters per person per day of additional water is to be provided for food preparation and personal hygiene. This amount can be reduced depending on the choice of food rations.

**3.31.5 Safe Areas – Food [MSC.1/Circ.1369 – Inter 45]**

Food can be of any kind including dry food. Storage of food should be distributed as necessary, so an access route is available from the safe areas. Minimum rations totaling not less than 10,000 kJ (2400 kcal) per person per day is to be available (Res MSC.218(82) – 4.1.5.1.18 amendment to LSA Code). The total food needed to meet the requirements for SRtP is to take into account the intended area of operation of the OSV.

*Note:* If galleys are required for food preparation, they are to be accessible from safe areas but not necessarily located within the safe areas.

**3.31.6 Safe Areas – Medical Care Space [MSC.1/Circ.1369 – Inter 46]**

In addition to the OSV's hospital or medical center, one or more locations on the OSV are to be provided which are to:

- i) Be in a different fire zone (from the hospital or primary medical center)
- ii) Be easily accessible and
- iii) Have lighting and power supply on the main and emergency source of electrical power.

Reference should also be made to MSC/Circ.1129.

**3.31.7 Safe Areas – Heat Stress and Hypothermia Prevention [MSC.1/Circ.1369 – Inter 47]**

Any means for protection against heat stress and hypothermia are to take into account external weather conditions, which may depend on area(s) of operation of the OSV. Casualty scenarios for which there is a reduction in ventilation or heating capacity should be identified and consequences assessed.

The temperature within the internal safe areas is to be maintained in the range of 10°C to 30°C, consideration being paid to the external temperature during the expected operations.

**3.31.8 Safe Areas – Light [MSC.1/Circ.1369 – Inter 48]**

Portable rechargeable battery operated lighting may be acceptable for use in spaces which are not covered by the OSV's emergency lighting system. Adequate charging capability should be available for these lights.

Supplementary lighting complying with SOLAS regulation II-1/42-1 is also acceptable.

*Note:* For safe areas, the minimum illumination level is to be 75 lux.

**3.31.9 Safe Areas – Ventilation [MSC.1/Circ.1369 – Inter 49 and SOLAS II-2/21.5.1.3]**

As a minimum, the available ventilation volume is to be 4.5 m<sup>3</sup>/h per person.

The ventilation design is to reduce the risk of smoke and hot gases affecting the use of the safe area(s).

**3.31.10 Safe Areas – Other Systems Vital to Damage Control [MSC.1/Circ.1369 – Inter 50]**

This includes any system the Administration determines is vital to damage control pertaining to fire or flooding.



**3.31.11 Safe Areas – Embarkation Deck Access [MSC.1/Circ.1369 – Inter 51 and SOLAS II-2/21.5.1.4]**

Means of access from safe areas to life-saving appliances are to be provided from all safe areas in case of any casualty, either internally through areas unaffected by the fire or via external routes. External routes are considered to remain available also in the portion of the OSV containing the MVZ where the casualty had occurred.

**3.33 Evacuation and Abandonment Systems****3.33.1 Evacuation and Abandonment – General [SOLAS II-2/22.3.2]**

The system is to be capable of operation for at least 3 hours based on the assumption of no damage outside the unserviceable MVZ. The system is not required to remain operational within the unserviceable MVZ.

*Notes:*

- 1 Applies to the systems listed in SOLAS Regulation II-2/22.3.1.
- 2 Battery operated systems are to have the capacity for at least 3 hours of uninterrupted operations.

**3.33.2 Evacuation and Abandonment – Electrical Systems [MSC.1/Circ.1369 – Inter 52]**

Electrical power is to be available for the abandonment of the OSV, including life-saving appliances and arrangements and the systems referenced in SOLAS regulation II-2/22.3.1, with due regard that such services may be operated simultaneously.

*Notes:*

- 1 See 3/3.1.3, 3/3.5.1, and 3/3.5.2.
- 2 After the total loss of any one MVZ, at least one source of electrical power which includes the appropriate auxiliaries is to remain operational and provide adequate power to comply with the operational conditions of 3/3.33.1.

**3.33.3 Evacuation and Abandonment – Fire Main [MSC.1/Circ.1369 – Inter 53]**

The fire main is to remain operational in all MVZs not directly affected by the casualty. Water for firefighting purposes is to be available to all areas of the OSV.

*Note:* See 3/3.19.1.

**3.33.4 Evacuation and Abandonment – Internal Communications [MSC.1/Circ.1369 – Inter 54]**

A means is to be available for communicating orders to firefighting and damage control teams and personnel in charge of evacuation and abandonment.

*Note:* See 3/3.15.2 and 3/3.15.3.

**3.33.5 Evacuation and Abandonment – External Communications [MSC.1/Circ.1369 – Inter 55]**

The OSV is to be capable of communicating via GMDSS or the VHF Marine and Air Band distress frequencies even if the main GMDSS equipment is lost.

*Note:* See 3/3 17.1.

**3.33.6 Evacuation and Abandonment – Bilge System [MSC.1/Circ.1369 – Inter 56]**

The bilge pumping system and all associated equipment essential for its operation is to be available in all spaces not directly affected by the casualty.

