

# IMO Resolution A.753 (18) guidelines for the application of plastic pipes on ships

## Appendix 4 – Fire endurance requirements matrix Table 1

		Locations										
		A	B	C	D	E	F	G	H	I	J	K
		Machinery spaces of category A	Other machinery spaces and pump rooms	Cargo pump rooms	RO/RO cargo holds	Other dry cargo holds	Cargo tanks	Fuel oil tanks	Ballast water tanks	Cofferdams void spaces pipe tunnel and ducts	Accommodation service and control spaces	Open decks
<b>Piping Systems</b>												
Cargo (Flammable cargoes f.p. < 60°C)	Cargo lines	NA	NA	L1	NA	NA	0	NA	0 <sup>10</sup>	0	NA	L1 <sup>2</sup>
	Crude oil washing lines	NA	NA	L1	NA	NA	0	NA	0 <sup>10</sup>	0	NA	X
	Vent lines	NA	NA	NA	NA	NA	0	NA	0 <sup>10</sup>	0	NA	X
Inert Gas	Water seal effluent line	NA	NA	0 <sup>1</sup>	NA	NA	0 <sup>1</sup>	0 <sup>1</sup>	0 <sup>1</sup>	0 <sup>1</sup>	NA	0
	Scrubber effluent line	0 <sup>1</sup>	0 <sup>1</sup>	NA	NA	NA	NA	NA	0 <sup>1</sup>	0 <sup>1</sup>	NA	0
	Main line	0	0	L1	NA	NA	NA	NA	NA	0	NA	L1 <sup>6</sup>
	Distribution lines	NA	NA	L1	NA	NA	0	NA	NA	0	NA	L1 <sup>2</sup>
Flammable liquids (f.p. > 60°C)	Cargo lines	X	X	L1	X	X	NA <sup>3</sup>	0	0 <sup>10</sup>	0	NA	L1
	Fuel oil	X	X	L1	X	X	NA <sup>3</sup>	0	0	0	L1	L1
	Lubricating	X	X	L1	X	X	NA	NA	NA	0	L1	L1
	Hydraulic oil	X	X	L1	X	X	0	0	0	0	L1	L1
SeaWater <sup>1</sup>	Bilge main branches	L1 <sup>7</sup>	L1 <sup>7</sup>	L1	X	X	NA	0	0	0	NA	L1
	Fire main and water spray	L1	L1	L1	X	NA	NA	NA	0	0	X	L1
	Foam system	L1W	L1W	L1W	NA	NA	NA	NA	NA	0	L1W	L1W
	Sprinkler system	L1W	L1W	L3	X	NA	NA	NA	0	0	L3	L3
	Ballast	L3	L3	L3	L3	X	0 <sup>10</sup>	0	0	0	L2W	L2W
	Cooling water, essential services	L3	L3	NA	NA	NA	NA	NA	0	0	NA	L2W
	Tank cleaning services fixed machines	NA	NA	L3	NA	NA	0	NA	0	0	NA	L3 <sup>2</sup>
	Non-essential systems	0	0	0	0	0	NA	0	0	0	0	0
Freshwater	Cooling water essential services	L3	L3	NA	NA	NA	NA	0	0	0	L3	L3
	Condensate return	L3	L3	L3	0	0	NA	NA	NA	0	0	0
	Non-essential systems	0	0	0	0	0	NA	0	0	0	0	0
Sanitary /Drains / Scuppers	Deck drains (internal)	L1W <sup>4</sup>	L1W <sup>4</sup>	NA	L1W <sup>4</sup>	0	NA	0	0	0	0	0
	Sanitary/Drains (internal)	0	0	NA	0	0	NA	0	0	0	0	0
	Scuppers and discharges (overboard)	0 <sup>1,8</sup>	0 <sup>1,8</sup>	0 <sup>1,8</sup>	0 <sup>1,8</sup>	0 <sup>1,8</sup>	0	0	0	0	0	0
Sounding/air	Water tanks/dry spaces	0	0	0	0	0	0 <sup>10</sup>	0	0	0	0	0
	Oil tanks (f.p. > 60°C)	X	X	X	X	X	X <sup>3</sup>	0	0 <sup>10</sup>	0	X	X
Miscellaneous	Control air	L1 <sup>5</sup>	L1 <sup>5</sup>	L1 <sup>5</sup>	L1 <sup>5</sup>	L1 <sup>5</sup>	NA	0	0	0	L1 <sup>5</sup>	L1 <sup>5</sup>
	Service air (non-essential)	0	0	0	0	0	NA	0	0	0	0	0
	Brine	0	0	NA	0	0	NA	NA	NA	0	0	0
	Auxiliary low pressure steam (< 7 bar)	L2W	L2W	0 <sup>9</sup>	0 <sup>9</sup>	0 <sup>9</sup>	0 <sup>9</sup>	0	0	0	0 <sup>9</sup>	0 <sup>9</sup>
	Central vacuum cleaners	NA	NA	NA	0	NA	NA	NA	NA	0	0	0
	Exhaust Gas Cleaning System Effluent Line	L3 <sup>1</sup>	L3 <sup>1</sup>	NA	NA	NA	NA	NA	NA	0	L3 <sup>1,11</sup> NA	0
	Urea Transfer/Supply System (SCR Inst.)	L1 <sup>12</sup>	L1 <sup>12</sup>	NA	NA	NA	NA	NA	NA	0	L3 <sup>1,11</sup> NA	0

