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**HAZARDOUS AREA CLASSIFICATION  
(APPLICATION OF SOLAS REGULATION II-1/45.11)**

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), with a view to providing more specific guidance on hazardous area classification, having considered paragraph 12.32 of the report of the Sub-Committee on Ships Systems and Equipment (SSE 3/16) to the Committee, approved criteria for the application of SOLAS regulation II-1/45.11, as set out in the annex.

2 Member States are invited to use the annexed guidance when applying SOLAS regulation II-1/45.11 to hazardous areas on board ships constructed on or after 1 January 2017, and to bring this guidance to the attention of all parties concerned.

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## ANNEX

### HAZARDOUS AREA CLASSIFICATION (APPLICATION OF SOLAS REGULATION II-1/45.11)

#### **Hazardous area classification in respect of selection of electrical equipment, cables and wiring and positioning of openings and air intakes**

Where the prescriptive requirements within SOLAS and related Codes (IBC and IGC Codes) and the standards published by the International Electrotechnical Commission (IEC), such as, but not limited to, IEC 60092-502, are not aligned, the prescriptive requirements in SOLAS and other relevant IMO instruments should take precedence and be applied. The differences between the above mentioned documents are listed in the appendix, as provided by IACS.

**APPENDIX**

**SUMMARY OF DISCREPANCIES ON THE HAZARDOUS AREA CLASSIFICATION ISSUES AMONG THE SOLAS CONVENTION, THE IBC AND IGC CODES AND STANDARD IEC 60092-502**

