Ballast Water Management Systems

Object of Amendment

Rules/Guidance for Ballast Water Management Installations

Reason for Amendment

IACS Unified Requirements (UR) M74 and F45 stipulate detailed requirements regarding Ballast Water Management Systems (BWMS) and these have already been incorporated into the NK Rules.

Although each UR individually specifies requirements for ventilation corresponding to BWMS installation area, IACS felt this was not a desirable situation given the intended purpose of each UR; so, it decided to resolve said situation by revisiting and reviewing the URs.

As a result of its review, IACS amended URs M74 and F45 to merge the requirements for ventilation corresponding to BWMS installation area specified in both URs into a new section in UR M74, revisiting arrangement requirements for BWMS Technology Categorisation for tankers, etc. IACS, furthermore, adopted amended versions of each UR as UR M74 (Rev.3) and UR F45 (Rev.1).

Accordingly, relevant requirements in the NK Rules are amended based on the above.

Outline of the Amendment

The main amendments are as follows.

(1) Clarify isolation arrangements between ballast piping serving ballast tanks inside and outside of the cargo areas of tankers. In addition, amend BWMS arrangement requirements for tankers.
(2) Revisit fire categorisations and ventilation requirements applicable to machinery spaces where a BWMS is installed therein.

Effective Date and Application

This amendment applies to BWMS which are installed on ships that fall under the following:

(1) Those for which the date of contract for construction is on or after 1 January 2027.
(2) For the ships other than (1) above, those for which the retrofitting, replacement or major conversion of BWMS is carried out on or after 1 January 2027.

ID:DX25-09

Amended	Original	Remarks
RULES FOR BALLAST WATER MANAGEMENT INSTALLATIONS **Part 4 REQUIREMNETS FOR BALLAST WATER MANAGEMENT SYSTEM INSALLATION** **Chapter 2 ARRAGEMENT, PIPING, ELECTRICAL INSTALLATIONS, ETC.** **2.1 General** **2.1.1 Terminology** The following definitions apply throughout this chapter. ((1) to (3) are omitted.) (4) "Dangerous liquid" means any liquid that is identified as hazardous in the Material Safety Data Sheet (*MSDS*) or other documentation relating to the liquid. Whether a liquid is identified as hazardous may depend on the concentration of that liquid, e.g. hypochlorite solutions of 0.1 % are considered non-hazardous. ((5) and (6) are omitted.) (7) "Airlock" means a space enclosed by gastight steel bulkheads with two gastight doors spaced not more than 2.5 *m* apart. Such doors are to be self-closing without holding back arrangements. Air locks are to have mechanical ventilation and are not to be used for	**RULES FOR BALLAST WATER MANAGEMENT INSTALLATIONS** **Part 4 REQUIREMNETS FOR BALLAST WATER MANAGEMENT SYSTEM INSALLATION** **Chapter 2 ARRAGEMENT, PIPING, ELECTRICAL INSTALLATIONS, ETC.** **2.1 General** **2.1.1 Terminology** The following definitions apply throughout this chapter. ((1) to (3) are omitted.) (4) "Dangerous liquid" means any liquid that is identified as hazardous in the Material Safety Data Sheet (*MSDS*) or other documentation relating to the liquid. ((5) and (6) are omitted.) (Moved)	UR M74 (Rev.3) para.2.4 UR F45 (Rev.1) para.1.2.1 Moved from 3.1.1(1), Chapter 3

Amended	Original	Remarks
other purposes. Audible and visual alarm systems to give warnings on both sides of the air lock are to be provided to indicate when more than one door is moved from its closed position. Air lock spaces are to be monitored for the dangerous gases defined **(3)** above. (8) "Ballast water management room" (*BWMR*) means any space containing equipment belonging to the *BWMS*. Spaces containing remote controls for *BWMS* or spaces dedicated to the storage of liquid or solid chemicals for *BWMS* need not be considered a *BWMR*.	(Moved)	UR F45 (Rev.1) para.1.2.3 Moved from 3.1.1(3), Chapter 3

Amended-Original Requirements Comparison Table (Ballast Water Management Systems)

Amended	Original	Remarks

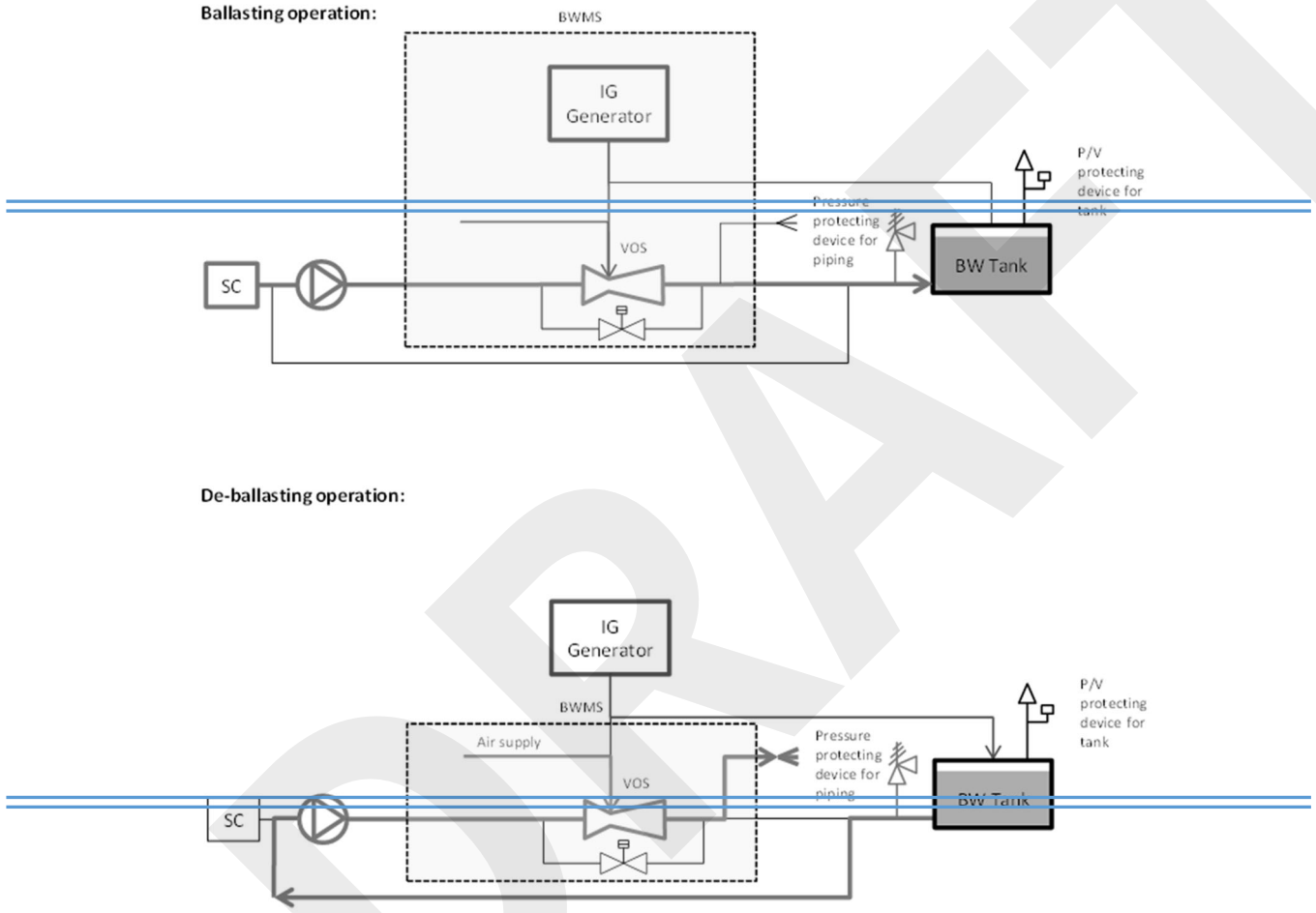
Table 2.1.1-2 Applicability of the Requirements for Each *BWMS* Technology Category

