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REVISED 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 contained in *Hazardous area classification (application of SOLAS regulation II-1/45.11)* (MSC.1/Circ.1557).

2 The Maritime Safety Committee, at its 107th session (31 May to 9 June 2023), approved draft amendments to the aforementioned guidance (MSC.1/Circ.1557) in order to address inconsistencies between the standard IEC 60092-502 published by the International Electrotechnical Commission (IEC) and relevant IMO instruments, prepared by the Sub-Committee on Ship Systems and Equipment, at its ninth session (27 February to 3 March 2023), for circulation of the Revised Guidance as MSC.1/Circ.1557/Rev.1, as set out in the annex.

3 Member States are invited to use the annexed Revised Guidance when applying SOLAS regulation II-1/45.11 to hazardous areas on board ships constructed on or after 1 October 2023, and to bring this Revised Guidance to the attention of all parties concerned.

4 This circular supersedes MSC.1/Circ.1557.

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ANNEX

**REVISED HAZARDOUS AREA CLASSIFICATION
(APPLICATION OF SOLAS REGULATION II-11/45.11)**

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 60092-502:1999, 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 60092-502:1999

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
1	Hazardous area and classification on open deck from the cargo tank ventilation outlet for small flow by thermal variations	Within 5 m radius; SOLAS regulation II-2/11.6.2.2. Reference is made to UI SC70.			Within 4.5 m radius; IEC 60092-502:1999, 4.2.2.7 and 4.2.3.1. Zone 1: open areas on deck within a 3 m radius. Zone 2: additional 1.5 m beyond Zone 1; IEC 60092-502:1999, 4.2.2.7 and 4.2.3.1.	Per UI SC70 and MSC.1/Circ.1120: Areas on open deck, or semi-enclosed spaces on open deck, within 3 m of cargo tank ventilation outlets which permit the flow of small volumes of vapour or gas mixtures caused by thermal variation are defined as Zone 1. Areas within 2 m beyond the zone specified above are to be considered Zone 2.
2	The separation distance of the nearest air intakes for non-hazardous spaces from the tank ventilation outlet for small flow by thermal	At least 10 m; the openings shall be arranged in accordance with SOLAS regulation II-2/4.5.3.4.1 of referred to in	At least 10 m; IBC Code, paragraph 8.3.4.2. At least 15 m; IBC Code, paragraph 15.12.1.3 (although toxicity not	At least 10 m; IGC Code, paragraph 8.2.11.2. Cargo tank PRV vent exits: at least equal to B or 25 m,	At least 6 m; IEC 60092-502:1999, 4.2.2.7, 4.2.3.1 and 8.2.5.	For oil tankers, and chemical and gas carriers, the requirements of SOLAS, IBC Code and IGC Code are to be met, as

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
	variations.	SOLAS regulation II-2/11.6.2.	flammability).	whichever is less. For ships less than 90 m in length, smaller distances may be permitted; IGC Code, paragraph 8.2.11.1.		applicable.
	Hazardous zone in way of P/V breaker	SOLAS regulation II-2/11.6.2.2: at least 10 m.			10 m from a cargo gas outlet intended for the passage of large volumes of gas or vapour mixture during cargo loading; IEC 60092-502:1999, 4.2.2.8 & 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 60092-502:1999, 4.2.2.7 and 4.2.3.1.	For tankers, a minimum distance of 10 m applies.
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; SOLAS regulation II-2/11.6.2.2 referring back to SOLAS 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,	At least 11.5 m; IEC 60092-502:1999, 4.2.2.8, 4.2.3.2 and 8.2.5.	For oil tankers, and chemical and gas carriers, the requirements of SOLAS, IBC Code and IGC Code are to be met, as applicable. Any other

