

GUIDE FOR

MEANS OF ACCESS TO TANKS AND HOLDS FOR INSPECTION APRIL 2016

Guide to Color Coding Used in Online Version of the Guide

The following summarizes the colors corresponding to Rule Changes, Corrigenda items and editorial changes in the Guide files which are available for download.

Rule Changes:

Changes effective 1 April 2016

NOTICE NO. 1 – November 2016 (effective 1 November 2016)

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Editorial Changes



GUIDE FOR

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APRIL 2016 (Updated November 2016 – see next page)

**American Bureau of Shipping
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the State of New York 1862**

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Updates

November 2016 consolidation includes:

- April 2016 version plus Notice No. 1

Foreword (1 November 2016)

Background

The maritime industry has long recognized that periodic surveys/inspections are the primary means for **verifying** that a vessel's structure is maintained within applicable requirements throughout its operational life. These surveys/inspections help **confirm** that the vessel is free from damage such as cracks, buckling, corrosion and overloading, and that material thickness are within established limits. For surveys/inspections to be carried out effectively, suitable means of access to the vessel's structure are required.

To address the issue of suitable access, the Maritime Safety Committee (MSC) adopted the following resolutions into SOLAS Regulation II-1/3-6 on "Access to and within spaces in the cargo area of oil tankers and bulk carriers":

- **MSC.194(80) – Adoption of Amendments to the International Convention for the Safety Of Life At Sea, 1974, as amended**
- **MSC.151(78) – Adoption of Amendments to the International Convention for the Safety Of Life At Sea, 1974, as amended and**
- **MSC.158(78) – Adoption of Amendments to the Technical Provisions**

To assist in the implementation of these new IMO resolutions, the International Association of Classification Societies (IACS) developed the Unified Interpretation (UI) SC 191, for the application of amended SOLAS Regulation II-1/3-6 (Resolution MSC.151(78)) and revised Technical Provisions for Means of Access for Inspections (Resolution MSC.158(78)). **In addition, the Maritime Safety Committee (MSC) has approved the interpretations of the provision of SOLAS Chapter II-1 and of the Technical provisions adopted with resolution MSC.158(78) as contained in MSC.1/Circ.1284 and in MSC.1/Circ.1464/Rev.1.**

The November 2016 update incorporates IACS UI SC191 Rev.6 including Corr.1, and Rev 7 with Corr. 1 for rafts, boats, and vertical ladders.

Application

The vessel types and sizes listed below, if constructed on/after 1 January 2006 are required to comply with SOLAS Regulation II-1/3-6 and Resolutions MSC.151(78) and MSC.158(78):

- Oil tankers of 500 gross tonnage
- Bulk carriers (as defined in SOLAS regulation IX/1) of 20,000 gross tonnage and over.

Scope

In support of the Statutory and IACS guidance, ABS has prepared the *Guide for Means of Access to Tanks and Holds for Inspection*. This Guide provides graphical illustrations and additional textual clarification of the means of access requirements. The goal is to improve the comprehension and application of the Statutory and IACS guidance.

This Guide presents two (2) levels of means of access guidance. The first provides the base criteria to meet the IMO requirements. The second, and *preferred*, level of guidance incorporates the application of current ergonomics practices to the means of access requirements. The application of ergonomics to the means of access requirements will enhance levels of safety as well as quality of work by providing appropriate access for survey, inspection and maintenance activities for tanks and holds.

Associated Notations

This Guide offers two optional notations related to means of access, **PMA** and **PMA+**. The **PMA** notation is awarded for compliance with all IMO permanent means of access requirements. The **PMA+** notation is awarded for compliance with the enhanced ergonomic level of means of access guidance contained in this Guide.

This Guide becomes effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website www.eagle.org to verify that this version of this Guide is the most current.

We welcome your feedback. Comments or suggestions can be sent electronically by email to rsd@eagle.org.



GUIDE FOR

MEANS OF ACCESS TO TANKS AND HOLDS FOR INSPECTION

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SECTION 1 Introduction

1 Introduction (1 April 2016)

The ability to survey/inspect the condition of a vessel is a principal means to help verify that the vessel's structure is maintained to comply with applicable requirements. These surveys/inspections assist Owners; flag Administrations and classification societies in determining that vessels are free from damage and that material thickness are within established limits. For surveys/inspections to be carried out safely and effectively, suitable means of access to the vessel's structure is required.