BWMS technology category →	1	2	3a	3b	3c	4	5	6	7a	7b	8
Requirements ↓	In-line UV or UV + Advanced Oxidation Technology (AOT) or UV + TiO2 or UV + Plasma	In-line flocculation	In-line membrane separation and de-oxygenation (injection of N_2 from N_2 generator)	In-line de-oxygenation (injection of inert gas from inert gas generator)	In-tank de-oxygenation with inert gas generator	In-line full-flow electrolysis	In-line side-stream electrolysis	In-line (stored) chemical injection	In-line side-stream ozone injection without gas/liquid separation tank and without discharge treatment tank	In-line side-stream ozone injection with gas/liquid separation tank and discharge water treatment tank	In-tank pasteurisation and de-oxygenation with N_2 generator
2.2.1	x	x	x	x	x	x	x	x	x	x	x
2.2.2			x	x	x						x
2.2.3-1 and **-2**				x	x				x	x	
2.2.3-1 and **-3** to **-~~6~~5**						x	x	x			
2.2.3-~~7~~6 and **-~~8~~7**	x	x	x	x		x	x	x	x	x	
2.2.3-~~9~~8 to **-~~14~~13**	X	x	x	x	x	x	x	x	x	x	x
2.2.3-~~15~~14 to **2.2.3-~~17~~16**	x	x	x	x		x	x	x	x	x	
2.2.4-1(1)		x	x			x	x	x	x	x	x
2.2.4-1(2)			x	x	x				x	x	x
2.2.4-1(3)									x	x	
2.2.4-1(4)						x	x	x	x	x	
2.2.4-1(5)						x	x	x			
2.2.4-1(6)			x	x	x				x	x	x

UR M74 (Rev.3)
Table of TB file

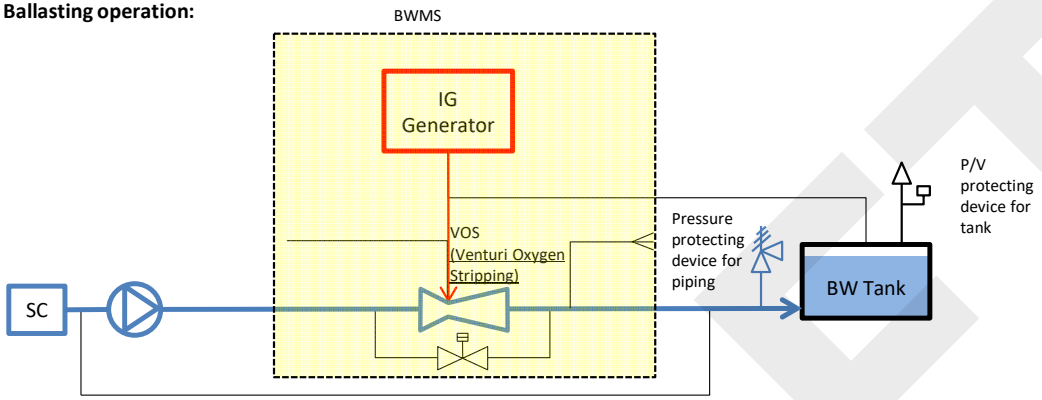
Amended-Original Requirements Comparison Table (Ballast Water Management Systems)

Amended				Original								Remarks
2.2.4-2(1) to (~~7~~5)		x	x	x	x	x	x	x	x	x	x	
2.2.4-2(~~8~~6)			x			x	x	x	x	x	x	
2.2.4-2(~~9~~7) ~~and (11)~~			x			x	x	x	x	x	x	
~~2.2.4-2(10)~~			~~x~~						~~x~~	~~x~~	~~x~~	
2.2.4-3		x				x	x	x	x	x		
2.2.4-4						x	x	x	x	x		
2.2.5-1(1) to (4)						x	x	x				
2.2.5-1(5)		x	x	x	x	x	x	x	x	x	x	
2.2.5-1(6)			x			x	x	x	x	x	x	
2.2.5-1(7)			x						x	x	x	
2.2.5-1(8)			x			x	x	x	x	x	x	
2.2.5-2(1)		x	x	x	x	x	x	x	x	x	x	
2.2.5-2(2)			x								x	
2.2.5-2(3)						x	x	x				
2.2.5-2(4)									x	x		
2.2.5-2(5)									x	x		
2.2.5-3(1)	x	x	x	x	x	x	x	x	x	x	x	
2.2.5-3(2)		x	x	x	x	x	x	x	x	x	x	
2.2.5-3(3) and (4)		x	x	x	x	x	x	x	x	x	x	
2.2.5-3(5)		x	x	x	x	x	x	x	x	x	x	
2.2.~~5~~6				x						x		

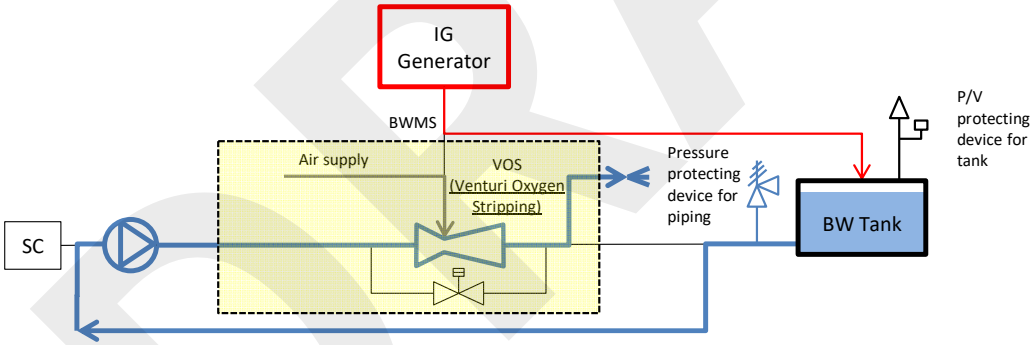
Amended	Original	Remarks
Fig. 2.1.1-1(4) *BWMS* Technology Group 3b: In-line De-oxygenation (Injection of Inert Gas from either an Oil-fired Inert Gas Generator or Inert Gas from Treatment of the Flue Gas from Main or Auxiliary Boilers)  		UR M74 (Rev.3) Annex II clarification for VOS