### L1

Fire endurance test (appendix 1) in dry conditions, 60 min.  
A no go for GF products.

### L1W

Fire endurance as L3 with 5% flow loss after exposure.  
A no go for GF products.

### L2

Fire endurance test (appendix 1) in dry conditions, 30 min.  
A no go for GF products.

### L2W

Fire endurance as L2 with 5% flow loss after exposure.  
A no go for GF products.

### L3

Fire endurance test (appendix 2) in wet conditions, 30 min.  
HEAT FIT can be used.

### 0

No fire endurance test required.  
GF products can be used.

### NA

Not applicable or available

### X

Metallic materials having a melting point greater than 925°C

## Footnotes

1. Where non-metallic piping is used, remotely controlled valves to be provided at ship's side (valve is to be controlled from outside space).
2. Remote closing valves to be provided at the cargo tanks.
3. When cargo tanks contain flammable liquids with f.p. > 60°, "O" may replace "NA" or "X".
4. For drains serving only the space concerned, "O" may replace "L1".
5. When controlling functions are not required by statutory requirements or guidelines, "O" may replace "L1".
6. For pipe between machinery space and deck water seal, "O" may replace "L1".
7. For passenger vessels, "X" is to replace "L1".
8. Scuppers serving open decks in positions 1 and 2, as defined in regulation 13 of the International Convention on Load Lines, 1966, should be "X" throughout unless fitted at the upper end with the means of closing capable of being operated from a position above the freeboard deck in order to prevent downflooding.
9. For essential services, such as fuel oil tank heating and ship's whistle, "X" is to replace "O".
10. For tankers where compliance with paragraph 3.6 of regulation 19 of Annex I of MARPOL 73/78 is required, "NA" is to replace "O".
11. L3 in service spaces, NA in accommodation and control spaces.
12. Type Approved plastic piping without fire endurance test (0) is acceptable downstream of the tank valve, provided this valve is metal seated and arranged as fail-to-closed or with quick closing from a safe position outside the space in the event of fire.
13. For Passenger Ships subject to SOLAS II-2/21.4 (Safe return to Port), plastic pipes for services required to remain operative in the part of the ship not affected by the casualty thresholds, such as systems intended to support safe areas, are to be considered essential services. In accordance with MSC.1/Circ.1369, interpretation 12, for Safe Return to Port purposes, plastic piping can be considered to remain operational after a fire casualty if the plastic pipes and fittings have been tested to L1 standard.

## Location definition

- A. Machinery spaces of category A Machinery spaces of category A as defined in SOLAS II-2/3.31.
- B. Other machinery spaces and pump rooms Spaces, other than category A machinery spaces and cargo pump rooms, containing propulsion machinery, boilers, fuel oil units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air-conditioning machinery, and similar spaces and trunks to such spaces.
- C. Cargo pump rooms Spaces containing cargo pumps and entrances and trunks to such spaces.
- D. Ro-ro cargo holds Ro-ro cargo holds are ro-ro cargo spaces and special category spaces and special category spaces as defined in SOLAS II-2/3.41 and SOLAS II-2/3.46.
- E. Other dry cargo holds All spaces other than ro-ro cargo holds used for non- liquid cargo and trunks to such spaces.
- F. Cargo tanks All spaces used for liquid cargo and trunks to such spaces.
- G. Fuel oil tanks All spaces used for fuel oil (excluding cargo tanks) and trunks to such spaces.
- H. Ballast water tanks All spaces used for ballast water and trunks to such spaces.
- I. Cofferdams, voids, etc. Cofferdams and voids are those empty spaces between two bulkheads separating two adjacent compartments.
- J. Accommodation, service Accommodation spaces, service spaces and control stations as defined in SOLAS II-2/3.1, SOLAS II-2/3.45 and SOLAS II-2/3.18.
- K. Open decks Open deck spaces as defined in SOLAS II-2/9.2.2.3.2(5).