UNIFIED INTERPRETATIONS TO SOLAS CHAPTER II-2 AND RELATED FIRE TEST PROCEDURES

Proposed unified interpretations for revised SOLAS chapter II-2 and the FTP Code

Submitted by the United States

SUMMARY

Executive summary: This document contains proposed unified interpretations for the revised SOLAS chapter II-2 and the FTP Code

Action to be taken: Paragraph 7

Related documents: FP 43/INF.4 and MSC/Circ.541

1 The use of combustible materials shall be restricted

There is a need to clarify the requirements for combustible materials used in the construction and arrangements aboard ships in order to fulfill the intent of the SOLAS Convention fire safety objectives. SOLAS regulation II-2/2.1 clearly states the fire safety objective to contain, control, and suppress fire in the compartment of origin. Restricting the use of combustibles (regulation II-2/2.2) is one of the functional requirements embodied in the regulations to achieve this objective. Current construction practices allow such systems as non-essential composite or plastic piping to be used without restriction throughout the ship and, more specifically, throughout concealed spaces that are part of accommodation spaces. Annex 1 proposes a unified interpretation to regulation II-2/2.2 on the restricted use of combustible materials.

2 Exposed interior surfaces

The term “exposed interior surfaces” in regulation II-2/6.2 is analogous to the “low flame-spread” surfaces in regulation II-2/5.3.2.4. Floor coverings are only an “exposed interior surface” when applied in corridors and stairway enclosures. Therefore, floor coverings used in other locations are not required to meet the smoke and toxicity requirements in regulation II-2/6.2. Annex 1 proposes a unified interpretation for regulation II-2/6.2 on exposed interior surfaces.
3 Fire testing of watertight doors

3.1 Confusion exists as to whether watertight doors below the bulkhead deck must be tested to resolution A.754(18) of the FTP Code if used in fire resisting divisions. Regulation II-2/9.4.1.1.2 requires doors and frames in “A” class divisions to be tested in accordance with the FTP Code. MSC/Circ.541 has already addressed doors fitted above the bulkhead deck. MSC/Circ.541 states that doors required to meet both fire-protection and watertight requirements should comply with the fire requirements in regulation II-2/9.4 and water tightness requirements in SOLAS regulation II-1/18.

3.2 Regulation II-2/9.4.1.1.2 exempts watertight doors fitted below the bulkhead deck from being insulated. This specific exemption from insulation demonstrates that there is no expectation for watertight doors below the bulkhead deck to meet the insulation requirements when installed in an ”A-15”, “A-30” or “A-60” division. Annex 1 proposes an interpretation for regulation II-2/9.4.1.1.2 exempting watertight doors below the bulkhead deck from fire testing.

4 Fire doors

4.1 The maximum size fire door that can be approved should be limited to the size that can be tested. Regulation II-2/9.4.1.1.2 requires that fire doors and frames be tested in accordance with the FTP Code. New vessel designs continue to incorporate larger and larger fire doors. These large fire doors are replacing passive bulkheads intended to contain fire in the space of origin. The practice of allowing large, possibly untested, doors to replace bulkheads may decrease reliability of a division.

4.2 These larger door constructions are often larger than can be accommodated in the fire test laboratory furnace. Test dimensions are discussed in paragraphs 2.3.1 and 2.6.1 of resolution A.754(18), for “A” and “B” class respectively. Paragraph 2.3.1 specifically states, “the test specimen should incorporate the maximum size of door…for which approval is to be sought.” Where a fire door is larger than the maximum size tested, the Administration should use regulation II-2/17 to ensure a proper analysis and evaluation of the fire safety design and arrangements.

4.3 Annex 1 proposes an interpretation for regulation II-2/9.4.1.1.2 clarifying the need for proper analysis of fire doors that are too large to test.