*Notes:*

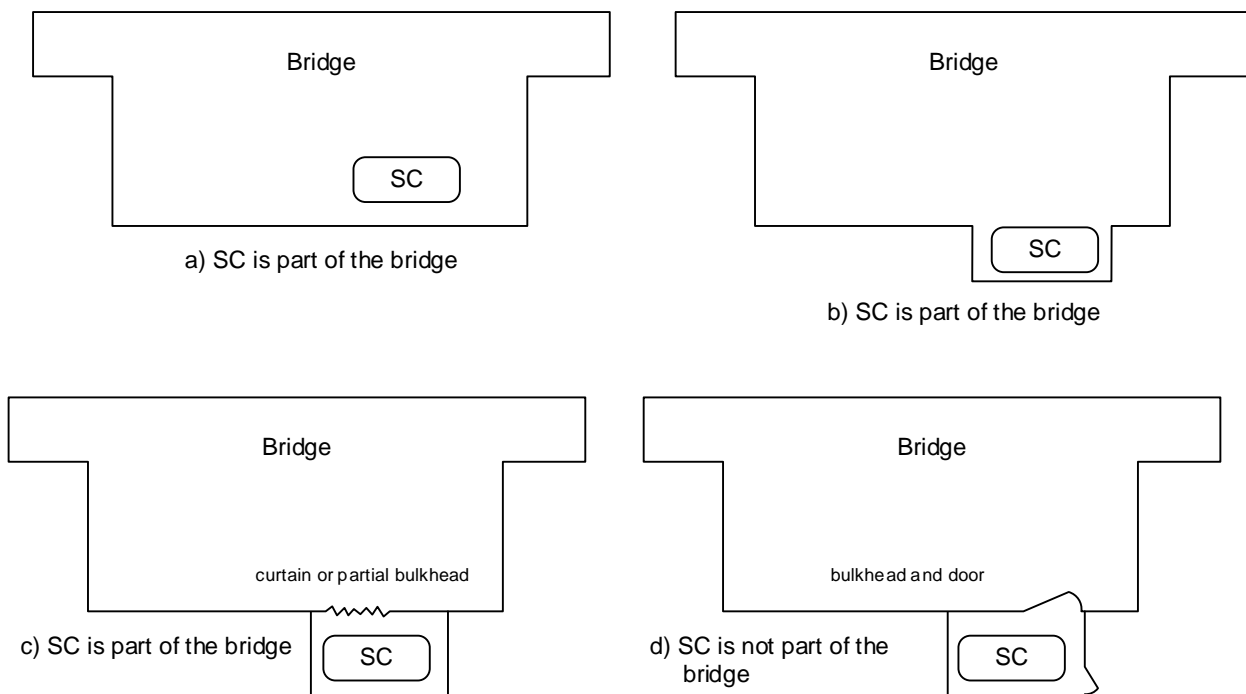
- 1 The bilge and ballast pumping systems and all associated essential equipment are to be operational in all spaces served by the systems and not directly affected by the fire casualty. (See 2/3.9.)
- 2 Manual control at local positions may be accepted provided fixed or portable means of communication are available from those positions to the safety center or the command station used for the evacuation and abandonment of the OSV. (See 2/3.21 and 3/3.15.2.)
- 3 After any fire casualty, any bilge and ballast pumps not affected by the casualty are to remain connected to a source of electrical power.
- 4 Any remotely operated valve which needs to remain operational after a fire casualty is to comply with 2/3.21, 3/3.1.6, and 3/3.7.4.

### 3.35 Safety Center

#### 3.35.1 Safety Center – Location [SOLAS II-2/23.3 and MSC.1/Circ.1368, paragraph 2 and Appendix 4]

The safety center is to be a part of the navigation bridge or be located in a separate space adjacent to and having direct access to the navigation bridge, so the management of emergencies can be performed without distracting watch officers from their navigational duties.

The safety center may be considered as part of the navigation bridge when arranged as examples indicated in diagrams (a), (b) and (c) of the below illustration. For arrangements such as diagram (d) of the below illustration, the safety center would not be considered as being part of the navigation bridge.



#### 3.35.2 Safety Center – Part of Navigation Bridge [MSC.1/Circ.1368, paragraph 3]

When the safety center is part of the bridge:

- i) It is acceptable to consider nearby members of the bridge team as being sufficient to make the safety center "continuously manned".
- ii) Alarms in the safety center are to be audible at the conning position for responsible members of the bridge team to make them aware of an alarm condition.
- iii) At least one member of the on-watch bridge team is to be properly trained and authorized to take appropriate initial and interim actions in the event of an emergency or in response to an alarm, until the safety center is fully manned.

#### 3.35.3 Safety Center – Not Part of Navigation Bridge [MSC.1/Circ.1368, paragraph 4]

Where the safety center is not part of the navigation bridge, it may or may not be continuously manned.

#### 3.35.4 Safety Center – Continuously Manned [MSC.1/Circ.1368, paragraph 4.1]

When the safety center is continuously manned the functionality of the systems listed in Section 8, Table 2 are to be duplicated on the navigation bridge.

**3.35.5 Safety Center – Not Continuously Manned [MSC.1/Circ.1368, paragraph 4.2]**

When the safety center is not continuously manned, there is to be the capability on the navigation bridge to alert the bridge team of developing shipboard emergencies, to respond to them appropriately by taking initial and interim actions and to allow necessary monitoring functions after the safety center is manned by properly trained persons. Considering this, the functionality of the systems listed in Section 8, Table 3 is to be duplicated on the navigation bridge.

**3.35.6 Safety Center – Layout [SOLAS II-2/23.4]**

The layout and ergonomic design of the safety center is to take into account the *ABS Guidance Notes on the Application of Ergonomics to Marine Systems*.

**3.35.7 Safety Center – Communications [SOLAS II-2/23.5]**

Means of communication is to be provided between the safety center, the central control station, if applicable, the navigation bridge, the engine control room, the storage room(s) for fire extinguishing system(s) and fire equipment lockers.

**3.35.8 Safety Center – Hierarchy of Control [MSC.1/Circ.1368, paragraph 5]**

The hierarchy of control between the navigation bridge and the safety center is to be specified within the OSV's safety management system. In this respect:

- i) An adequate number of properly trained personnel are to be available for immediate response to the safety center in an emergency while maintaining an effective navigational watch.
- ii) The duties of the safety center personnel and navigation bridge personnel are not to overlap.
- iii) Coordination of emergency management actions and communications are to be assured through established emergency procedures, harmonized with the onboard decision support system required by SOLAS regulation III/29.

