

메탄을 연료 탱크 보호 Cofferdam 설치 관련 규정 정리

2023. 03. 31. (금)

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LFL(low-flashpoint liquid) 연료 추진 선박 적용 근거 규정

- MSC. 391(95) International code of safety for ships using gases or other low-flashpoint fuels (IGF Code) (11 Jun. 2015)
- MSC.1/Circ.1621 : Interim guidelines for the safety of ships using methyl/ethyl alcohol as fuel (7 Dec. 2020)
- DNV Rule Part 6 Ch.2 Sec.6 : Low flashpoint liquid fueled engines – LFL fueled and gasoline refueling and storage installations – gasoline inst (July 2022)
- LR Rule for the classification of ships using gases or other low-flashpoint fuels (July 2022)
: Appendices LR1 – Requirements for ships using methyl alcohol (Methanol) or ethyl alcohol
- ABS Rule Interpretations for MSC Interim Guidelines (Q&A by e-mail dated 28 March 2023)

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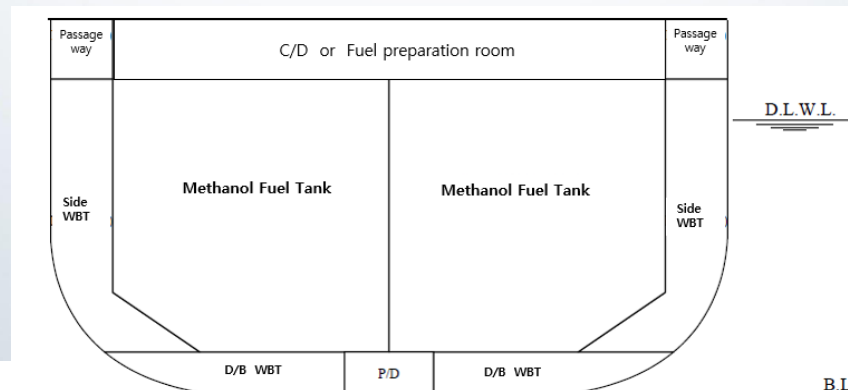
- International code of safety for ships using or other low-flashpoint fuels (IGF Code, 2015)
 - ☺ LNG 연료 추진 선박에서의 적용에 한정됨 (while the provisions of the IGF Code in part A-1 limit the application to natural gas, the committee recognized that requirements for additional low-flashpoint fuels may be added to the Code as and when developed)
- MSC.1/Circ.1621 Interim guidelines for the safety of ships using methyl/ethyl alcohol as fuel. (상기 IGF code의 적용을 메탄올/에탄올 등 LFL 연료 추진 선박에 확장하여 적용할 수 있도록 보완 및 Interim Guideline 으로 채택, 2020)
 - ☺ 5.3.2 Integral fuel tanks should be surrounded by protective cofferdams, except on those surfaces bound by shell plating below the lowest possible waterline, other fuel tanks containing methyl/ethyl alcohol, or fuel preparation space.
 - ☺ 5.4.3 Independent fuel tanks should be secured to the ship's structure. The arrangement for supporting and fixing the tanks should be designed for the maximum expected static, dynamic inclinations and accidental loads as well as the maximum expected values of acceleration, taking into account the ship characteristics and the position of the tanks.
 - ☺ 2.2.3.2 Cofferdam is a structural space surrounding a fuel tank which provides an added layer of gas and liquid tightness protection against external fire, and toxic and flammable vapours between the fuel tank and other areas of the ship; and

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- DNV Rules_ Part 6 Ch.2 Sec.6: Low flashpoint liquid fueled engines – LFL fueled and gasoline refueling and storage installations – gasoline inst (July 2022)
 - ☺ 3.2.1.3 Minimum distance between the fuel tank and fuel pipes and the ship's side shell shall be at least 800mm when situated above lowest possible waterline.
 - ☺ 3.2.1.6 Fuel tanks shall not be accepted in the double bottom on chemical tankers.
 - ☺ 3.2.2.1 Integral fuel tanks shall be surrounded by protective cofferdams, except on those surfaces bound by shell plating below the lowest possible waterline, other fuel tanks containing methyl/ethyl alcohol, or fuel preparation space.
 - ☺ 3.2.2.2 Cofferdams shall be arranged with vapour and liquid leakage detection and a possibility for water filling or inert gas purging upon detection of leakage. Water filling of cofferdams shall be arranged without permanent connections to water systems. Emptying shall be done with a separate system. If bilge ejectors are used for this purpose, they shall not be permanently connected to the drive water system.
 - ☺ 3.3.4.1 Piping systems in fuel tanks and their cofferdams shall have no connections with piping systems in the rest of the ship, apart from fuel pipes which shall be arranged as specified in other parts of this section. (FO/WB tank not acceptable as cofferdam)
 - ☺ 4.3.1 LFL fuel design density, ρ_L , shall not be less than 0.8 t/m³.
- LR rule and regulations for the classification of ships using gases or other low-flashpoint fuels (July 2022)
Appendices LR1 – Requirements for ships using methyl alcohol (Methanol) or ethyl alcohol
 - ☺ 4.2.1 A risk assessment should be conducted to ensure that risks arising from the use of methyl/ethyl alcohol fuels affecting persons on board, the environment, the structural strength or the integrity of the ship are addressed. Consideration should be given to the hazards associated with physical layout, operation and maintenance, following any reasonably foreseeable failure.
 - ☺ 5.3.2 Integral fuel tanks should be surrounded by protective cofferdams, except on those surfaces bound by shell plating below the lowest possible waterline, other fuel tanks containing methyl/ethyl alcohol, or fuel preparation space.
 - ☺ 5.3.3 The fuel containment system should be abaft of the collision bulkhead and forward of the aft peak bulkhead.
 - ☺ LR 5.3-02 No part of the outer extent of fuel tanks is to be less than 800 mm inboard from the ship shell side or from the boundary of any adjacent space, except as otherwise allowed by 5.3.2.