5 Spaces having little or no fire risk

5.1 It is unclear what is meant by “spaces having little or no fire risk” in regulations II-2/7.5.2, 9.2.2.3.2.2 and 10.6.1.1. Spaces considered having little or no fire risk are afforded reduced thermal boundaries and are not required to be fitted with a fixed fire detection and alarm system or an automatic sprinkler system. Fire risk is based on both risk of ignition and the expected fire severity. The characteristics that determine the fire risk include, but are not limited to: fire load, material combustibility, surface flammability, ignition hazards, compartment size, compartment use, etc. Consideration should be given to these characteristics when categorizing spaces as having “little or no fire risk.”

5.2 There is concern over the possibility of unrestricted use of combustible materials in the construction of private sanitary facilities and allowing the categorizing of these private sanitary facilities as “spaces having little or no fire risk.” Current construction practices for private sanitary facilities within accommodation spaces do not include automatic sprinklers. It is our
understanding that this is based upon the presumed fire risk of such spaces. As demonstrated by
the research provided in document FP 43/INF.4 (United States), spaces containing composite
materials not meeting low flame-spread requirements can result in a much greater fire severity,
compared to spaces built with low flame-spread materials. The following revised SOLAS II-2
regulations need to be considered in determining the intent of the SOLAS Convention:

.1 Regulation II-2/9.2.2.3.2.2(9) states, “Private sanitary facilities shall be considered
a portion of the space in which they are located.” The use of combustible
materials within accommodation spaces is restricted through regulation II-2/5.
Regulation II-2/5.3.2.1 does not specifically exempt private sanitary facilities
from complying with low flame-spread requirements.

.2 Regulation II-2/10.6.1.1 requires that accommodation spaces be equipped with an
automatic sprinkler system; however, spaces having little or no fire risk need not
be fitted with such a system. Regulation II-2/7.5.2 specifically exempts private
bathrooms from being fitted with smoke detectors without any reference to the
associated fire risk of the space.

5.3 Annex 1 proposes an interpretation for regulations II-2/7.5.2, 9.2.2.3.2.2 and 10.6.1.1 on
spaces having little or no fire risk and to private sanitary facilities being considered such a space.

6 Means of escape

6.1 Direct access to stairway enclosures should be restricted to certain types of spaces such as
corridors and public spaces as discussed in regulation II-2/13.3.2.3. Regulation II-2/3.39 defines
a public space as a portion of an accommodation space which is used for halls, dining rooms,
lounges and similar permanently enclosed spaces. The United States has noted that current
cruise ship designs incorporate large theatres. The portion of the theatre that provides seating is a
public space while the backstage area is an accommodation space. Therefore, the backstage
should not have direct access to stairway enclosures. Permitting such areas to have direct
stairway access constitutes a degradation of the stairway integrity.

6.2 The interpretation at annex 1 for regulation II-2/13.3.2.3, proposes that direct access to
stairway enclosures for public spaces should be limited to those areas intended for public use.

7 Interpretations of the FTP Code

7.1 Editorial change to paragraph 10 of resolution A.653(16).

7.1.1 Paragraph 10 of resolution A.653(16) uses the wording “criteria not exceeding those
listed in the following table.” This can be misleading and may create confusion in understanding
the acceptance criteria since some criteria are minimum and others are maxima. The table
already provides a clear indication of the acceptance criteria. An editorial change should be
made to remove the words “not exceeding those.” The sentence should read: “Materials giving
average values for all of the surface flammability criteria as listed in the following table…”(etc.)”

7.1.2 The interpretation at annex 2 proposes an editorial change to paragraph 10 of the FTP
Code, annex 1, part 5 – resolution A.653(16) on Test for surface flammability.

7.2 Application of hose stream and thermal radiation tests for approval of “A” and “B” class
doors with windows.
7.2.1 The United States proposes that the table in annex 2 be used when applying hose stream and thermal radiation tests. By definition, regulation II-2/3.2.1, “A” class divisions are steel or equivalent. Therefore, the performance should be based on the standard steel bulkhead assembly from resolution A.754(18). Steel bulkheads have the ability to pass the hose-stream test. Therefore, it is reasonable to expect materials “equivalent” to steel to perform similarly. The “B” class divisions need only be constructed of non-combustible material and, therefore, may not have the same strength characteristics as “steel or equivalent” materials.