**3.35.9 Safety Center – Integrated Computer Technology [MSC.1/Circ.1368, paragraphs 6 and 7]**

Integrated computer technology may be used in carrying out the various functions on the navigation bridge and safety center. When such a system is utilized:

- i) The hierarchy of control for the various computer stations and locations are to be clearly documented.
- ii) The computer system and programming is to be designed to assure failure of the system does not cause the loss of any of the OSV's safety systems.
- iii) The operational status and failures of the computer system or its communications are to be indicated.

**3.35.10 Safety Center – Other Controls and Monitoring [MSC.1/Circ.1368, paragraph 8]**

Controls and monitoring of safety and security related systems other than those listed under SOLAS regulation II-2/23.6 may also be located in the safety center.

**3.35.11 Safety Center – Fire Alarm Activation [MSC.1/Circ.1368, Appendix 2]**

Activation of the fire alarm is to be possible from the navigation bridge.

**3.35.12 Safety Center – Fire Pump [MSC.1/Circ.1368, Appendix 2]**

Operation and control of fire pumps is to be duplicated, unless the automatic start of one fire pump is provided.

**3.35.13 Safety Center – Fire Doors [MSC.1/Circ.1368, Appendix 3]**

Operation and control of the system is to be from the navigation bridge when the safety center is unmanned, until the management of the emergency situation is transferred to the safety center. This implies duplication of the systems and a function to transfer the commands and controls (bridge ↔ safety center).



## SECTION 4 Fire Casualty Not Exceeding Fire Casualty Threshold

### 1 General

This Section is intended to support a system-based design with guidance on the availability of essential systems to support an OSV's safe return to port (SRtP) after a fire casualty that does not exceed the fire casualty threshold (see 2/3.1). The systems listed in this Section are those from SOLAS regulation II-2/21.4, except for "other systems determined by the Administration". Each system is divided further into subsystems (i.e., pumps, cabling, controls, etc.) with an intended type of design criteria to achieve the capabilities for safe return to port. In addition, applicable design criteria notes and definitions are associated with each subsystem.

For referenced definitions, see Section 2, and for referenced design criteria notes, see Section 3.

### 3 Systems

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.1 Propulsion	a. Prime movers	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.7.1	Provide adequate speed throughout the operational range for SRtP conditions. apply: 3/3.7.2	Sea trial or model tank tests under SRtP operational conditions.
	b. Power transmission/shafting	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.7.1 and 3/3.7.3		
	c. Propulsor units/propellers	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.7.1		
	d. Auxiliary machinery associated with propulsion	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3, 3/3.3.1 and 3/3.7.1		
	e. Control systems	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 and 3/3.7.4		
3.3 Electrical power	a. Source	Essential apply: 2/3.13, 2/3.9	Fully redundant including emergency source apply: 2/3.17; 3/3.5.4	Provide available and sustainable electrical power. apply: 3/3.5.5	Sea trial under SRtP operational conditions or submitting an electrical balance considering SRtP operational conditions. Apply: 3/3.5.3
	b. Control system of source	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 and 3/3.7.4		
	c. Transmission/cabling	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.1		

**Section 4 Fire Casualty Not Exceeding Fire Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.5 Steering systems and controls	a. Hydraulic steering gear unit	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.9.1ii) and 3/3.9.1iii)	For the weather conditions stated in 3/3.7.2, provide adequate maneuverability throughout the operational range of SRtP conditions.	Sea trial or model tank tests under SRtP operational conditions.
	b. Electrical power to steering unit	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.1		
	c. Control system of steering unit	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1, 3/3.7.4 and 3/3.9.1i)		
3.7 Navigational systems	a. Equipment essential for navigation, position fixing and detection of collision risk	Essential apply: 2/3.13, 2/3.9	Fully redundant for equipment listed in 3/3.11.1 apply: 2/3.17	Equipment listed in 3/3.11.1 is available and function properly throughout the operational range for SRtP conditions.	Sea trial under SRtP operational conditions.
	b. Electrical power to equipment	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.1		
3.9 Systems for fill, transfer and service of fuel oil	a. Pumps	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.13.1 and 3/3.13.2	For the weather conditions stated in 3/3.7.2, provide adequate fuel oil to the propulsion system throughout the SRtP operational range.  Provide fuel oil for generation of electrical power and any fuel-oil operated equipment associated with safe areas throughout the SRtP operational range.	Sea trials under SRtP operational conditions or submitting of fuel oil calculations considering SRtP operational conditions.
	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.1		
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 and 3/3.7.4		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3, 3/3.1.4, 3/3.3.1, 3/3.13.1, 3/3.13.2, 3/3.21.3 (note) and 3/3.25.1 (note 2) essential ROVs Apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.11 Internal communication	a. PA system and equipment essential for internal communication	Essential apply: 2/3.13, 2/3.9	PA system – fully redundant apply: 2/3.17; 3/3.15.3 Essential internal communication equipment (including portable and fixed means) - fully redundant apply: 2/3.17; 3/3.15.1 and 3/3.15.2	Provide functional PA system throughout the operational range for SRtP operations.  Provide two-way communications with stations listed in 3/3.15.1 throughout the operational range for SRtP conditions.	Demonstration of effective communication to all parts of the OSV considering SRtP conditions.