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- ☺ 5.3.6 Special consideration should be given to chemical tankers using methyl/ethyl alcohol cargoes as fuel.
- ☺ (BTS Q&A) please note that any arrangement that deviates from the requirements of the Code (Interim Guidelines) can be considered based on equivalent levels of safety being demonstrated and goal and functional requirements being met. See LR LPPF Rules, Appendix LR1, Part A 2.3 (Alternate design)
- ☺ Part A – 2.3.3 The equivalence of the alternative design shall be demonstrated as specified in SOLAS regulation II-1/55 and approved by the Administration.
- ABS Interpretations for MSC Interim Guidelines (Q&A by e-mail dated 28 March 2023)
 - ☺ 5.3.2 of MSC.1/Circ.1621 states that integral fuel tanks should be surrounded by protective cofferdams, except on those surfaces bound by shell plating below the lowest possible waterline, other fuel tanks containing methyl/ethyl alcohol, or fuel preparation space. Therefore, water ballast tank cannot be considered as protective cofferdam in accordance with 5.3.2 of MSC.1/Circ.1621.
 - ☺ It is acceptable to locate pipe duct(duct keel) below the methanol fuel tank without a cofferdam between them provided that the pipe duct is used only for the passage of piping, not for any other purpose.
 - ☺ Diagonal (corner to corner) contact between side passage way or water ballast tank with the methanol fuel tank is not allowed to prevent leakage of methanol fuel through the contact point.
 - ☺ In case type A/B independent fuel tank is installed under upper deck (Inside hold space) on chemical tankers, in so far as classification is concerned, there is no specific requirement to provide double bottom or double side in way of independent methanol fuel tank, provided that damage stability criteria considering bottom and side damage is satisfied.



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대 구 분	소 구 분	적 용	비 고
FO Tank	E/RM 과 연료탱크 사이에 FO Tank 를 배치 시 Cofferdam 으로 간주 할 수 있는지?	코페댐 인정 안됨	
Ballast Tank (A)	Ballast Pump 및 BWTS 장비가 E/RM 내부에 설치되는 경우, E/RM 으로 통하는 pipe connection 있음.	코페댐 인정 안됨	B/C, LNGC, VLGC, Containership ...
Ballast Tank (B)	Ballast Pump 및 BWTS 장비가 E/RM 외부 또는 별도의 P/RM이 있는 경우, E/RM 으로 통하는 pipe connection 없음.	코페댐 인정 안됨	Tanker, P/C Tanker ...
Pipe Duct (Duct keel)	단순히 Pipe 통과 용도로 사용하는 경우, Leakage detector 및 Separate bilge system 설치	적용 허용	
Diagonal contact to (corner to corner)	Side Passageway 등이 Methanol fuel tank 와 corner to corner 접촉이 발생하는 경우	허용 안됨	
Double Bottom 구역까지 연료 탱크 확장	Chemical Tanker 에서는 D/B 에 연료탱크 배치를 설치 불가 (DNV 선급 유의)	DNV 선급 불허	Chemical Tanker
메탄올 연료탱크와 Side Shell 간 이격 거리	선박의 최소 운항 흘수 상방에서 연료탱크 및 연료 Pipe 를 Side Shell 로부터 최소 이격 거리	최소 800 mm 이상	단, 최소 운항 흘수 이하에서는 Single Hull 적용을 허용
독립 연료탱크를 Hold Space 배치 시 D/H 구조	IMO type A/B 독립 연료탱크를 Hold 안에 배치 시 D/H(double side, double bottom) 적용 필요성	D/H 요구 없음	Damage Stability 만족 요구

Thank You.

미래를 위한 준비!!
친환경 중소형 선박,
우리 손으로 만들겠습니다.