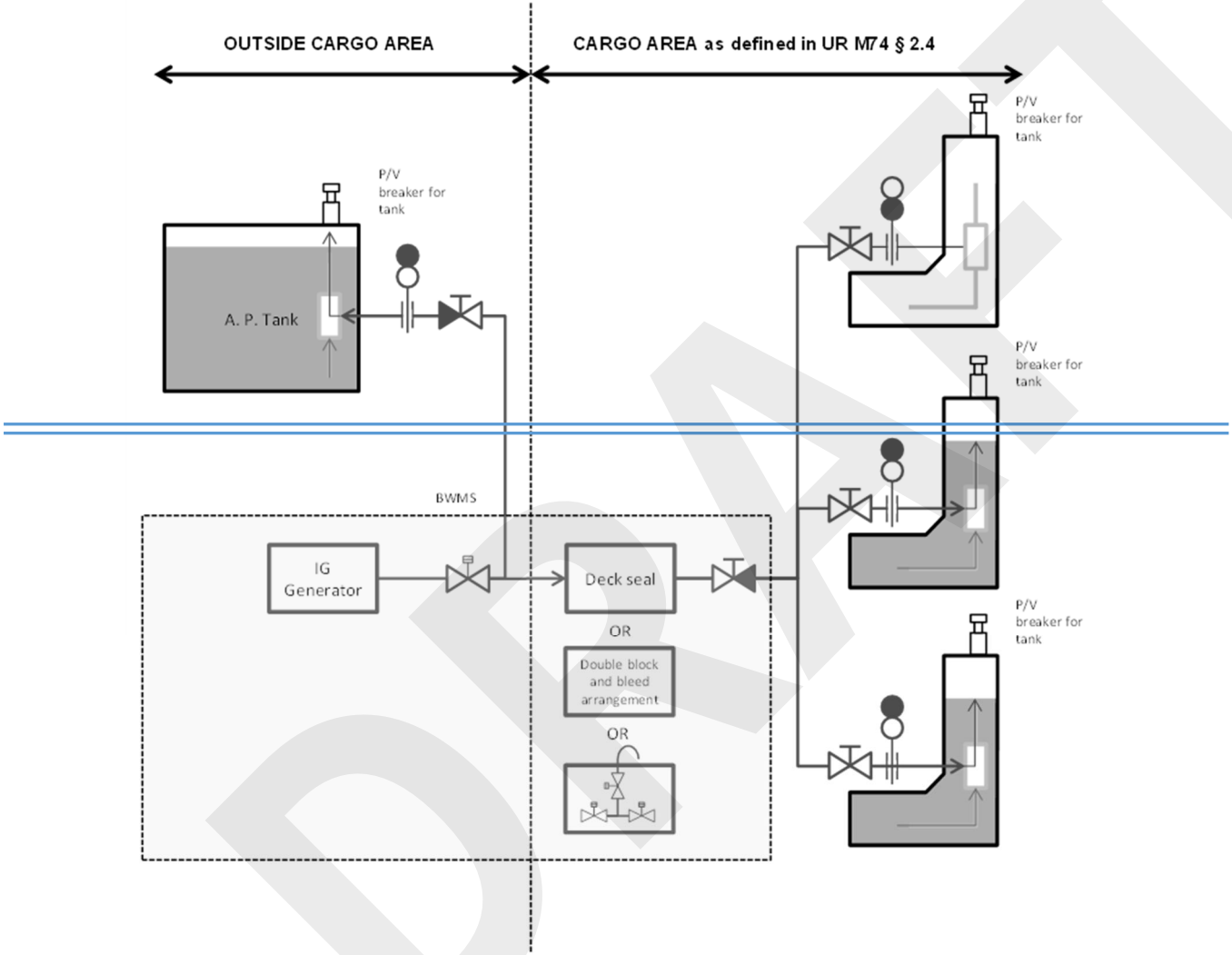
Amended	Original	Remarks

Ballasting operation:

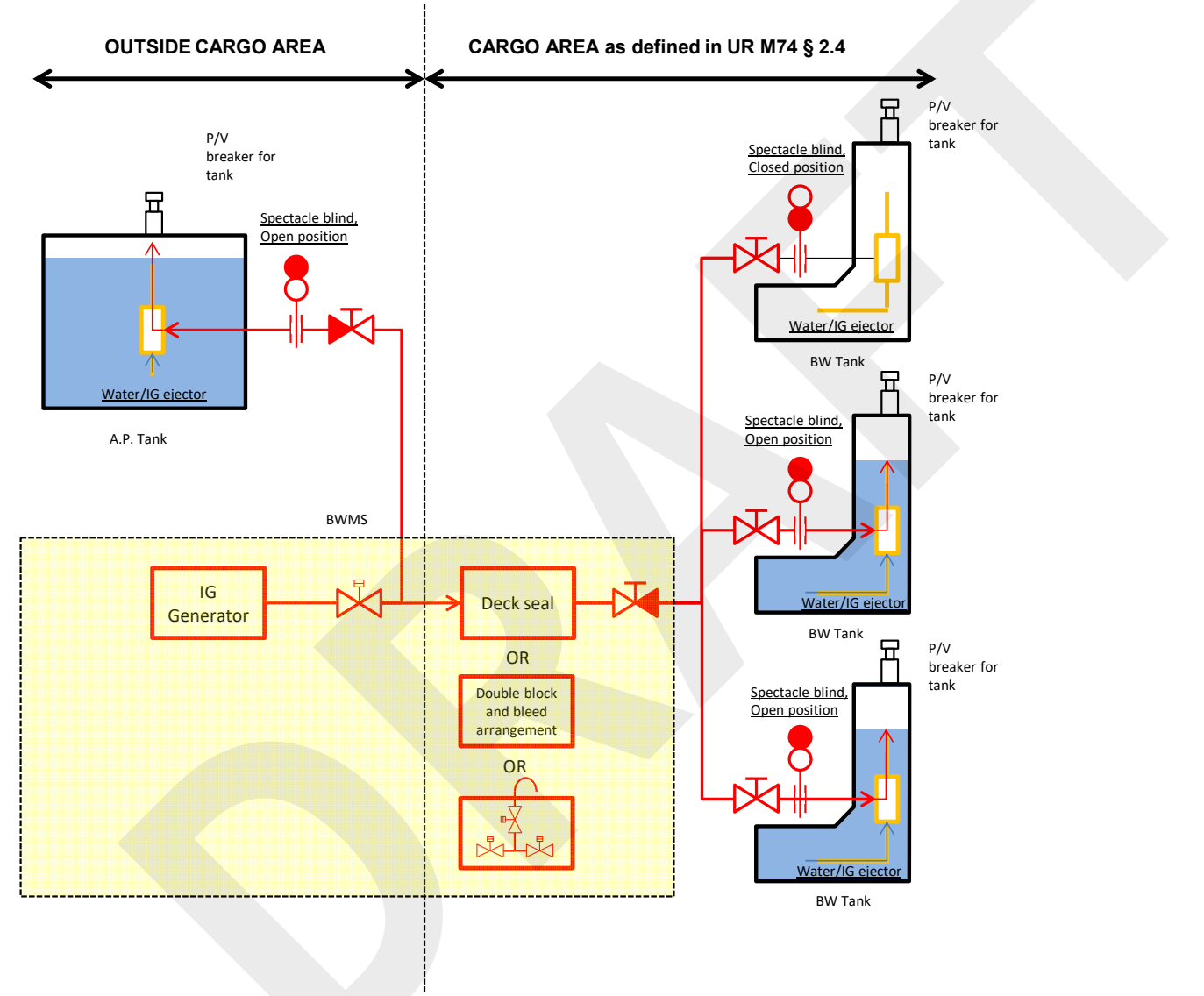


De-ballasting operation:



Amended	Original	Remarks
Fig. 2.1.1-1(5) *BWMS* Technology Group 3c: In-tank De-oxygenation with IGG  		UR M74 (Rev.3) Annex II

Amended	Original	Remarks



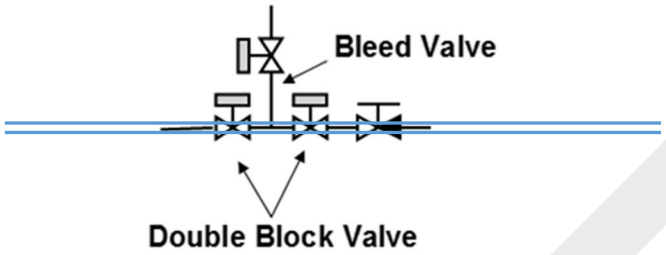
Amended-Original Requirements Comparison Table (Ballast Water Management Systems)