The most recent adoptions to IMO legislation (SOLAS Reg. II-1/3-6) have established new requirements for means of access. Throughout the life of a vessel, this access enables overall and close-up inspections and material thickness measurements of the vessel's structures. These means of access may be used by flag Administrations, classification societies, vessel personnel and others as necessary.

To assist in the implementation of these new requirements, IACS has developed Unified Interpretation (UI) SC 191 for the application of amended SOLAS regulation II-1/3-6 (resolution MSC.151 (78)) and revised Technical provisions for means of access for inspections (resolution MSC.158 (78)). *In addition, the Maritime Safety Committee (MSC) has approved the interpretations of the provision of SOLAS Chapter II-1 and of the Technical provisions adopted with resolution MSC.158(78) as contained in MSC.1/Circ.1284 and in MSC.1/Circ.1464/Rev.1.* In support of this document, ABS has prepared the *Guide for Means of Access to Tanks and Holds for Inspection*. This Guide provides additional information, via text and graphics, about the means of access requirement's interpretation and application, as well as the criteria for the **PMA** and **PMA+** notations.

2 Application

The means of access requirements in SOLAS and in this Guide apply to:

- *Oil tankers of 500 gross tonnage and over constructed on or after 1 January 2006.* This regulation is only applicable to oil tankers having tanks integral with the structure of the vessel which are used for carriage of oil in bulk, which is contained in the definition of oil in Annex 1 of MARPOL 73/78. Independent oil tanks can be excluded.
- *Bulk carriers (as defined in SOLAS regulation IX/1) of 20,000 gross tonnage and over, constructed on or after 1 January 2006.* SOLAS Regulation IX/1 defines a bulk carrier as a ship which is constructed generally with single deck, topside tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk, and includes such types as ore carriers and combination carriers.

Note: Oil tankers of 500 gross tonnage and over constructed on or after 1 October 1994 but before 1 January 2005 shall comply with the provisions of regulation II-1/12-2 adopted by resolution MSC.27(61). Also, for oil tankers of less than 5,000 tonnes deadweight, Administrations may approve, in special circumstances, smaller dimensions for access through vertical and horizontal openings, if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Administration.

3 Scope (1 April 2016)

To enable physical surveys, inspections, and maintenance activities to be conducted effectively, consideration needs to be given to how the vessel will be designed, in particular, means of access arrangements. The effectiveness of the design of means of access can be maximized, as illustrated in this Guide, through the application of ergonomics to the vessel's structural designs and arrangements.

This Guide presents two (2) levels of means of access guidance. The first level provides the base criteria to meet the IMO requirements. The second, and *preferred*, level of guidance incorporates the application of ergonomics to the IMO means of access requirements.

This Guide overlaps, in several areas, with two existing ABS publications: the *ABS Guidance Notes on the Application of Ergonomics to Marine Systems* and the *ABS Guide for Ergonomic Notations*. These publications are recommended companion documents to further promote the application and understanding of ergonomics principles to vessel designs.

The application of ergonomics to the means of access requirements can improve overall personnel performance and safety, while reducing the potential for human error.

4 Terminology (1 April 2016)

Accessibility: The ability for personnel to access equipment that requires maintenance, inspection, removal, or replacement while wearing the appropriate clothing, including personal protective equipment, and the ability to use all necessary tools and test equipment.

Active Protection: A safety design or device that actively (or directly) requires a person to take specific actions before a potential loss, for example, donning a fall arrestor fitted to both the ladder and the climber.

Crew Member: Any person onboard a vessel, including the Master, who is not a passenger. This term is used interchangeably throughout this document with “seafarer”.

Design Load: The maximum intended load, being the total of all loads including the weight of the personnel, materials, and equipment, including the means of access structure.

Guardrail or Safety Rail: Device for protection against accidental fall or accidental access to a hazardous area, with which stairs, step ladders or landings, platforms and walkways, or deck edges/fall points may be equipped.

Handrail: Top element designed to be grasped by the hand for body support which can be used individually or as the upper part of a rail.

Maintenance: All activities necessary to keep equipment in, or restore it to, a specified level of performance.

Newton: SI unit of force. One Newton is equal to the amount of net force required to accelerate a mass of one kilogram at a rate of one meter per second squared.

Newton-Meters (N-m): SI unit of torque. One Newton-meter is equal to the torque resulting from a force of one Newton applied perpendicularly to a moment arm which is one meter long.