7.2.2 Thermal radiation through a division could render an escape route unusable or cause ignition in adjacent spaces. Glass is inherently a poor conductor of heat, but can have little resistance to thermal radiation. The United States has chosen 645 cm$^2$ as the maximum size window not requiring the thermal radiation test. The basis for the size is that ignitable materials are not typically stored in way of doors and radiation view factors are quite small for a 645 cm$^2$ window. The United States also recognizes the benefits of having small vision panels. This size is consistent with United States national building standards and is a reasonable size for windows installed as “vision panels.”

**Action requested of the Sub-Committee**

8 The Sub-Committee is invited to consider the above comments and the unified interpretations contained in the attached annexes and take action as appropriate.

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ANNEX 1

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-2

Regulation 2.2 *Restricted use of combustible materials*

Combustible constructions and arrangements should be limited to the minimum quantity practicable. Where combustible construction and arrangements are permitted, consideration should be taken of the fire hazard properties of materials such as their exposed surfaces having low flame spread characteristics. For example, plastic piping should meet the Guidelines for the application of plastic pipes on ships (Resolution A.753(18)).

Regulation 6.2 *Exposed interior surfaces*

Exposed interior surfaces in regulation 6.2 are analogous to the “low flame-spread” surfaces in regulation 5.3.2.4. For the purposes of this regulation, floor coverings are only an exposed interior surface required to meet smoke and toxicity requirements when applied in corridors and stairway enclosures.

Regulation 9.4.1.1.2 *Fire testing of watertight doors*

Steel or equivalent doors fitted below the bulkhead deck that are required to be watertight need not be tested to the Fire Test Procedures Code provided that the doors meet requirements for watertightness in regulation 18 of Chapter II-1.

Regulation 9.4.1.1.2 *Fire door*

The maximum size fire door that can be type approved is that which can be tested, as discussed in Res. A.754(18) paragraphs 2.3.1 and 2.6.1, for “A” and “B” class doors respectively. Where a fire door is larger than the maximum size permitted in the FTP Code, the Administration should use regulation 17 to ensure a proper analysis of the fire safety design and arrangements.

Regulations 7.5.2, 9.2.2.3.2.2, and 10.6.1.1 *Spaces having little or no fire risk*

To be considered a space having little or no fire risk, consideration should be given to the space characteristics such as; material combustibility, surface flammability, ignition hazards, fire load, compartment size, compartment use, etc. For example, stowage of combustible materials in public toilets should be limited to the minimum quantity practicable.

For private sanitary facilities to be considered a space having little or no fire risk, it should be constructed of materials that have low flame spread characteristics and total volume of combustible material in accordance with SOLAS regulation 5.3.2. Any other construction should be evaluated in accordance with regulation 17, including facilities provided with sprinkler system protection.

Regulation 13.3.2.3 *Means of escape*

Direct access to stairway enclosures is only intended for those areas of an accommodation space designed for occupancy by large groups of persons as defined in regulation 3.39 for public spaces. Portions of an accommodation space that serve a purpose different than that of a public space such as theatre backstage areas, should not have direct access to stairway enclosures.

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ANNEX 2

UNITED INTERPRETATIONS OF THE FTP CODE

Resolution A.653(16) Test for surface flammability, Paragraph 10

1 The sentence should read: “Materials giving average values for all of the surface flammability criteria as listed in the following table…(etc)”

Annex 1, Part 3, Appendix 1 and Resolution A.754(18) Test for “A”, “B” and “F” class divisions, Appendix A.I – Windows, paragraph 5

2 The following table should be used when applying hose stream and thermal radiation tests for approval of “A” and “B” class doors with windows.

<table>
<thead>
<tr>
<th>Window Dimension</th>
<th>Door Fire Rating</th>
<th>Hose Stream Test Required?</th>
<th>Heat Flux Test Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 645 cm²</td>
<td>A-Class</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>≥ 645 cm²</td>
<td>A-Class</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>≥ 645 cm²</td>
<td>A-0</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>≤ 645 cm²</td>
<td>B-15</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>≥ 645 cm²</td>
<td>B-15</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Any dimension</td>
<td>B-0</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>