**Section 4 Fire Casualty Not Exceeding Fire Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
	b. Electrical power to equipment and/or repeater systems	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 and 3/3.15.2		
3.13 External communications	a. Radio communication equipment	Essential apply: 2/3.13, 2/3.9	Fully redundant including portable and fixed means apply: 2/3.17; 3/3.17.1	Provide communications via GMDSS or VHF Marine and Air Band distress frequencies throughout the operational range for SRtP conditions.	Demonstration of effective external communications considering SRtP conditions.
	b. Electrical power to equipment and charging capability for any portable devices	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 and 3/3.17.1		
3.15 Fire main system	a. Pumps	Essential apply: 2/3.13, 2/3.9	Fully redundant including emergency pump apply: 2/3.17; 3/3.19.1	At required pressure specified by appropriate SOLAS regulation, provide two water jets, simultaneously, in accordance with 3/3.19.1 throughout the operational range for SRtP conditions.	Demonstration of system arrangement and functionality (i.e. locations of fire hydrants, isolating valves, pumps) considering SRtP conditions.  Submitting of hydraulic calculations for the fire main system considering SRtP conditions.
	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.1		
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1, 3/3.7.4 and 3/3.19.1		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3, 3/3.1.4, 3/3.3.1, 3/3.19.1, 3/3.21.3 (note) and 3/3.25.1 (note 2) Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.17 Fixed fire-extinguishing systems	a. Gaseous based – storage room	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.21.1	At design pressure and flow rates, provide functional fixed fire-extinguishing systems, as applicable, throughout the operational range for SRtP conditions.	With various sections isolated, demonstration of fixed fire-extinguishing systems functionality considering SRtP conditions.
	b. Gaseous based – control system	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 and 3/3.7.4		
	c. Gaseous based – piping, valves and fittings	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3, 3/3.1.4, 3/3.3.1, 3/3.21.3, 3/3.21.6 and 3/3.25.1 (note 2) Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		

**Section 4 Fire Casualty Not Exceeding Fire Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
	d. Water based – machinery spaces	Essential apply: 2/3.13, 2/3.9	Fully redundant including another fixed fire-extinguishing system apply: 2/3.17; 3/3.21.3, 3/3.21.4, 3/3.21.6 and 3/3.21.8		
	e. Water based – non-machinery spaces	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3, 3/3.3.1, 3/3.21.2, 3/3.21.3, 3/3.21.5, 3/3.21.6, 3/3.21.7 and 3/3.21.8		
3.19 Fire and smoke detection system	a. Detectors, associated wiring and associated controls	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.23.1	Provide a functional fire and smoke detection system throughout the operational range for SRtP conditions.	Demonstration of system functionality considering SRtP conditions.
	b. Electrical power source to system	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.23.1		
3.21 Bilge and ballast system	a. Pumps	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.25.1	At design pressure and flow rates, provide functional bilge and ballast systems in accordance with 3/3.25.1 throughout the operational range for SRtP conditions.	Demonstration of bilge and ballast systems arrangement and functionality (i.e. locations of isolating valves, pumps, etc.) considering SRtP conditions.  Submitting of hydraulic calculations for the bilge and ballast system considering SRtP conditions.
	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.1		
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1, 3/3.7.4 and 3/3.25.1		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3, 3/3.1.4, 3/3.3.1, 3/3.21.3 (note) and 3/3.25.1  Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.23 Power-operated watertight and semi-watertight doors	a. Door assembly	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19	Provide functional door assemblies and position indication system in accordance with 3/3.27.1 throughout the operational range for SRtP conditions.	Demonstration of position indication system functionality and local control of power-operated doors considering SRtP conditions.
	b. Power to doors	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.1 (electrical) or 3/3.3.1 (hydraulic)		
	c. Control system to doors	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 and 3/3.7.4		
	d. Position indication	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.27.1		

**Section 4 Fire Casualty Not Exceeding Fire Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.25 Safe areas support systems	See Section 6.	--	--	--	--
3.27 Flooding detection systems	a. Detectors, associated wiring and associated controls	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.29.1	Provide a functional flooding detection system throughout the operational range for SRtP conditions.	Demonstration of system functionality considering SRtP conditions.
	b. Electrical power source to system	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17; 3/3.29.1		





## SECTION 5 Flooding Casualty Not Exceeding Flooding Casualty Threshold

### 1 General

This Section is intended to support a system-based design with guidance on the availability of essential systems to support an OSV's safe return to port (SRtP) after a flooding casualty that does not exceed the flooding casualty threshold (see 2/3.3). In accordance with SOLAS regulation II-1/8-1.2, the systems listed in this Section are those from SOLAS regulation II-2/21.4, except for "other systems determined by the Administration". Each system is divided further into subsystems (i.e., pumps, cabling, controls, etc.) with an intended type of design criteria to achieve the capabilities for safe return to port. In addition, applicable design criteria notes and definitions are associated with each subsystem.

For referenced definitions, see Section 2, and for referenced design criteria notes, see Section 3.

### 3 Systems

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.1 Propulsion	a. Prime movers	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.7.1	Provide adequate speed throughout the operational range for SRtP conditions. apply: 3/3.7.2	Sea trial or model tank tests under SRtP operational conditions.
	b. Power transmission/shafting	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.7.1 and 3/3.7.3		
	c. Propulsor units/propellers	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.7.1		
	d. Auxiliary machinery associated with propulsion	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.3.2 and 3/3.7.1		
	e. Control systems	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.6, 3/3.5.2 and 3/3.7.4		
3.3 Electrical power	a. Source	Essential apply: 2/3.13, 2/3.11	Fully redundant including emergency source apply: 2/3.17; 3/3.5.4	Provide available and sustainable electrical power. apply: 3/3.5.5	Sea trial under SRtP operational conditions or submitting an electrical balance considering SRtP operational conditions. all apply: 3/3.5.3
	b. Control system of source	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.6, 3/3.5.2 and 3/3.7.4		
	c. Transmission/cabling	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.2		