Amended	Original	Remarks
2.2 Installation	**2.2 Installation**	
2.2.1 General Requirements	**2.2.1 General Requirements**	
9 Monitoring functions of *BWMS* belong to system category I when applying **Part X of the Rules for the Survey and Construction of Steel Ships**. In cases where by-pass valves are integrated into valve remote control systems, it may be decided that the ballast transfer remote control systems belong to system category II or higher.	**9** In general, *BWMS* monitoring functions of *BWMS* belong to system category I when applying **Part X of the Rules for the Survey and Construction of Steel Ships**. However, in cases where by-pass valves are integrated into valve remote control systems, such by-pass valves belong to the system category II for ballast transfer remote control systems.	UR M74 (Rev.3) para.3.1.4
2.2.3 Requirements for Tankers*	**2.2.3 Requirements for Tankers**	
(Deleted)	**4** *BWMS* category 4 may be acceptable in cargo compressor rooms of liquefied gas carriers and inside cargo pump rooms of oil tankers or chemical tankers when such rooms are located above cargo tank decks.	UR M74 (Rev.3) Deletion of Note 1) for para.3.2.1.2
4 (Omitted)	**5** (Omitted)	
5 (Omitted)	**6** (Omitted)	
6 In general, two independent *BWMS* are required (e.g. one for ballast tanks located within cargo areas and one for ballast tanks located outside cargo areas). Specific arrangements where only one in-line *BWMS* may be accepted are given in **Table 2.2.3-1** and **Fig. 2.2.3-3**. A *BWMS* category 1 which is used for treatment of the discharge from ballast tanks in the cargo area, is to be located in the cargo area.	**7** In general, two independent *BWMS* are required (e.g. one for ballast tanks located within cargo areas and one for ballast tanks located outside cargo areas). Specific arrangements where only one in-line *BWMS* may be accepted are given in **Table 2.2.3-1** and **Fig. 2.2.3-3**.	UR M74 (Rev.3) para.3.2.2
7 (Omitted)	**8** (Omitted)	
8 (Omitted)	**9** (Omitted)	
9 The appropriate isolation arrangements described in -**8** above are to be one of following **(1)** to **(3)**. For *BWMS* categories 2, 3a, 4 and 9, only the following **(1)** is acceptable. (1) Two non-return valves with positive means of closing in series with spool pieces (**Fig. 2.2.3-1(1)**). As an alternative to such positive means of closing,	**10** The appropriate isolation arrangements described in -**9** above are to be one of following **(1)** to **(3)**. For BWMS categories 2, 3a, 4 and 9, only the following **(1)** is acceptable. (1) Two non-return valves with positive means of closing in series with spool pieces (**Fig. 2.2.3-1(1)**). As an alternative to such positive means of closing,	UR M74 (Rev.3) Note for paras.3.2.3.1.1, 3.2.3.1.2 and 3.2.3.1.3

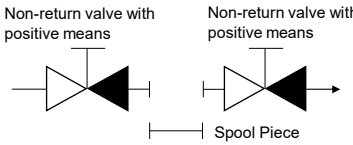
Amended	Original	Remarks
additional valves having such means of closing may be provided between non-return valves and spool pieces **(Fig. 2.2.3-1(2))**. (2) Two non-return valves with positive means of closing in series with liquid seals at least 1.5 m in depth (**Fig. 2.2.3-1(3)**). As an alternative to such positive means of closing, additional valves having such means of closing may be provided between non-return valves and liquid seals **(Fig. 2.2.3-1(4))**. For ships operating in cold weather conditions, freeze protection is to be provided for water seals (portable heating systems may be accepted for this purpose). (3) Automatic double block and bleed valves and non-return valves with positive means of closing (**Fig. 2.2.3-1(5)**). As an alternative to such positive means of closing, additional valves having such means of closing may be provided after non-return valves **(Fig. 2.2.3-1(6))**.	additional valves having such means of closing may be provided between non-return valves and spool pieces. (2) Two non-return valves with positive means of closing in series with liquid seals at least 1.5 m in depth (**Fig. 2.2.3-1(2)**). As an alternative to such positive means of closing, additional valves having such means of closing may be provided between non-return valves and liquid seals. For ships operating in cold weather conditions, freeze protection is to be provided for water seals (portable heating systems may be accepted for this purpose). (3) Automatic double block and bleed valves and non-return valves with positive means of closing (**Fig. 2.2.3-1(3)**). As an alternative to such positive means of closing, additional valves having such means of closing may be provided after non-return valves.	
Fig. 2.2.3-1 Means of Appropriate Isolation ~~(1)~~  ~~(2)~~  		UR M74 (Rev.3) para.3.2.3.1.1, 3.2.3.1.2 and 3.2.3.1.3 The current figures (1) to (3) are replaced with new figures (1) to (6).

Amended	Original	Remarks

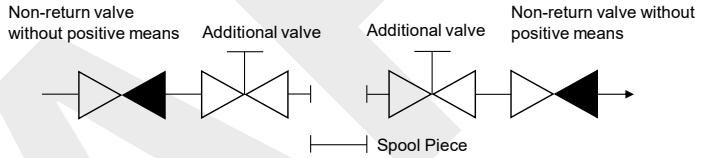
~~(3)~~



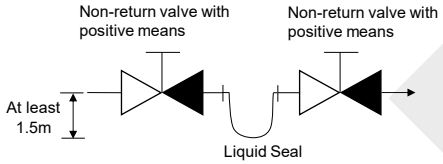
(1) Means of appropriate isolation for **2.2.3-9(1)**



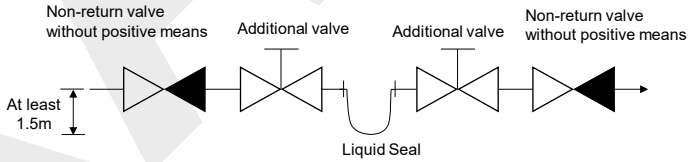
(2) Alternative to positive means for **2.2.3-9(1)**



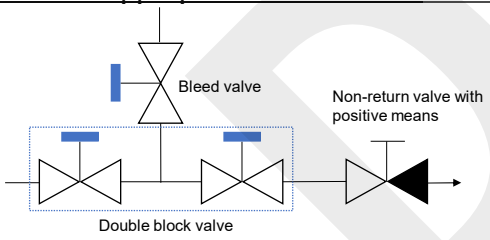
(3) Means of appropriate isolation for **2.2.3-9(2)**



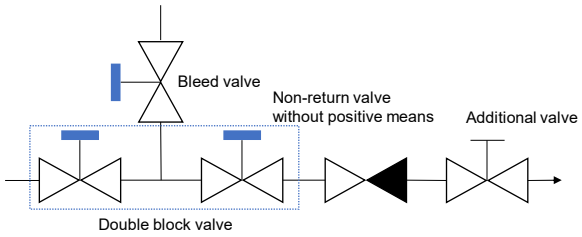
(4) Alternative to positive means for **2.2.3-9(2)**



(5) Means of appropriate isolation for **2.2.3-9(3)**



(6) Alternative to positive means for **2.2.3-9(3)**



Amended-Original Requirements Comparison Table (Ballast Water Management Systems)