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
1	Hazardous area and classification on open deck from the cargo tank ventilation outlet for small flow by thermal variations	<p>Within 5 m radius; SOLAS regulation II-2/11.6.2.2.</p> <p>Reference is made to UI SC70 "Cargo tank vent systems and selection of electrical equipment".</p>			<p>Within 4.5 m radius; IEC 60092-502, 4.2.2.7 and 4.2.3.1.</p> <p>Zone 1: open areas on deck within a 3 m radius. Zone 2: additional 1.5 m beyond Zone 1; IEC 60092-502, 4.2.2.7 and 4.2.3.1.</p>
2	The separation distance of the nearest air intakes for non-hazardous spaces from the tank ventilation outlet for small flow by thermal variations	At least 5 m; SOLAS regulation II-2/11.6.2.2.	<p>At least 10 m; IBC Code, paragraph 8.3.4.2.</p> <p>At least 15 m; IBC Code, paragraph 15.12.1.3 (although toxicity not flammability).</p>	<p>At least 10 m; IGC Code, paragraph 8.2.10 and 2014 amended IGC Code, paragraph 8.2.11.2.</p> <p>Cargo tank PRV vent exits: at least equal to B or 25 m, whichever is less. For ships less than 90 m in length, smaller distances may be permitted; IGC Code, paragraph 8.2.10 and 2014 amended IGC Code, paragraph 8.2.11.1.</p>	At least 6 m; IEC 60092-502, 4.2.2.7, 4.2.3.1 and 8.2.5.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
3	The separation distance of the nearest air intakes for non-hazardous spaces from the tank vent outlets for cargo loading, discharging and ballasting	At least 10 m; SOLAS regulation II-2/4.5.3.4.1.3. At least 10 m; For tankers constructed on or after 1 January 2017 as per resolution MSC.392(95) SOLAS amendments of regulation II-2/11.6.2.2 referring back to regulation II-2/4.5.3.4.1.	At least 10 m; IBC Code, paragraph 12.1.5. At least 15 m; IBC Code, paragraph 15.12.1.3 (although toxicity not flammability).	At least 10 m; IGC Code, paragraph 12.1.6.  Cargo tank PRV vent exits: at least equal to B or 25 m, whichever is less. For ships less than 90 m in length, smaller distances may be permitted; 2014 amended IGC Code, paragraph 8.2.11.1. All other vent outlets connected to the cargo containment system: at least 10 m; 2014 amended IGC Code, paragraph 8.2.11.2.	At least 11.5 m; IEC 60092-502, 4.2.2.8, 4.2.3.2 and 8.2.5.
4	The separation distance of the nearest air intakes for non-hazardous areas from the ventilation exhaust outlet for hazardous areas (i.e. cargo compressor room, cargo pump room, etc.)	MSC.1/Circ.1321, part IV chapter 3, paragraph 1.2: the position of the cargo pump room vent outlet should be arranged at a distance of at least 3 m measured horizontally from any ignition source and from the nearest opening to accommodation, service or machinery spaces.	At least 10 m; IBC Code, paragraph 12.1.5.	At least 10 m; IGC Code, paragraph 12.1.6.  Ventilation ducts, air intakes and exhaust outlets serving artificial ventilation systems shall be positioned in accordance with recognized standards*; 2014 amended IGC Code, paragraph 12.1.5. *IEC60092-502:1999	At least 6 m; IEC 60092-502, 4.2.2.7, 4.2.3.1 and 8.2.5.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
5	Hazardous area and classification on open deck from the cargo shore connection or spillage coaming		Within the coaming required by 3.7.7 or within a 3 m radius beyond the coaming; IBC Code, paragraph 3.7.8. It should be noted that paragraph 3.7.8 only applies to stern or bow loading arrangements.	Within 3 m radius; IGC Code, paragraph 3.8.6. It should be noted that paragraph 3.8.6 of the pre-2014 Code only applies to stern or bow loading arrangements.  Within 3 m beyond the spillage coming up to a height of 2.4 m above the deck; 2014 amended IGC Code, paragraph 1.2.24.15.	Within 4.5 m radius; IEC 60092-502, 4.2.2.10 and 4.2.3.1.  Zone 1: open areas on deck within a 3 m radius, up to a height of 2.4 m above the deck. Zone 2: additional 1.5 m beyond Zone 1; IEC 60092-502, 4.2.2.10 and 4.2.3.1.
6	Opening to main cargo control stations and service spaces not giving access to accommodations, control stations and similar spaces containing sources of ignition	Subject to Administration; SOLAS regulation II-2/4.5.2.2. Note: SOLAS regulation II-2/4.5.2.2 does not categorize the space as hazardous or non-hazardous.	IBC Code, paragraph 3.2.3.		The intent of a minimum distance of 1.5 m from the boundaries of any hazardous area is to be followed; IEC 60092-502, 8.2.5.
7	Openings to accommodation spaces, service spaces, control stations and machinery spaces facing the cargo area	Not less than 4% of L, but not less than 3 m from the end of the superstructure or deckhouse. (This distance need not exceed 5 m); SOLAS regulation II-2/4.5.2.	Not less than 4% of L, but not less than 3 m from the end of the superstructure or deckhouse. (This distance need not exceed 5 m); IBC Code, paragraph 3.2.3.	Not less than 4% of L, but not less than 3 m from the end of the superstructure or deckhouse. (This distance need not exceed 5 m); IGC Code, paragraph 3.2.4 and 2014 amended IGC Code, paragraph 3.2.4.1.	At least 1.5 m from the boundaries of any hazardous area; IEC 60092-502, 8.2.5.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
8	Access doors to forecastle spaces containing source of ignition facing the cargo area	<p>Access doors to forecastle spaces containing source of ignition shall not face the cargo area; SOLAS regulation II-2/4.5.2.1.</p> <p>Access doors to forecastle spaces containing source of ignition shall not face the cargo area and are to be at not less than 3 m from the end of the superstructure or deckhouse. (This distance need not exceed 5 m); SOLAS regulation II-2/4.5.2.1.</p> <p>Reference is made to UI SC120 "Access to forecastle spaces on tankers; SOLAS regulations II-2/4.5.2.1 and 4.5.2.2, IBC Code paragraph 3.2.3 and IGC Code paragraph 3.2.4".</p>	<p>Access doors to forecastle spaces containing source of ignition shall not face the cargo area; IBC Code, paragraph 3.2.3.</p> <p>Reference is made to UI SC120 "Access to forecastle spaces on tankers; SOLAS regulations II-2/4.5.2.1 and 4.5.2.2, IBC Code paragraph 3.2.3 and IGC Code paragraph 3.2.4".</p>	<p>Access doors to forecastle spaces containing source of ignition shall not face the cargo area; IGC Code, paragraph 3.2.4.</p> <p>Accesses to forecastle spaces containing sources of ignition may be permitted through a single door facing the cargo area, provided the doors are located outside hazardous areas as defined in chapter 10; 2014 amended IGC Code, paragraph 3.2.4.4.</p> <p>Reference is made to UI SC120 "Access to forecastle spaces on tankers; SOLAS regulations II-2/4.5.2.1 and 4.5.2.2, IBC Code paragraph 3.2.3 and IGC Code paragraph 3.2.4".</p>	<p>The forecastle spaces installed the access doors facing the cargo area shall be designated as the hazardous area of Zone 2; IEC 60092-502, 4.2.</p> <p>See also IEC 60092-502, 4.2.3.6 as commented in item 18 below.</p>