**Section 5 Flooding Casualty Not Exceeding Flooding Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.5 Steering systems and controls	a. Hydraulic steering gear unit	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.9.1ii) and 3/3.9.1iii)	For the weather conditions stated in 3/3.7.2, provide adequate maneuverability throughout the operational range of SRtP conditions.	Sea trial or model tank tests under SRtP operational conditions.
	b. Electrical power to steering unit	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.2		
	c. Control system of steering unit	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.6, 3/3.5.2, 3/3.7.4 and 3/3.9.1i)		
3.7 Navigational systems	a. Equipment essential for navigation, position fixing and detection of collision risk	Essential apply: 2/3.13, 2/3.11	Fully redundant for equipment listed in 3/3.11.1 apply: 2/3.17	Equipment listed in 3/3.11.1 is available and function properly throughout the operational range for SRtP conditions.	Sea trial under SRtP operational conditions.
	b. Electrical power to equipment	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.2		
3.9 Systems for fill, transfer and service of fuel oil	a. Pumps	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.13.1 and 3/3.13.3	For the weather conditions stated in 3/3.7.2, provide adequate fuel oil to the propulsion system throughout the SRtP operational range.  Provide fuel oil for generation of electrical power and any fuel-oil operated equipment associated with safe areas throughout the SRtP operational range.	Sea trials under SRtP operational conditions or submitting of fuel oil calculations considering SRtP operational conditions.
	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.2		
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.6, 3/3.5.2 and 3/3.7.4		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.3.2, 3/3.13.1, 3/3.13.3 and 3/3.25.1 (note 2)  Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.11 Internal communication	a. PA system and equipment essential for internal communication	Essential apply: 2/3.13, 2/3.11	PA system – fully redundant apply: 2/3.17; 3/3.15.3  Essential internal communication equipment (including portable and fixed means) - fully redundant apply: 2/3.17; 3/3.15.1 and 3/3.15.2	Provide functional PA system throughout the operational range for SRtP operations.  Provide two-way communications with stations listed in 3/3.15.1 throughout the operational range for SRtP conditions.	Demonstration of effective communication to all parts of the OSV considering SRtP conditions.

**Section 5 Flooding Casualty Not Exceeding Flooding Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
	b. Electrical power to equipment and/or repeater systems	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.2 and 3/3.15.2		
3.13 External communications	a. Radio communication equipment	Essential apply: 2/3.13, 2/3.11	Fully redundant including portable and fixed means apply: 2/3.17; 3/3.17.1	Provide communications via GMDSS or VHF Marine and Air Band distress frequencies throughout the operational range for SRtP conditions.	Demonstration of effective external communications considering SRtP conditions.
	b. Electrical power to equipment and charging capability for any portable devices	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.2 and 3/3.17.1		
3.15 Fire main system	a. Pumps	Essential apply: 2/3.13, 2/3.11	Fully redundant including emergency pump apply: 2/3.17; 3/3.19.1	At required pressure specified by appropriate SOLAS regulation, provide two water jets, simultaneously, in accordance with 3/3.19.1 throughout the operational range for SRtP conditions.	Demonstration of system arrangement and functionality (i.e. locations of fire hydrants, isolating valves, pumps) considering SRtP conditions.  Submitting of hydraulic calculations for the fire main system considering SRtP conditions.
	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.2		
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.6, 3/3.5.2, 3/3.7.4 and 3/3.19.1		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.3.2, 3/3.19.1 and 3/3.25.1 (note 2) Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.17 Fixed fire-extinguishing systems	a. Gaseous based – storage room	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.21.1	At design pressure and flow rates, provide functional fixed fire-extinguishing systems, as applicable, throughout the operational range for SRtP conditions.	With various sections isolated, demonstration of fixed fire-extinguishing systems functionality considering SRtP conditions.
	b. Gaseous based – control system	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.6, 3/3.5.2 and 3/3.7.4		
	c. Gaseous based – piping, valves and fittings	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.3.2, 3/3.21.3, 3/3.21.6 and 3/3.25.1 (note 2) Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		

**Section 5 Flooding Casualty Not Exceeding Flooding Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
	d. Water based – machinery spaces	Essential apply: 2/3.13, 2/3.11	Fully redundant including another fixed fire-extinguishing system  apply: 2/3.17; 3/3.21.3, 3/3.21.4, 3/3.21.6 and 3/3.21.8		
	e. Water based – non-machinery spaces	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.3.2, 3/3.21.2, 3/3.21.3, 3/3.21.5, 3/3.21.6, 3/3.21.7 and 3/3.21.8		
3.19 Fire and smoke detection system	a. Detectors, associated wiring and associated controls	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.23.1	Provide a functional fire and smoke detection system throughout the operational range for SRtP conditions.	Demonstration of system functionality considering SRtP conditions.
	b. Electrical power source to system	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.23.1		
3.21 Bilge and ballast system	a. Pumps	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.25.1	At design pressure and flow rates, provide functional bilge and ballast systems in accordance with 3/3.25.1 throughout the operational range for SRtP conditions.	Demonstration of bilge and ballast systems arrangement and functionality (i.e. locations of isolating valves, pumps, etc.) considering SRtP conditions.  Submitting of hydraulic calculations for the bilge and ballast system considering SRtP conditions.
	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.2		
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.6, 3/3.5.2, 3/3.7.4 and 3/3.25.1		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.3.2 and 3/3.25.1 essential ROVs Apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.23 Power-operated watertight and semi-watertight doors	a. Door assembly	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19	Provide functional door assemblies and position indication system in accordance with 3/3.27.1 (replace fire with flooding) throughout the operational range for SRtP conditions.	Demonstration of position indication system functionality and local control of power-operated doors considering SRtP conditions.
	b. Power to doors	Essential apply: 2/3.13, 2/3.11	Protection apply: 2/3.19; 3/3.1.3 and 3/3.5.2 (electrical) or 3/3.3.2 (hydraulic)		
	c. Control system to doors	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.6, 3/3.5.2 and 3/3.7.4		

**Section 5 Flooding Casualty Not Exceeding Flooding Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
	d. Position indication	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.27.1 (replace fire with flooding)		
3.25 Safe areas support systems	See Section 6.	--	--	--	--
3.27 Flooding detection systems	a. Detectors, associated wiring and associated controls	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.29.1	Provide a functional flooding detection system throughout the operational range for SRtP conditions.	Demonstration of system functionality considering SRtP conditions.
	b. Electrical power source to system	Essential apply: 2/3.13, 2/3.11	Fully redundant apply: 2/3.17; 3/3.29.1		



## SECTION 6 Safe Area

### 1 General

This Section is intended to support a system-based design with guidance on providing basic services to safe area(s) (see 2/3.23) of an OSV after a fire or flooding casualty which does not exceed the casualty threshold. The services listed in this Section are those from SOLAS regulation II-2/21.5. Each service is divided further into subsystems (i.e., pumps, cabling, controls, etc.) with an intended type of design criteria to achieve the capabilities for safe return to port. In addition, applicable design criteria notes and definitions are associated with each subsystem.