Amended	Original	Remarks
10 The appropriate isolation arrangements described in -8 and -9 above are to be provided on open decks in cargo areas. However, according to **-13** and **-14** below, the means of appropriate isolation for piping up to 50.8 *mm* for active substances, N2 gas, inert gas, neutraliser liquids, fresh water, compressed air or sea water may be provided in an enclosed space in the cargo area (e.g. a cargo pump room).	**11** The appropriate isolation arrangements described in -9 and -10 above are to be provided on open decks in cargo areas.	UR M74 (Rev.3) para.3.2.3.2
11 When fore peak tanks are ballasted with piping systems serving other ballast tanks within cargo areas in accordance with **D14.3.2, Part D of the Guidance for the Survey and Construction of Steel Ships**, the appropriate isolation arrangements described in **-8** and **-9** above are not required between fore peak tanks and common ballast water piping serving the other ballast tanks within the cargo area.	**12** When fore peak tanks are ballasted with piping systems serving other ballast tanks within cargo areas in accordance with **D14.3.2, Part D of the Guidance for the Survey and Construction of Steel Ships**, the appropriate isolation arrangements described in **-9** and **-10** above are not required between fore peak tanks and common ballast water piping serving the other ballast tanks within the cargo area.	
12 As indicated in **Table 2.2.3-1** and **Fig. 2.2.3-3**, the appropriate isolation arrangements described in **-8** and **-9** above are necessary for interconnections in BWMS piping for active substances, N2 gas, inert gas, neutraliser liquid, freshwater (e.g. for cleaning), compressed air (e.g. for remaining water purge) or sea water (e.g. for adjusting the salinity or supply of water to an ejector), etc.	**13** As indicated in **Table 2.2.3-1** and **Fig. 2.2.3-3**, the appropriate isolation arrangements described in -9 and -10 above are necessary for interconnections in BWMS piping such as N2 gas piping, inert gas piping, neutraliser liquid piping, freshwater piping for filter cleaning, compressed air piping for remaining water purge and sea water piping for adjusting the salinity, etc.	UR M74 (Rev.3) Note 2 for para.3.2.3.1
13 Notwithstanding **-12** above, alternative means of isolation may be considered by the Society for piping up to 50.8 *mm* and active substances, N2 gas, inert gas, neutraliser liquid, fresh water, compressed air or sea water.	**14** Notwithstanding **-13** above, alternative means of isolation may be considered by the Society for the active substance piping and neutraliser piping with diameters not exceeding 50.8 *mm*.	UR M74 (Rev.3) Note 2 for para.3.2.3.1
14 Sampling lines connected to the ballast water piping systems serving tanks in cargo areas are to satisfy the following **-15** for the purpose of the following **(1)** and **(2)**. ((1) and (2) are omitted.)	**15** Sampling lines connected to the ballast water piping systems serving tanks in cargo areas are to satisfied the following **-16** for the purpose of the following **(1)** and **(2)**. ((1) and (2) are omitted.)	
15 The "sampling lines" described in **-14** above are to satisfy the following **(1)** and **(2)**. (1) Such lines are not to be led into non-hazardous enclosed spaces outside cargo areas.	**16** The "sampling lines" described in **-15** above are to satisfy the following **(1)** and **(2)**. (1) Such lines are not to be led into non-hazardous enclosed spaces outside cargo areas.	

Amended	Original	Remarks
(2) The appropriate isolation arrangements described in **-9** to **-13** above for interconnections need not be applied to such lines. **16** Notwithstanding **-15(1)** above, sampling lines may be led into non-hazardous enclosed spaces outside cargo areas provided they satisfy the following **(1)** to **(6)**. An example arrangement of sampling lines led into non-hazardous enclosed spaces outside cargo areas is provided in **Fig. 2.2.3-2**. ((1) to (6) are omitted.)	(2) The appropriate isolation arrangements described in **-10** to **-14** above for interconnections need not be applied to such lines. **17** Notwithstanding **-16(1)** above, sampling lines may be led into non-hazardous enclosed spaces outside cargo areas provided they satisfy the following **(1)** to **(6)**. An example arrangement of sampling lines led into non-hazardous enclosed spaces outside cargo areas is provided in **Fig. 2.2.3-2**. ((1) to (6) are omitted.)	UR M74 (Rev.3) Note (3) for Annex I Table 1

Table 2.2.3-1 In-line *BWMS* Technology Categorization
(Does not cover categories 3c and 8)

		1	2	3a	3b	4	5	6	7a	7b
BWMS technology category →		In-line UV, UV with advanced oxidation technology (AOT), UV with TiO2 or UV with plasma	In-line flocculation	In-line membrane separation and de-oxygenation (injection of N2 from N2 generator)	In-line de-oxygenation (injection of inert gas from inert gas generator)	In-line full-flow electrolysis	In-line side-stream electrolysis (3)	In-line (stored) chemical injection	In-line side-stream ozone injection without gas/liquid separation tank and discharge water treatment tank	In-line side-stream ozone injection with gas/liquid separation tank and discharge water treatment tank
Characteristics ↓										
Disinfection when ballasting	Making use of active substance		X			X	X	X	X	X
	Full flow of ballast water is	X	X	X	X	X				X

Amended-Original Requirements Comparison Table (Ballast Water Management Systems)

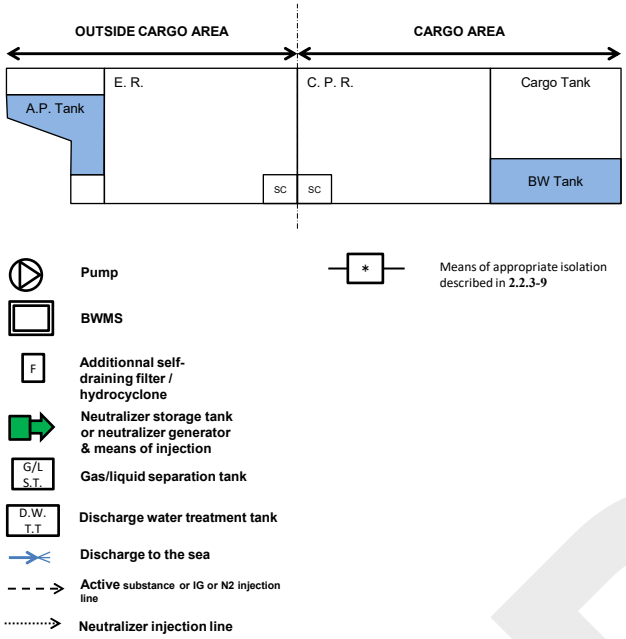
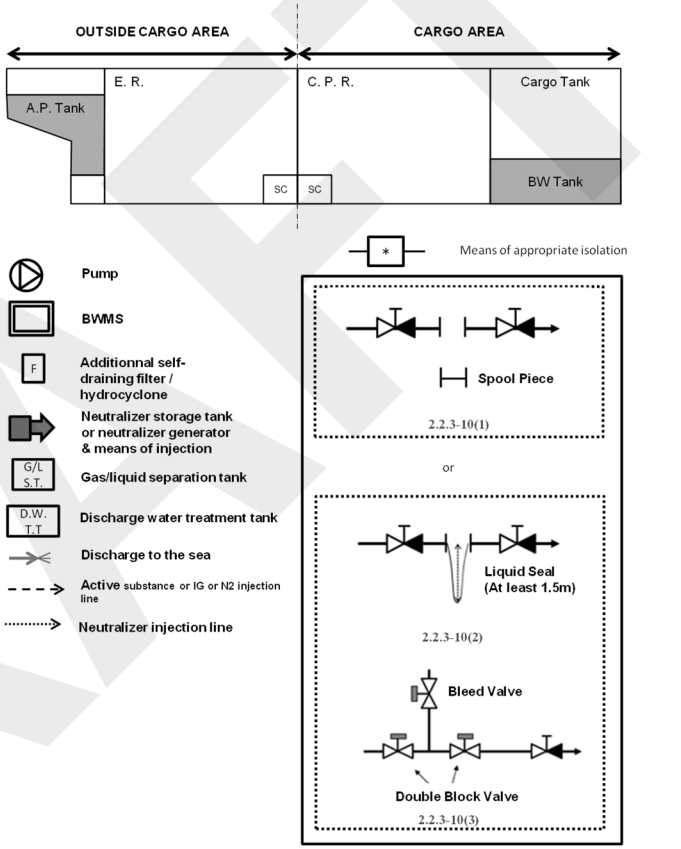
Amended											Original	Remarks
	passing through the *BWMS*											
	Only a small part of ballast water is passing through the *BWMS* to generate the active substance						X					
After-treatment when de-ballasting	Full flow of ballast water is passing through the *BWMS*	X								X		
	Injection of neutraliser					X	X	X	X	X		
	Not required by the Type Approval Certificate issued by the Administration		X	X								
Examples of dangerous gas as defined in **2.1.1(3)**			(1)	O_2 N_2	CO_2, CO	H_2, Cl_2	H_2, Cl_2	(1)	O_2, O_3, N_2			
Arrangement of one *BWMS*	*BWMS* is located outside cargo area	Not Acceptable (3)	**Fig.2.2.3-3(2)** (2)	**Fig.2.2.3-3(2)** (2)	**Fig.2.2.3-3(3)**	**Fig.2.2.3-3(4)** (2)	**Fig.2.2.3-3(5)**	**Fig.2.2.3-3(6)**	**Fig.2.2.3-3(7)**	**Fig.2.2.3-3(8)** (2)		

Notes

1 To be investigated on a case-by-case basis based on the result of the *IMO (GESAMP) MEPC* report for basic and final approval in accordance with the G9 Guideline.