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
				smaller distances may be permitted; IGC Code, paragraph 8.2.11.1. All other vent outlets connected to the cargo containment system: at least 10 m; IGC Code, paragraph 8.2.11.2.		requirement on the location of air intakes and openings such as in SOLAS regulation II-2/4.5.2, IBC Code 3.2, IGC Code 3.2 is to be also complied with.
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, paragraph12.1.6. Ventilation ducts, air intakes and exhaust outlets serving artificial ventilation systems shall be positioned in accordance with recognized standards;* IGC Code, paragraph 12.1.5. *IEC60092-502:1999	At least 6 m; IEC 60092-502:1999, 4.2.2.7, 4.2.3.1 and 8.2.5.	For oil tankers, the minimum distance of MSC.1/Circ.1321 to be met. For chemical tankers, IBC Code 12.1.5 applies. For gas carriers, the minimum distance of 6 m per IEC standard 60092-502:1999 applies.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
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 beyond the spillage coming up to a height of 2.4 m above the deck; IGC Code, paragraph 1.2.24.15.	Within 4.5 m radius; IEC 60092-502:1999, 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 60092-502:1999, 4.2.2.10 and 4.2.3.1.	For bow and stern loading/unloading arrangements on oil tankers reference is made to IACS UR F16.
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 60092-502:1999, 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 3.2.4.1.	At least 1.5 m from the boundaries of any hazardous area; IEC 60092-502:1999, 8.2.5.	

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
8	Access doors to forecastle spaces containing source of ignition facing the cargo area	Access doors to forecastle spaces containing source of ignition shall not face the cargo area; SOLAS regulation II-2/4.5.2.1. 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. Reference is made to UI SC120.	Access doors to forecastle spaces containing source of ignition shall not face the cargo area; IBC Code, paragraph 3.2.3. Reference is made to UI SC120.	Access doors to forecastle spaces containing source of ignition shall not face the cargo area; IGC Code, paragraph 3.2.4.1. 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; IGC Code, paragraph 3.2.4.4. Reference is made to UI SC120.	The forecastle spaces installed the access doors facing the cargo area shall be designated as the hazardous area of Zone 2; IEC 60092-502:1999, 4.2. See also IEC 60092- 502:1999, 4.2.3.6 as commented in item 18 below.	
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,	30 air changes/hour; IBC Code, paragraph 12.1.3. 45 air	30 air changes/hour; IGC Code, paragraph 12.1.3.	Spaces containing sources of release: 30 air changes/hour; IEC 60092-502:1999, 8.1.3.	For oil tankers, SOLAS regulation II-2/4.5.4.1 applies. (Reference is also made to IACS UR F21)

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
		paragraph 1.1.	changes/hour; IBC Code, paragraph 15.17 (toxic).		Note: The IEC standard refer to spaces "containing sources of release", while the IBC and IGC Codes refer to spaces for "cargo handling operations".	For chemical tankers, the IBC Code requirements apply. For gas carriers, the IGC Code requirements apply. Note: The IEC standard refers to spaces "containing sources of release", while the IBC and IGC Codes refer to spaces for "cargo handling operations". Further, IEC does not consider the threat of toxicity.
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 60092-502:1999, 8.1.3.	The IBC Code categorization differs from that of IEC (spaces not normally entered not containing cargo handling equipment vs spaces not containing sources of release).

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
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- 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.	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 replaced by "flammable vapours".	Alarms shall be activated for flammable products when the vapour concentration reaches 30% of the lower flammable limit, for the spaces of paragraph 13.6.2 of the IGC Code; IGC Code, paragraph 13.6.15.	30% LFL; IEC 60092-502:1999, 8.4.2. Note: The requirement of the standard applies to spaces protected by over-pressure.	IEC 60092-502:1999, 8.4.2 applies to spaces protected by over-pressure. This is not considered equivalent to a cargo pump-room.
12	Fan monitoring (air lock)			Where spaces are protected by pressurization, the ventilation shall be designed and installed in accordance with recognized standards;* IGC	Motor running or rotating fan monitoring device is not accepted; IEC 60092-502:1999, 8.4.3.	Monitoring of current or power supply is not as reliable as a differential pressure or flow monitoring device.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
				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.		
13	Tanks for heated cargo	Tanker requirements apply to tankers carrying cargo with FP below 60°C; SOLAS regulation II-2/1.6.1. For petroleum cargoes with FP of 60°C and above only deck foam requirements apply; SOLAS regulation II-2/1.6.4. Hazardous zone classification and electrical installation shall be complied with; IEC	Follows SOLAS principle related to flashpoint. However, the IBC Code considers non-flammable products and products with a flashpoint of 60°C and above in a different way (paragraphs 11.1.2 and 11.1.3); In the case of a heated cargo, carriage conditions might need to be established and the requirements for cargoes having a flashpoint not		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 60092-502:1999, 4.3.2 referring back to 4.2.	IEC 60092-502:1999, 4.3.2 and the IBC Code, paragraph 10.1.6 are in agreement. SOLAS cites do not specifically address heated cargo.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
		60092-502:1999; SOLAS regulation II-1/45.11.	exceeding 60°C applied; IBC Code, paragraph 10.1.6.			
14	Classification of cargo pump-room	Hazardous zone classification and electrical installation shall be complied with; IEC 60092- 502:1999; SOLAS regulation II-1/45.11.		IGC Code, paragraph 1.3.17.7; IGC Code, paragraph 1.2.24.6.	IEC 60092-502:1999, 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).	If hazardous area classification is dependent on ventilation, then ventilation is not expected to be discontinued.
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.	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; IGC Code, paragraph 12.1.8.	IEC 60092-502:1999, 8.3.1 includes an assumption that ventilation shall not be discontinued for long periods.	