For referenced definitions, see Section 2, and for referenced design criteria notes, see Section 3.

### 3 Services

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.1 Sanitation	a. Pumps	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant apply: 2/3.17; 3/3.31.1 and 3/3.31.3	At design pressure and flow rate, provide sanitation in accordance with 3/3.31.3 throughout the operational range for SRtP conditions.	Demonstration of effective sanitation facilities considering SRtP conditions.
	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 or 3/3.5.2, and 3/3.31.1		
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9 or 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 or 3/3.5.2, 3/3.7.4 and 3/3.31.1		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.3.1 or 3/3.3.2, 3/3.21.3 (note), 3/3.25.1 (note 2), 3/3.31.1 and 3/3.31.3 Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.3 Water (potable)	a. Storage tanks	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant apply: 2/3.17; 3/3.31.1 and 3/3.31.4	At design pressure and flow rate, provide potable water in accordance with 3/3.31.4 throughout the operational range for SRtP conditions.	Demonstration of effective potable water facilities considering SRtP conditions.
	b. Pumps	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant apply: 2/3.17; 3/3.31.1 and 3/3.31.4		

**Section 6 Safe Area**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
	c. Electrical power to pumps	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 or 3/3.5.2, and 3/3.31.1		
	d. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9 or 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 or 3/3.5.2, 3/3.7.4 and 3/3.31.1		
3.3 Water (potable) (continued)	e. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.3.1 or 3/3.3.2, 3/3.21.3 (note), 3/3.25.1 (note 2), 3/3.31.1 and 3/3.31.4  Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4	At design pressure and flow rate, provide potable water in accordance with 3/3.31.4 throughout the operational range for SRtP conditions.	Demonstration of effective potable water facilities considering SRtP conditions.
3.5 Food	a. Equipment essential for food preparation, if applicable	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant for food preparation equipment, if applicable apply: 2/3.17; 3/3.31.1 and 3/3.31.5	Properly prepared food listed in 3/3.31.5 is available throughout the operational range for SRtP conditions.	Demonstration of effective food supplies considering SRtP conditions.
	b. Electrical power to food preparation equipment, if applicable	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 or 3/3.5.2, and 3/3.31.1		
3.7 Alternate space for medical care	a. Locations	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant apply: 2/3.17; 3/3.31.1 and 3/3.31.6	Provide alternate space for medical care in accordance with 3/3.31.6 throughout the operational range for SRtP conditions.	Demonstration of an effective alternate space for medical care considering SRtP conditions.
	b. Equipment essential for medical care, as applicable	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant for medical care equipment, as applicable apply: 2/3.17; 3/3.31.1 and 3/3.31.6		
	c. Electrical power to alternate medical care space	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 or 3/3.5.2, 3/3.31.1 and 3/3.31.6		
3.9 Shelter from the weather	a. Spaces - number, arrangement and sizing	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant apply: 2/3.17; 3/3.31.1 and 3/3.31.2	Number, arrangement and sizing of safe areas in accordance with 3/3.31.2 are available throughout the operational range for SRtP conditions.	Demonstration of properly arranged, sized and number of safe areas considering SRtP conditions.

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.11 Means of preventing heat stress and hypothermia	a. Cooling / heating sources of the atmosphere for safe space(s)	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant apply: 2/3.17; 3/3.31.1 and 3/3.31.7	Provide means of preventing heat stress and hypothermia in accordance with 3/3.31.7 throughout the operational range for SRtP conditions.	Demonstration of effective means of preventing heat stress and hypothermia considering SRtP conditions.
	b. Power to cooling/heating sources	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 or 3/3.5.2 or also 3/3.3.1 or 3/3.3.2, 3/3.31.1 and 3/3.31.7		
	c. Control system to cooling / heating sources	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9 or 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 or 3/3.5.2, 3/3.7.4 and 3/3.31.1		
3.11 Means of preventing heat stress and hypothermia (continued)	d. Ventilation ducting and fittings, if applicable	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, thickness concept of 3/3.3.1 or water head requirement of 3/3.3.2 in relation to ventilation ducting and fittings, 3/3.31.1 and 3/3.31.7	Provide means of preventing heat stress and hypothermia in accordance with 3/3.31.7 throughout the operational range for SRtP conditions.	Demonstration of effective means of preventing heat stress and hypothermia considering SRtP conditions.
3.13 Lighting	a. Electrical power source	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant including emergency source apply: 2/3.17; 3/3.5.4, 3/3.5.5 and 3/3.31.8	Provide available and sustainable lighting in accordance with 3/3.31.8 throughout the operational range for SRtP conditions.	Demonstration of effective lighting for safe area(s) considering SRtP conditions.
	b. Control system of electrical power source	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9 or 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 or 3/3.5.2, 3/3.7.4 and 3/3.31.1		
	c. Lamp fixtures / cabling	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 or 3/3.5.2, 3/3.31.1 and 3/3.31.8		
3.15 Ventilation	a. Fans	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant apply: 2/3.17; 3/3.31.1 and 3/3.31.9	At appropriate pressure and flow rate, provide ventilation in accordance with 3/3.31.9 throughout the operational range for SRtP conditions.	Demonstration of effective ventilation for safe area(s) considering SRtP conditions.
	b. Electrical power to fans	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, 3/3.5.1 or 3/3.5.2, and 3/3.31.1		



<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
	c. Control system to fans	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9 or 2/3.11	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 or 3/3.5.2, 3/3.7.4 and 3/3.31.1		
	d. Ventilation ducting and fittings	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Protection apply: 2/3.19; 3/3.1.3, thickness concept of 3/3.3.1 or water head requirement of 3/3.3.2 in relation to ventilation ducting and fittings, 3/3.31.1 and 3/3.31.9		
3.17 Embarkation deck access	a. Embarkation device/system	Essential apply: 2/3.13, 2/3.9 or 2/3.11	Fully redundant apply: 2/3.17; 3/3.31.1 and 3/3.31.11	Provide appropriate embarkation devices/systems in accordance with 3/3.31.11 throughout the operational range for SRtP conditions.	Demonstration of device/system functionality considering SRtP conditions.