2 Isolation arrangements between ballast piping serving ballast tanks located within cargo areas and ballast piping serving ballast tanks located outside cargo areas are only subject to **2.2.3-9(1)**.

3 For *BWMS* in category 1 which require treatment both for ballasting and de-ballasting operations, it is not acceptable with one single *BWMS* located outside cargo area. Refer to the above Table and **Fig. 2.1.1-1(1)** (*BWMS* Technology Group 1).

Amended	Original	Remarks
Fig. 2.2.3-3 Arrangements with only one in-line BWMS Fig. 2.2.3-3(1) Explanation of symbols used in figure	Fig. 2.2.3-3 Arrangements with only one in-line BWMS Fig. 2.2.3-3(1) Explanation of symbols used in figure	Update of appropriate isolation arrangements according to 2.2.3-9
		
2.2.4 Special Requirements for *BWMS* Categories 2, 3a, 3b, 3c, 4, 5, 6, 7a, 7b and 8 **1** Where the *BWMS* operating principle involves generation of dangerous gas, the following **(1)** to **(6)** are to be satisfied.	**2.2.4 Special Requirements for *BWMS* categories 2, 3a, 3b, 3c, 4, 5, 6, 7a, 7b and 8** **1** Where the *BWMS* operating principle involves generation of dangerous gas, the following **(1)** to **(6)** are to be satisfied.	UR M74 (Rev.3) para.3.3.1.5 Moved to 2.2.5-1(1) and

Amended-Original Requirements Comparison Table (Ballast Water Management Systems)

Amended	Original	Remarks
((1) to (4) are omitted) (5) Measures for hydrogen (i.e. *BWMS* categories 4, 5 and 6) (Moved) (Moved) (a) Audible and visual alarms and automatic *BWMS* shut-down are to be arranged so as to activate when respectively high and high-high levels of H_2 concentrations are detected. (b) Open ends of the hydrogen by-product enriched gas relieving devices are to be led to the safe locations on open decks described in **2.2.1-13(4)**. (6) (Omitted)	((1) to (4) are omitted) (5) Measures for hydrogen (i.e. *BWMS* categories 4, 5 and 6) (a) Redundant ventilation fans and monitoring of ventilation systems are to be provided when hydrogen de-gassing arrangements are provided. (b) Ventilation fans are to be certified as explosion proof and have spark arrestors to avoid ignition sources from developing within ventilation systems in which remaining H_2 gas may be present in dangerous concentrations. (c) Audible and visual alarms and automatic *BWMS* shut-down are to be arranged so as to activate when respectively high and high-high levels of H_2 concentrations are detected. (d) Open ends of the hydrogen by-product enriched gas relieving devices are to be led to the safe locations on open decks described in **2.2.1-13(4)**. (6) (Omitted)	(2)
2 Where piping conveys active substances, by-products or neutralisers that contain dangerous gases or dangerous liquids, the following **(1)** to **(6)** are to be satisfied. This applies to injection lines conveying dangerous gases or dangerous liquids but does not apply to ballast water lines where dangerous gases or dangerous liquids are diluted. ((1) to (4) are omitted) (5) Pipe length and number of connections are to be minimised. Piping system routing is to be kept away from heat sources, ignition sources and other sources that may react hazardously with the dangerous gases or liquids conveyed inside. Pipes are to be suitably supported and protected from mechanical damage. (Moved)	**2** Where piping conveys active substances, by-products or neutralisers that contain dangerous gases or dangerous liquids, the following **(1)** to **(11)** are to be satisfied. This applies to injection lines conveying dangerous gases or dangerous liquids but does not apply to ballast water lines where dangerous gases or dangerous liquids are diluted. ((1) to (4) are omitted) (5) Pipe length and number of connections are to be minimised.	(5) - UR M74 (Rev.3) para.3.3.2.2 (6) - UR M74 (Rev.3) para.4.1.2 Moved to 2.2.5-1(5) (7) - UR M74 (Rev.3) para.3.3.2.4 Moved to (5) (9) - UR M74 (Rev.3) para.4.1.3 Moved to 2.2.5-1(6) (10) - UR M74 (Rev.3)

Amended	Original	Remarks
	(6) The insides of double-walled spaces or pipe ducts constructed as the special safeguards for the purpose of **(2)** above are to be equipped with mechanical exhaust ventilation leading to the safe locations on open decks described in **2.2.1-13(4)**, **(7)** or **(8)** above.	para.4.1.4 Moved to 2.2.5-1(7) (11) - UR M74 (Rev.3) para.4.1.5 Moved to 2.2.5-1(8)
(Moved)	(7) Piping system routing is to be kept away from heating sources, ignition sources and other sources that may react hazardously with the dangerous gases or liquids conveyed inside. Pipes are to be suitably supported and protected from mechanical damage.	
(6) (Omitted)	(8) (Omitted)	
(Moved)	(9) H_2 by-product enriched air vent pipes (i.e. *BWMS* categories 4, 5 and 6) or O_2 enriched air vent pipes (i.e. *BWMS* categories 3a, 7a, 7b and 8) or O_3 piping (i.e. *BWMS* categories 7a and 7b) are not to be routed through accommodation spaces, services spaces and control stations.	
(Moved)	(10) O_2 enriched air vent pipes (i.e. *BWMS* categories 3a, 7a, 7b and 8) are not to be routed through hazardous areas unless they are arranged as follows. (a) Within double-walled pipes or pipe ducts as described in **(2)** above (b) Provided with gas detection as described in **2.2.4-1(4)** (c) Provided with mechanical exhaust ventilation as described in **(6)** above	
(Moved)	(11) The routing of H_2 by-product enriched air vent pipes (i.e. *BWMS* categories 4, 5 and 6) and O_2 enriched air vent pipes (*BWMS* categories 3a, 7a, 7b and 8) is to be as short and as straight as possible. When necessary, horizontal portions may be arranged with a minimum slope in accordance with manufacturer recommendations.	

Amended	Original	Remarks
2.2.5 Ventilation **1** In cases where ventilation systems for *BWMR* generating dangerous gas or dealing with dangerous liquids are arranged, the following **(1)** to **(8)** are to be satisfied:	**(Newly added)** (Newly added)	Moved from 3.6, Chapter 3 UR M74 (Rev.3) para.4.1
(1) For *BWMS* categories 4, 5 and 6 provided with the hydrogen de-gas arrangements, the venting arrangement is to be provided with redundant fans and redundant monitoring.		UR M74 (Rev.3) para.4.1.1 Moved from 2.2.4-1(5)(a)
(2) The ventilation fan required by **(1)** above is to be of a non-sparking type and have a motor of a certified safe type when installed in hazardous areas or the ventilation ducts of de-gas arrangements. As a minimum, a ventilation system is to have a flame arrester or flame screen at the ventilation outlet to avoid ignition sources to enter the ventilation systems where residual H_2 gas may be present in dangerous concentrations.		UR M74 (Rev.3) para.4.1.1 Moved from 2.2.4-1(5)(b)
(3) In the case of the loss of ventilation, visual and audible alarms are to be activated both inside and outside the *BWMR* and at locations where crew members are on duty. If ventilation is not restored after a pre-set time, the *BWMS* is to automatically shut-down. Any need for cooldown necessary for safe shut-down is to be considered in the shut-down sequences.		UR M74 (Rev.3) para.4.1.1
(4) *BWMS* are not to be started without ventilation systems running.		UR M74 (Rev.3) para.4.1.1
(5) The insides of double-walled spaces or pipe ducts constructed as the special safeguards for the purpose of **2.2.4-2(2)** are to be equipped with mechanical exhaust ventilation leading to the safe locations on open decks described in **2.2.1-13(4)**, **(7)** or **(8)**.		UR M74 (Rev.3) para.4.1.2 Moved from 2.2.4-2(6)