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
9	Ventilation of cargo pump rooms (cargo handling spaces on chemical and gas carriers)	20 air changes/hour; SOLAS regulation II-2/4.5.4.1 and MSC.1/Circ.1321, part IV, chapter 3, paragraph 1.1.	30 air changes/hour; IBC Code, paragraph 12.1.3.  45 air changes/hour; IBC Code, paragraph 15.17 (toxic).	30 air changes/hour; IGC Code, paragraph 12.1.2 and 2014 amended IGC Code, paragraph 12.1.3.	Spaces containing sources of release: 30 air changes/hour; IEC 60092-502, 8.1.3.  Note: The IEC standard refer to spaces "containing sources of release", while the IBC and IGC Codes refer to spaces for "cargo handling operations".
10	Ventilation of hazardous spaces not containing source of release		20 air changes/hour; spaces normally entered IBC Code, paragraph 12.2.  8 air changes/hour; spaces not normally entered; IBC Code, paragraph 12.3 (16 air changes/hour if portable).		Spaces not containing sources of release: 6 air changes/hour; IEC 60092-502, 8.1.3.
11	Concentration of gas implying that space is non-hazardous (alarm limits)	10% LFL (Lower Flammable Limit) for cargo pump rooms in tankers; SOLAS regulation II-2/4.5.10.1.3.  30% LFL for all ballast tanks and void spaces of double-hull and double-	10% LFL for cargo pump room; IBC Code, paragraph 11.1.1.7 (resolution MSC.219(82)), clarifying that SOLAS regulation II-2/4.5.10 applies, in which case "hydrocarbon gases" are	Alarms should be activated for flammable products when the vapour concentration reaches 30% of the lower flammable limit, for the spaces of paragraph 13.6.7 of the IGC Code;	30% LFL; IEC 60092-502, 8.4.2.  Note: The requirement of the standard applies to spaces protected by over-pressure.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
		bottom spaces adjacent to the cargo tanks in oil tankers of 20,000 tonnes deadweight and above; SOLAS regulation II-2/4.5.7.3 and the FSS Code, chapter 16, paragraph 2.2.3.3.	replaced by "flammable vapours".	IGC Code, paragraph 13.6.10.  30% LFL for the spaces specified in paragraph 13.6.2 of the amended IGC Code; 2014 amended IGC Code, paragraph 13.6.15.	
12	Fan monitoring (air lock)			Monitoring of current or power in the electrical supply is accepted; IGC Code, paragraph 3.6.4 (MSC/Circ.406).  Where spaces are protected by pressurization, the ventilation shall be designed and installed in accordance with recognized standards*; 2014 amended IGC Code, paragraph 3.6.2.  *IEC 60092-502(1999). As per the Note to 8.4.3 of the standard, a fan motor or a fan rotation monitoring device will not satisfy this requirement.	Motor running or rotating fan monitoring device is not accepted; IEC 60092-502, 8.4.3.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
13	Tanks for heated cargo	<p>Tanker requirements apply to tankers carrying cargo with FP below 60°C; SOLAS regulation II-2/1.6.1.</p> <p>For petroleum cargoes with FP of 60°C and above only deck foam requirements apply; SOLAS regulation II-2/1.6.4.</p> <p>Hazardous zone classification and electrical installation shall be complied with; IEC 60092-502(1999); SOLAS regulation II-1/45.11.</p>	<p>Follows SOLAS principle related to flashpoint. However, the IBC Code considers non-flammable (NF) products and products with a flashpoint of 60°C and above in a different way (paragraphs 11.1.2 and 11.1.3);</p> <p>In the case of a heated cargo, carriage conditions might need to be established and the requirements for cargoes having a flashpoint not exceeding 60°C applied; IBC Code, regulation 10.1.6.</p>		<p>When carrying cargoes heated to temperature within 15°C of their flash point, hazardous zone classification for tankers carrying cargoes with FP not exceeding 60°C applies; IEC 60092-502, 4.3.2 referring back to 4.2.</p>
14	Classification of cargo pump-room	<p>Hazardous zone classification and electrical installation shall be complied with; IEC 60092-502(1999); SOLAS regulation II-1/45.11.</p>		<p>IGC Code, paragraph 1.3.17.7; 2014 amended IGC Code, paragraph 1.2.24.6.</p>	<p>IEC 60092-502, 4.1.4.1 Table 1 and 4.2.2.4 may indicate that cargo pump-rooms are Zone 1. However, as ventilation is only running during cargo handling, the requirements may be interpreted that it is Zone 0 (flag Administration position may be required).</p>