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
16	Gas carrier ballast tanks			Ballast tanks may be connected to pumps in machinery spaces; 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.	
17	Gas carrier hold space				Hold spaces of gas carriers (except those with type C tanks), where a secondary barrier is required, are considered hazardous areas Zone 0; IEC 60092-502:1999, 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.	Reference is made to UI SC120.	Reference is made to UI SC120.	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 60092-502:1999, 4.2.3.6.	1. SOLAS regulations II-2/4.5.2.1 and 4.5.2.2, etc. restrict the installation of openings (e.g. doors) facing cargo areas. 2. IEC60092-502:1999 4.2.3.6 addresses classification of hazardous areas.

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
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 structures are provided as they are considered to restrict natural ventilation; IEC 60092-502:1999, 4.2.2.11.	IACS considers that a more reasonable criterion might be that the zone from deck level up to the top of the structures should be zone 1 and the remaining zone up to 2.4 m should be considered zone 2.
20	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 12.1.7.	IEC 60092-502:1999; 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.	
21	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 deckhouse facing	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) of the ship but not less than 3 m from the end of the	Shall not face the cargo area. They shall 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 the length (L) of the ship but not less than 3 m from the	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 considered as Zone 2 and a Zone 1 space except where required for	

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
		the cargo area. This distance need not exceed 5 m; SOLAS regulation II-2/4.5.2.1. 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.	superstructure or deckhouse 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.	end of the superstructure or deckhouse 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.	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 60092-502:1999, 4.1.5. 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 pressurization designed and operated in accordance with the requirements given in 8.2 and 8.4; IEC 60092-502:1999, 8.1.4. Note: SOLAS and Codes refer to permitted openings of spaces, while the IEC standard defines hazardous areas.	

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
22	Air locks			IGC Code, paragraph 3.6.	IEC 60092-502:1999, 4.1.5.3.	The IGC Code is more specific for air locks installed between the hazardous area on the open weather deck and non-hazardous spaces, also attention is to be paid to the audible and visual alarm on both sides of air lock.
23	Earthed distribution systems and hull return systems	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			Distribution systems: Distribution systems shall comply with the provisions of IEC 60092-201:2019. 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 60092-502:1999, 5.2.1.	

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
		regulation II-1/45.4.1. The hull return system of distribution shall not be used for any purpose in a tanker; SOLAS regulation II-1/45.3.1. The above regulation does not preclude under conditions approved by the Administration the use of: – impressed current cathodic protective systems; – limited and locally earthed systems; or – insulation level monitoring devices provided the circulation current does not exceed			The following systems are permitted to be of hull or structure return type: – limited and locally earthed systems outside any hazardous area; – intrinsically-safe systems; – impressed current cathodic protective systems; IEC 60092-502:1999, 5.2.2. 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 60092-502:1999, 5.2.3.	

No.	Title	SOLAS	IBC	IGC	IEC 60092-502:1999	Explanatory Notes
		30 mA under the most unfavorable conditions. SOLAS regulation II-1/45.3.2.				
24	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 1.2.24.9.	The cargo tanks, including all ballast tanks with cargo tank area; IEC 60092-502:1999, 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).	