Amended	Original	Remarks
(6) H_2 by-product enriched air vent pipes (i.e. *BWMS* categories 4, 5 and 6) or O_2 enriched air vent pipes (i.e. *BWMS* categories 3a, 7a, 7b and 8) or O_3 piping (i.e. *BWMS* categories 7a and 7b) are not to be routed through accommodation spaces, services spaces and control stations.		UR M74 (Rev.3) para.4.1.3 Moved from 2.2.4-2(9)
(7) O_2 enriched air vent pipes (i.e. *BWMS* categories 3a, 7a, 7b and 8) are not to be routed through hazardous areas unless they are arranged as follows. (a) They are within double-walled pipes or pipe ducts as described in **2.2.4-2(2)**. (b) They are provided with the gas detection described in **2.2.4-1(4)**. (c) They are provided with the mechanical exhaust ventilation described in **(5)** above.		UR M74 (Rev.3) para.4.1.4 Moved from 2.2.4-2(10)
(8) The routing of H_2 by-product enriched air vent pipes (i.e. *BWMS* categories 4, 5 and 6) and O_2 enriched air vent pipes (*BWMS* categories 3a, 7a, 7b and 8) is to be as short and as straight as possible. When necessary, horizontal portions may be arranged with a minimum slope in accordance with manufacturer recommendations.		UR M74 (Rev.3) para.4.1.5 Moved from 2.2.4-2(11)
2 Ventilation systems for *BWMR* are to satisfy the following **(1)** to **(5)**.	(Newly added)	UR M74 (Rev.3) para.4.2 Moved from 3.6.1, Chapter 3
(1) Ventilation systems for *BWMR* containing *BWMS* for the following **(a)** to **(d)** purposes are to be independent of ventilation systems serving other spaces. (a) Storing, using or generating chemical substances (b) De-oxygenation, including pasteurisation and de-oxygenation (i.e. *BWMS* categories 3 and 8) (c) Electrolysis (d) Ozone injection		UR M74 (Rev.3) para.4.2.1

Amended	Original	Remarks
(2) Ventilation exhausts for *BWMR* containing nitrogen generators are to be located in the lower parts of spaces in order to efficiently disperse dangerous gases heavier than air.		UR M74 (Rev.3) para.4.2.2
(3) Ventilation exhausts for *BWMR* containing electrolysis systems are to be located so as to be able to efficiently disperse dangerous gases that may be generated during electrolysis. Due regard is to be paid to the expected quantity and density of such gases when designing the ventilation exhaust.		UR M74 (Rev.3) para.4.2.3
(4) Ventilation ducts serving *BWMR* for ozone-based *BWMS* are to satisfy the following **(a)** to **(c)**. (a) Parts of ducts located outside *BWMR* are to be made of steel having thicknesses of at least 3 *mm* for ducts with free cross-sectional areas of less than 0.075 m^2, thicknesses of at least 4 *mm* for ducts with free cross-sectional areas between 0.075 m^2 and 0.45 m^2 and thicknesses of at least 5 *mm* for ducts with free cross-sectional areas exceeding 0.45 m^2. (b) Ducts are to be suitably supported and stiffened. (c) The outside openings of ducts are to be fitted with protective screens of not more than 13 *mm* ×13 *mm* mesh.		UR M74 (Rev.3) para.4.2.4
(5) Ventilation systems for *BWMR* containing ozone-based *BWMS* are to be interlocked with the *BWMS* in accordance with the following **(a)** and **(b)**. (a) In the case of the loss of ventilation, visual and audible alarms are to be activated both inside and outside the *BWMR* and at locations where responsible members of the crew are on duty. If ventilation is not restored after a pre-set time, the *BWMS* is to automatically shut-down. Any need		UR M74 (Rev.3) para.4.2.5

Amended	Original	Remarks
for cooldown necessary for safe shut-down is to be considered in shut-down sequences. (b) *BWMS* are not to be started without ventilation systems running.		
3 Ventilation rates for *BWMR* are to satisfy the following **(1)** to **(5)**.	(Newly added)	UR M74 (Rev.3) para.4.3 Moved from 3.6.2, Chapter 3
(1) An adequate power ventilation system is to be provided in enclosed *BWMR*.		UR M74 (Rev.3) para.4.3.1
(2) The ventilation capacity is to be at least 30 air changes per hour where explosive or toxic gases may be generated during operation of the *BWMS*. The *IMO* reports issued during the basic and final approval procedures in accordance with *IMO (GESAMP) MEPC* report and "safety hazard" as listed in **Chapter 17, Part S of the Rules for the Survey and Construction of Steel Ships** are to be used as references for identifying those cases.		UR M74 (Rev.3) para.4.3.2
(3) The ventilation capacity may be reduced as in the following **(a)** to **(f)**. (a) Flocculation-type *BWMS*: 6 air changes per hour (b) De-oxygenation, incl. pasteurisation and de-oxygenation (categories 3 and 8): 6 air changes per hour (c) Full flow electrolysis: 6 air changes per hour (d) Side-stream electrolysis: 20 air changes per hour (e) Ozone injection: 20 air changes per hour (f) Chemical injection: 6 air changes per hour		UR M74 (Rev.3) para.4.3.3
(4) Notwithstanding **(1)** to **(3)** above, more stringent ventilation capacity requirements in other parts of the NK Rules like **Part S of the Rules for the Survey and Construction of Steel Ships** may apply to spaces located in cargo areas.		UR F45 (Rev.1) Note for para.4.3.3

Amended	Original	Remarks
(5) Provided that the *BWMS* is in a well-ventilated area in the engine room to prevent accumulation of vapours and gases, **-2** and **(1)** to **(3)** above need not to be complied with.	(Newly added)	UR M74 (Rev.3) para.4.2.6 and TB for UR M74 (Rev.3) - Point of discussion, para.2
2.2.6 Other Requirements	**2.2.5 Other Requirements**	
Chapter 3 FIRE SAFETY MEASURES	**Chapter 3 FIRE SAFETY MEASURES**	
3.1 General	**3.1 General**	
3.1.1 Terminology The definitions in above **Chapter 2** apply throughout this chapter.	**3.1.1 Terminology** The following definitions apply throughout this chapter.	
(Moved)	(1) "Airlock" means a space enclosed by gastight steel bulkheads with two gastight doors spaced not more than 2.5 *m* apart. Such doors are to be self-closing without holding back arrangements. Air locks are to have mechanical ventilation and are not to be used for other purposes. Audible and visual alarm systems to give warnings on both sides of the air lock are to be provided to indicate when more than one door is moved from its closed position. Air lock spaces are to be monitored for dangerous gases as defined above **(3)**.	Moved to 2.1.1(7), Chapter 2
(Deleted)	(2) "Ballast water management system" (*BWMS*) means the same as defined in **2.1.1(1)**.	
(Moved)	(3) "Ballast water management room" (*BWMR*) means any space containing equipment belonging to the *BWMS*. Spaces containing remote controls for *BWMS* or spaces dedicated to the storage of liquid or solid	Moved to 2.1.1(8), Chapter 2

Amended	Original	Remarks
	chemicals for *BWMS* need not be considered a *BWMR*.	
3.1.2 *BWMS* Storing, Introducing or Generating Chemicals	**3.1.2 *BWMS* Storing, Introducing or Generating Chemicals**	
Table 3.1.2-1 Requirements that may be Reduced for *BWMS* Storing, Introducing or Generating Chemicals Depending on the Chemicals		Renumbered due to transferring items from 3.6.1 to 2.2.5

Requirement	Conditions to be met before reducing the requirement
3.2.3-5	The stored chemicals are neither toxic nor flammable
3.3.1	No dangerous gas will be generated by the *BWMS*
3.3.2	The *BWMS* does not use any flammable or toxic chemical substances
2.2.5-2	No toxic chemical is stored and no toxic gas will be generated by the *BWMS*
3.6.1-1, **-3** and **-6**	No toxic chemical is used or will be generated by the *BWMS*

Notes

1 *IMO (GESAMP) MEPC* reports issued during the basic and final approval procedures and the "safety hazards" listed in **Chapter 17, Part S of the Rules for the Survey and Construction of Steel Ships** are to be considered for this purpose.