## SECTION 7 Fire Casualty Exceeding Fire Casualty Threshold

### 1 General

This Section is intended to support a system-based design with guidance on the availability of essential systems to support the orderly evacuation and abandonment (E&A) of an OSV after a fire casualty that exceeds the fire casualty threshold. The systems listed in this Section are those from SOLAS regulation II-2/22.3. Each system is divided further into subsystems (i.e., pumps, cabling, controls, etc.) with an intended type of design criteria to achieve the capabilities for safe evacuation and abandonment. In addition, applicable design criteria notes and definitions are associated with each sub-system.

For referenced definitions, see Section 2, and for referenced design criteria notes, see Section 3.

### 3 Systems

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.1 Electrical power	a. Source	Essential apply: 2/3.13, 2/3.9	Fully redundant including emergency source apply: 2/3.17 modified for fire casualty exceeding the threshold; 3/3.5.4	Provide available and sustainable electrical power. apply: 3/3.33.2	Sea trial under E&A operational conditions or submitting an electrical balance considering the minimum operational condition of 3 hours. apply: 3/3.33.2
	b. Control system of source	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 and 3/3.7.4		
	c. Transmission / cabling	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19 modified for fire casualty exceeding the threshold; 3/3.1.3 and 3/3.5.1		
3.3 Fire main system	a. Pumps	Essential apply: 2/3.13, 2/3.9	Fully redundant including emergency pump apply: 2/3.17 modified for fire casualty exceeding the threshold; 3/3.33.3	At required pressure specified by appropriate SOLAS regulation, provide functional fire main system in accordance with 3/3.33.3 for the operational condition of 3/3.33.1.	Demonstration of system arrangement and functionality (i.e. locations of fire hydrants, isolating valves, pumps) considering operational condition of 3/3.33.1. Submitting of hydraulic calculations for the fire main system considering operational condition of 3/3.33.1.

**Section 7 Fire Casualty Exceeding Fire Casualty Threshold**

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.3 Fire main system (continued)	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19 modified for fire casualty exceeding the threshold; 3/3.1.3 and 3/3.5.1	At required pressure specified by appropriate SOLAS regulation, provide functional fire main system in accordance with 3/3.33.3 for the operational condition of 3/3.33.1.	Demonstration of system arrangement and functionality (i.e. locations of fire hydrants, isolating valves, pumps) considering operational condition of 3/3.33.1.  Submitting of hydraulic calculations for the fire main system considering operational condition of 3/3.33.1.
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1, 3/3.7.4 and 3/3.33.3		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19 modified for fire casualty exceeding the threshold; 3/3.1.3, 3/3.1.4, 3/3.3.1, 3/3.21.3 (note), 3/3.25.1 (note 2) and 3/3.33.3  Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.5 Internal communications	a. Equipment essential for internal communication	Essential apply: 2/3.13, 2/3.9	Fully redundant including portable and fixed means - essential internal communication equipment apply: 2/3.17 modified for fire casualty exceeding the threshold; 3/3.15.2	Provide two-way communications with stations listed in 3/3.33.4 throughout the operational condition of 3/3.33.1.	Demonstration of effective communication to stations listed in 3/3.33.4 considering operational condition of 3/3.33.1.
	b. Electrical power to equipment and/or repeater systems	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19 modified for fire casualty exceeding the threshold; 3/3.1.3, 3/3.5.1 and 3/3.15.2		
3.7 External communications	a. Radio communication equipment	Essential apply: 2/3.13, 2/3.9	Fully redundant including portable and fixed means apply: 2/3.17 modified for fire casualty exceeding the threshold; 3/3.17.1 and 3/3.33.5	Provide communications via GMDSS or VHF Marine and Air Band distress frequencies throughout the operational condition of 3/3.33.1.	Demonstration of effective external communications considering operational condition of 3/3.33.1.
	b. Electrical power to equipment and charging capability for any portable devices	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19 modified for fire casualty exceeding the threshold; 3/3.1.3, 3/3.5.1, 3/3.17.1 and 3/3.33.5		