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
15	Discontinuation of ventilation for long periods		Spare parts shall be carried for each type of ventilation fan required on board; IBC Code, paragraph 12.1.9.	<p>Spare parts shall be carried for each type of ventilation fan required on board; IGC Code, paragraph 12.1.10.</p> <p>Where fans are required, full required ventilation capacity for each space shall be available after failure of any single fan, or spare parts shall be provided comprising a motor, starter spares and complete rotating element, including bearings of each type; 2014 amended IGC Code, paragraph 12.1.8.</p>	IEC 60092-502, 8.3.1 includes an assumption that ventilation shall not be discontinued for long periods.
16	Gas carrier ballast tanks			Ballast tanks may be connected to pumps in machinery spaces; IGC Code, paragraph 3.7.4; 2014 amended IGC Code, paragraph 3.7.5.	Ballast tanks on gas carriers, separated from a hold space, where cargo is carried in a cargo tank requiring a secondary barrier, by a single gastight boundary, are hazardous areas Zone 1.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
17	Gas carrier hold space				Hold spaces of gas carriers (except those with C-tanks), where a secondary barrier is required, are considered hazardous areas Zone 0; IEC 60092-502, 4.4.1 and annex D.
18	Access to forward spaces below level of main deck	Access openings to service spaces, control stations and machinery spaces are not to face the cargo area; SOLAS regulation II-2/4.5.2. Reference is made to UI SC120 "Access to forecastle spaces on tankers; SOLAS regulations II-2/4.5.2.1 and 4.5.2.2, IBC Code, paragraph 3.2.3 and IGC Code, paragraph 3.2.4".	Reference is made to UI SC120 "Access to forecastle spaces on tankers; SOLAS regulations II-2/4.5.2.1 and 4.5.2.2, IBC Code paragraph 3.2.3 and IGC Code paragraph 3.2.4".	Reference is made to UI SC120 "Access to forecastle spaces on tankers; SOLAS regulations II-2/4.5.2.1 and 4.5.2.2, IBC Code paragraph 3.2.3 and IGC Code paragraph 3.2.4".	It is implied that as long as the sill height is above 0.5 m then it is exempted from SOLAS and can face the cargo area; IEC 60092-502, 4.2.3.6.
19	Hazardous zone classification on main deck of tankers with deck girders				The entire deck area up to 2.4 m is considered as Zone 1 if deck girders are provided as they are considered to restrict natural ventilation; IEC 60092-502, 4.2.2.11.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
20	Hazardous zone in way of P/V-breaker	<p>SOLAS regulation II-2/11.6.2.2: at least 5 m.</p> <p>SOLAS amended regulation II-2/11.6.2.2 as per resolution MSC.392(95): at least 10 m for tankers constructed on or after 1 January 2017.</p>			<p>10 m from a cargo gas outlet intended for the passage of large volumes of gas or vapour mixture during cargo loading; IEC 60092-502, 4.2.2.8 &amp; 4.2.3.2 based on UI SC140, otherwise 4.5 m from a P/V breaker which does not release large volumes of gas or vapour locally; IEC 60092-502, 4.2.2.7 &amp; 4.2.3.1.</p>
21	Location of fan motors for cargo pump room and compressor room		To be located outside ducts; IBC Code, paragraph 12.1.8.	To be located outside ducts; IGC Code, paragraph 12.1.9. 2014 amended IGC Code, paragraph 12.1.7.	IEC 60092-502; follows zone classification. i.e. if Zone 0, outside ventilation duct (based on 6.5.2). If Zone 1, inside OK, provided certified for Zone 1.
22	Openings to accommodation spaces, service spaces, control stations and machinery spaces facing the cargo area	Shall not face the cargo area. Can be located at the transverse bulkhead not facing the cargo area, at a distance of at least 4% of the length of the ship but not less than 3 m from the end of the superstructure or	Shall not face the cargo area. They shall be located on the end bulkhead not facing the cargo area and/or on the outboard side of the superstructure or deck-house at a distance of at least 4% of the length (L)	Should not face the cargo area. They should be located on the end bulkhead not facing the cargo area or on the outboard side of the superstructure or deck-house or on both at a distance of at least 4% of	Access doors or other openings shall not be provided between an area intended to be considered as non-hazardous and a hazardous area, or between a space intended to be