2 The "chemicals" described in the table include *BWMS* additives.

3.2 Fire Categorisation	**3.2 Fire Categorisation**	
3.2.3 Storage of Chemicals	**3.2.3 Storage of Chemicals**	
3 When chemical substances are stored in same spaces containing ballast water management machinery, such spaces	**3** When chemical substances are stored in same spaces containing ballast water management machinery, such spaces	UR F45 (Rev.1) para.2.3.2

Amended	Original	Remarks
are considered to be both the spaces described in **-1** above and as the machinery spaces described in **3.2.1(2)**. However, if the storage of chemicals and the ballast water management machinery are located in a machinery space of category A, then the space is to be considered only as a machinery space of category A. When chemicals are stored in a room with *BWMS* in the cargo area of a tanker, this room is categorised as cargo pump room in accordance with **3.2.2** above.	are considered to be both the spaces described in **-1** above and as the machinery spaces described in **3.2.1**.	
(Deleted)	**3.6 Ventilation** **3.6.1 Equipment Requirements** **1** Ventilation systems for *BWMR* containing *BWMS* for the following **(1)** to **(4)** **purposes** are to be independent of ventilation systems serving other spaces. (1) *BWMS* storing, using or generating chemical substances (2) De-oxygenation, including pasteurisation and de-oxygenation (i.e. *BWMS* categories 3 and 8) (3) Electrolysis (4) Ozone injection **2** Ventilation exhausts for *BWMR* containing nitrogen generators are to be located in the lower parts of spaces in order to efficiently disperse dangerous gases heavier than air. **3** Ventilation exhausts for *BWMR* containing electrolysis systems are to be located so as to be able to efficiently disperse dangerous gases that may be generated during electrolysis. Due regard to be paid to the expected quantity and density of such gases when designing the ventilation exhaust. **4** Ventilation ducts serving *BWMR* for ozone-based *BWMS* are to satisfy the following **(1)** to **(3)**. (1) Parts of ducts located outside *BWMR* are to be made	Moved to 2.2.5, Chapter 2

Amended	Original	Remarks
	of steel having thicknesses of at least 3 *mm* for ducts with free cross-sectional areas of less than 0.075 m^2, thicknesses of at least 4 *mm* for ducts with free cross-sectional areas between 0.075 m^2 and 0.45 m^2 and thicknesses of at least 5 *mm* for ducts with free cross-sectional areas exceeding 0.45 m^2. (2) Ducts are to be suitably supported and stiffened. (3) The outside openings of ducts are to be fitted with protective screens of not more than 13 *mm*×13 *mm* mesh. **5** Ventilation systems for *BWMR* containing ozone-based *BWMS* or ventilation systems for hydrogen de-gassing arrangements required by **2.2.4-1(5)** are to be interlocked with the *BWMS* in accordance with the following **(1)** and **(2)**. (1) In the case of loss of ventilation (primary and secondary), visual and audible alarms are to be activated both inside and outside the *BWMR* and at locations where responsible members of the crew are on duty. If ventilation is not restored after a pre-set time, the *BWMS* is to automatically shut-down. Any need for cooldown necessary for safe shut-down is to be considered in shut-down sequences. (2) *BWMS* are not to be started without ventilation systems running. **6** For the ventilation systems described in **-5** above, relevant requirements in **2.2.4** are to be satisfied. **3.6.2 Ventilation Rates** **1** An adequate power ventilation system is to be provided in enclosed *BWMR*. **2** The ventilation capacity is to be at least 30 air changes per hour where explosive or toxic gases may be generated during operation of the *BWMS*. The *IMO* reports issued during	

Amended	Original	Remarks
	the basic and final approval procedures in accordance with *IMO (GESAMP) MEPC* report and "safety hazard" as listed in **Chapter 17, Part S of the Rules for the Survey and Construction of Steel Ships** are to be used as references for identifying those cases. **3** The ventilation capacity may be reduced as following **(1)** to **(6)**. (1) Flocculation-type *BWMS* : 6 air changes per hour (2) De-oxygenation, incl. pasteurisation and de-oxygenation (categories 3 and 8): 6 air changes per hour (3) Full flow electrolysis: 6 air changes per hour (4) Side-stream electrolysis: 20 air changes per hour (5) Ozone injection: 20 air changes per hour (6) Chemical injection: 6 air changes per hour **4** Notwithstanding **-1** to **-3** above, more stringent ventilation capacity requirements in other parts of the NK Rules like **Part S of the Rules for the Survey and Construction of Steel Ships** may apply to spaces located in cargo areas.	
3.6 Personal Equipment	**3.7 Personal Equipment**	
3.6.1 Personal Equipment	**3.7.1 Personal Equipment**	

Amended	Original	Remarks
GUIDANCE FOR BALLAST WATER MANAGEMENT INSTALLATIONS **Part 4 REQUIREMNETS FOR BALLAST WATER MANAGEMENT SYSTEM INSALLATION** **Chapter 2 ARRAGEMENT, PIPING, ELECTRICAL INSTALLATIONS, ETC.** **2.2 Installation** **2.2.3 Requirements for Tankers** **1** When providing the alternative means of isolation described in **2.2.3-14, Part 4 of the Rules**, the following **(1)** and **(2)** are recommended. (1) (Omitted) (2) The means of isolation is located on either the following **(a)** or **(b)**. (a) Open decks (b) If offering enhanced safety and gastightness, high positions in machinery spaces (in principle, just below the main deck). When piping penetrates bulkheads between engine rooms and hazardous areas (such as cargo pump rooms), the safety and gastightness of such penetrations are to be taken into account. **2** Where the cargo tanks are independent tanks arranged in a cargo hold (e.g. Asphalt carriers, chemical tankers with	**GUIDANCE FOR BALLAST WATER MANAGEMENT INSTALLATIONS** **Part 4 REQUIREMNETS FOR BALLAST WATER MANAGEMENT SYSTEM INSALLATION** **Chapter 2 ARRAGEMENT, PIPING, ELECTRICAL INSTALLATIONS, ETC.** **2.2 Installation** **2.2.3 Requirements for Tankers** When providing the alternative means of isolation described in **2.2.3-14, Part 4 of the Rules**, the following **(1)** and **(2)** are recommended. (1) (Omitted) (2) The means of isolation is located on either the following **(a)** or **(b)**. (a) Open decks (b) As high as possible in machinery spaces (in principle, just below the main deck). When piping penetrates bulkheads between engine rooms and hazardous areas (such as cargo pump rooms), the safety and gastightness of such penetrations are to be taken into account. (Newly added)	UR M74 (Rev.3) Note 2 for para.3.2.3.1 TB for UR M74 (Rev.3) - Point of discussion,

Amended	Original	Remarks
independent cargo tanks or gas carriers Type A, Type B and Type C) or separated by insulation spaces or inter-membrane spaces (e.g. Membrane LNG carriers), **2.2.3, Part 4 of the Rules** needs not to be complied with.		para.14

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 1 January 2027.

2. Notwithstanding the amendments, the current requirements apply to Ballast Water Management System other than those which fall under the following:

(1) Ballast Water Management System installed in ships for which the date of contract for construction* is on or after the effective date.

(2) Ballast Water Management System of which retrofitting, replacement or major conversion is carried out on or after the effective date.

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.
For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:
(1) such alterations do not affect matters related to classification, or
(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.
The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.