## Section 7 Fire Casualty Exceeding Fire Casualty Threshold

<i>System</i>	<i>Subsystem</i>	<i>Type</i>	<i>Design Criteria</i>	<i>Performance after Casualty</i>	<i>Test</i>
3.9 Bilge and ballast system	a. Pumps	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17 modified for fire casualty exceeding the threshold; 3/3.33.6	At design pressure and flow rates, provide functional bilge and ballast systems in accordance with 3/3.33.6 throughout the operational condition of 3/3.33.1.	Demonstration of bilge and ballast systems arrangement and functionality (i.e., locations of isolating valves, pumps, etc.) considering operational condition of 3/3.33.1.  Submitting of hydraulic calculations for the bilge and ballast system considering operational condition of 3/3.33.1.
	b. Electrical power to pumps	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19 modified for fire casualty exceeding the threshold; 3/3.1.3 and 3/3.5.1		
	c. Control system to pumps	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1, 3/3.7.4 and 3/3.33.6		
	d. Piping, valves and fittings	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19 modified for fire casualty exceeding the threshold; 3/3.1.3, 3/3.1.4, 3/3.3.1, 3/3.21.3 (note), 3/3.25.1 and 3/3.33.6  Essential ROVs apply: 2/3.21; 3/3.1.6 and 3/3.7.4		
3.11 Emergency lighting	a. Electrical power source	Essential apply: 2/3.13, 2/3.9	Fully redundant including emergency source apply: 2/3.17 modified for fire casualty exceeding the threshold; 3/3.5.4	Provide available and sustainable emergency lighting throughout the operational condition of 3/3.33.1.	Provide available and sustainable emergency lighting throughout the operational condition of 3/3.33.1.
	b. Control system of electrical power source	Essential apply: 2/3.13, (2/3.15 may be accepted, based on 1/5 and 1/7), 2/3.9	Manual actions apply: 2/3.21; 3/3.1.3, 3/3.1.4, 3/3.1.6, 3/3.5.1 and 3/3.7.4		
	c. Lamp fixtures / cabling	Essential apply: 2/3.13, 2/3.9	Protection apply: 2/3.19 modified for fire casualty exceeding the threshold; 3/3.1.3 and 3/3.5.1		
3.13 Evacuation guidance systems	a. Device/system	Essential apply: 2/3.13, 2/3.9	Fully redundant apply: 2/3.17 modified for fire casualty exceeding the threshold	Provide appropriate evacuation guidance systems throughout the operational condition of 3/3.33.1.	Demonstration of effective evacuation guidance systems considering operational condition of 3/3.33.1.



## SECTION 8 Safety Center

### 1 General

In compliance with the SPS Code (see 2/5), the requirements of SOLAS regulation II-2/23 and this section apply to offshore support vessels constructed on or after 1 July 2010 carrying more than 60 persons on board.

This Section is intended to support a system-based design with guidance to provide a safety center (see 2/3.25) to assist with the management of emergency situations caused by a fire or flooding casualty. The systems listed in this Section are those from SOLAS regulation II-2/23.6, except for ones associated with shell doors and atriums. The functionality of these safety systems should be available from the safety center under any envisaged emergency situation (other than a casualty affecting the safety center itself). The functionality of these systems within the safety center is specified in the tables of this Section. In the tables, design criteria notes are presented which have general application and also application to particular systems.

For OSVs carrying more than 60 but not more than 240 persons on board, special consideration may be given to the layout of the equipment required for the safety center and providing the means to satisfy the appropriate functionality of a system.

For referenced design criteria notes, see Section 3.

### 3 Functionality of Systems

**TABLE 1**  
**Functionality of Systems**  
**Instrumentation and Controls in Safety Center\***  
(MSC.1/Circ.1368, Appendix 1)

<i>Item No.</i>	<i>System</i>	<i>Operation &amp; Control</i>	<i>Monitoring/ Display</i>	<i>Alarm</i>
1	Powered ventilation systems	X	X	X
2	Fire doors	X	X	
3	General emergency alarm system	X		
4	Public address (PA) system	X		
5	Electrically-powered evacuation guidance systems	X		
6	Watertight and semi-watertight doors	X	X	X
7	Television surveillance system, if applicable		X	
8	Fire detection and alarm system	X	X	X
9	Fixed firefighting local application system(s)		X	X
10	Sprinkler and equivalent systems		X	X
11	Water-based systems for machinery spaces		X	X
12	Alarm to summon the crew	X		
13	Flooding detection systems			X
14	Fire pumps and emergency fire pumps	X	X	
--	Design Criteria Notes	General – apply: 3/3.35.1, 3/3.35.2, 3/3.35.3, 3/3.35.6, 3/3.35.7, 3/3.35.8, 3/3.35.9 and 3/3.35.10		

\* Note: See 2/3.25.

**TABLE 2**  
**Functionality of Systems**  
**Instrumentation and Controls on Navigation Bridge with a Continuously Manned**  
**Safety Center\***  
(MSC.1/Circ.1368, Appendix 2)

<i>Item No.</i>	<i>System</i>	<i>Operation &amp; Control</i>	<i>Monitoring/ Display</i>	<i>Alarm</i>
1	Powered ventilation systems			X
2	Fire doors		X	
3	General emergency alarm system	X		
4	Public address (PA) system	X		
5	Watertight and semi-watertight doors	X	X	X
6	Fire detection and alarm system	X	X	X
7	Sprinkler and equivalent systems		X	X
8	Alarm to summon the crew	X		
9	Flooding detection systems			X
10	Fire pump - OSV less than 1,000 gross tonnage	X		
--	Design Criteria Notes	General – apply: 3/3.35.4, 3/3.35.8 and 3/3.35.9 Item 6 – apply: 3/3.35.11 Item 10 – apply: 3/3.35.12		

\* Note: See 2/3.25.

**TABLE 3**  
**Functionality of Systems**  
**Instrumentation and Controls on Navigation Bridge when Safety Center\* is Not**  
**Continuously Manned**  
(MSC.1/Circ.1368, Appendix 3)

<i>Item No.</i>	<i>System</i>	<i>Operation &amp; Control</i>	<i>Monitoring/ Display</i>	<i>Alarm</i>
1	Powered ventilation systems	X		X
2	Fire doors	X	X	
3	General emergency alarm system	X		
4	Public address (PA) system	X		
5	Watertight and semi-watertight doors	X	X	X
6	Television surveillance system, if applicable		X	
7	Fire detection and alarm system	X	X	X
8	Sprinkler and equivalent systems		X	X
9	Alarm to summon the crew	X		
10	Flooding detection systems			X
11	Fire pump - OSV less than 1,000 gross tonnage	X		
--	Design Criteria Notes	General – apply: 3/3.35.5, 3/3.35.8 and 3/3.35.9 Item 2 – apply: 3/3.35.13 Item 7 – apply: 3/3.35.11 Item 11 – apply: 3/3.35.12		

\* Note: See 2/3.25.