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
		<p>deckhouse facing the cargo area. This distance need not exceed 5 m; SOLAS regulation II-2/4.5.2.1.</p> <p>Refer to SOLAS regulation II-2/4.5.2.2 for permitted access doors to main cargo control stations and service spaces and to wheelhouse doors and windows.</p>	<p>of the ship but not less than 3 m from the end of the superstructure or deck-house facing the cargo area. This distance, however, need not exceed 5 m. Refer to same paragraph for permitted access doors to spaces not having access to accommodation and service spaces and control stations, and wheelhouse doors and windows; IBC Code, paragraph 3.2.3.</p>	<p>the length (L) of the ship but not less than 3 m from the end of the superstructure or deck-house facing the cargo area. This distance, however, need not exceed 5 m. Refer to same paragraph for wheelhouse doors and windows; IGC Code, paragraph 3.2.4.</p> <p>2014 amended IGC Code: paragraphs 3.2.4.1 and 3.2.4.2 (same requirements, except the amended Code uses "shall" instead of "should").</p>	<p>considered as Zone 2 and a Zone 1 space except where required for operational reasons. Where access doors or other openings are provided for operational reasons, 4.1.5.2, 4.1.5.3, 4.1.5.4 or 4.1.5.5 apply; IEC 60092-502, 4.1.5.</p> <p>Where a space has an opening into an adjacent, more hazardous space or area, it may be made into a less hazardous space or non-hazardous space by pressurisation designed and operated in accordance with the requirements given in 8.2 and 8.4; IEC 60092-502, 8.1.4.</p> <p>Note: SOLAS and Codes refer to permitted openings of spaces, while the IEC standard defines hazardous areas.</p>

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
23	Protection by over-pressure			IGC Code, paragraph 12.1.4. 2014 amended IGC Code, paragraph 12.1.4.	Protection by over-pressure where a non-hazardous space has openings into a hazardous space; IEC 60092-502, 8.4.
24	Air locks			IGC Code, paragraph 3.6. 2014 amended IGC Code, paragraph 3.6.	IEC 60092-502, 4.1.5.3.
25	Earthed distribution systems and hull return systems	<p>Earthed distribution systems shall not be used in a tanker. The Administration may exceptionally permit in a tanker the earthing of the neutral for alternating current power networks of 3,000 V (line to line) and over, provided that any possible resulting current does not flow directly through any of the dangerous spaces; SOLAS regulation II-1/45.4.1.</p> <p>The hull return system of distribution shall not be used for any purpose in a tanker; SOLAS regulation II-1/45.3.1.</p>			<p>Distribution systems: Distribution systems shall comply with the provisions of IEC 60092-201. Both insulated and earthed distribution systems are permitted; systems with a hull or structure return, other than those noted under 5.2.2, are not permitted; IEC 60092-502, 5.2.1.</p> <p>The following systems are permitted to be of hull or structure return type:</p> <ul style="list-style-type: none"> <li>- limited and locally earthed systems</li> </ul>

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999
		<p>The above regulation does not preclude under conditions approved by the Administration the use of:</p> <ul style="list-style-type: none"> <li>- impressed current cathodic protective systems;</li> <li>- limited and locally earthed systems; or</li> <li>- insulation level monitoring devices provided the circulation current does not exceed 30 mA under the most unfavourable conditions.</li> </ul> <p>SOLAS regulation II-1/45.3.2.</p>			<p>outside any hazardous area;</p> <ul style="list-style-type: none"> <li>- intrinsically-safe systems;</li> <li>- impressed current cathodic protective systems;</li> </ul> <p>IEC 60092-502, 5.2.2.</p> <p>The neutral and any conductor required for protection against electric shock shall not be connected together or combined in a single conductor in a hazardous area; IEC 60092-502, 5.2.3.</p>
26	Hazardous zone classification on main deck of tankers	Hazardous zone classification and electrical installation shall be complied with IEC 60092-502(1999); SOLAS regulation II-1/45.11.	IBC Code, chapter 10: IEC 60092-502(1999).	IGC Code, paragraph 1.3.17.8. 2014 amended IGC Code, paragraph 1.2.24.9.	The cargo tanks, including all ballast tanks with cargo tank area; IEC 60092-502, 4.2.2.11 and 4.2.3.5 (areas on open deck over cargo tanks as per the above IEC paragraphs do not coincide with the definition of the cargo area in SOLAS or the Codes).