Seafarer: Any person onboard a vessel, including the Master, who is not a passenger. This term is used interchangeably throughout this document with “crew member”.

Shall: Expresses a provision that is mandatory.

Toeboard: Solid lower part of a guard-rail on a landing to prevent the fall of objects from a floor level.

5 Notations

This Guide offers two optional notations related to means of access, **PMA** and **PMA+**. The **PMA** notation is awarded for compliance with all IMO permanent means of access requirements. The **PMA+** notation is awarded for compliance to the enhanced ergonomic level of means of access guidance contained in this Guide.

5.1 PMA Notation (1 April 2016)

The optional **PMA** notation may be assigned to vessels to signify that the vessel’s *permanent* means of access meets the following:

- IMO Resolution MSC.151(78) – “Adoption of Amendments to the International Convention for the Safety Of Life At Sea, 1974, as Amended”
- IMO Resolution MSC.158(78) – “Adoption of Amendments to the Technical Provisions for Means of Access for Inspections”

- IACS Unified Interpretation (UI) SC 191 for the application of amended SOLAS regulation II-1/3-6 (resolution MSC.151 (78)) and revised Technical provisions for means of access for inspections (resolution MSC.158 (78))

Note: The **PMA** notation does not include IMO requirements for alternative or temporary means of access.

5.2 PMA+ Notation (1 April 2016)

The optional **PMA+** notation **may** be assigned to vessels meeting the **PMA** notation requirements *plus* the additional ergonomic considerations presented in this Guide. The **PMA+** notation is discussed in more detail in the following Subsection.

6 Detailed Considerations for the PMA+ Notation

6.1 Overview (1 April 2016)

The **PMA+** notation applies ergonomics and safety design practices to the design and arrangement of the permanent means of access requirements where allowable. These instances include those areas where the means of access requirements have prescribed minimums and/or maximums and ergonomic dimension exists within the allowable range. For those means of access requirements where no specific dimensioning is provided, ergonomic guidance and dimensioning is provided.

Note: If any **PMA+** requirements are found to conflict with MSC requirements or IACS interpretations, the MSC requirements or IACS interpretations take precedence.

6.2 Example of the Application of the PMA+ Notation (1 April 2016)

For tankers, IMO states “Continuous athwartship permanent access arranged at each transverse bulkhead on the stiffened surface, at a minimum of 1.6 m to a maximum of 3 m below the deck head.” This 1.6 m (63.0 in.) minimum is below current ergonomic practices, which is a minimum of **2130 mm (84.0 in.)**.

The minimum overhead clearance of 1600 mm (63.0 in.) is approximately 117 mm (4.5 in.) less than the mean male stature (height) presented in Appendix 1, Figure 1, “Differences in 50th Percentile Male Stature for 12 Regions, from the Average Stature of 1717 mm (**67.5 in.**)” of the *ABS Guidance Notes on the Application of Ergonomics to Marine Systems*. Also, this mean value does not include clothing allowances of approximately 25 mm (1.0 in.) for footwear and 75 mm (3.0 in.) for safety helmets. By combining these two clothing allowances to the mean stature we have an average male height of 1817 mm (71.5 in.). This value is approximately 220 mm (8.5 in.) higher than the IMO minimum height.

For a large majority of personnel this 1600 mm (63.0 in.) minimum would increase the likelihood of head strikes against overhead surfaces, potentially causing head and neck injuries as well as causing personnel to work/walk in awkward postures causing potential upper and lower back pain, discomfort or injury.

The current ergonomic practice of a **2130 mm (84.0 in.)** minimum overhead clearance will allow the vast majority of personnel to work upright without the potential for head strikes against upper surfaces or from working in awkward postures.

The way IMO states the overhead clearances, from “a minimum of 1.6 m to a maximum of 3 m” provides designers the opportunity to use the **PMA+** requirement of **2130 mm (84.0 in.)** as a design requirement.

6.3 Examples of PMA+ Notation Opportunities

The majority of the dimensional aspects of the means of access requirements are stated in a manner that provides the designer with some latitude with respect to dimensioning. Several examples include:

- “The minimum clear opening shall not be less than 600 mm × 600 mm” – which means that the clear opening can be greater than the dimension specified.
- “Elevated passageways forming sections of a permanent means of access, where fitted, shall have a minimum clear width of 600 mm” – which means the passageway can have a greater clear width.
- “Stanchions shall be not more than 3 m apart” – this establishes a maximum distance only. A shorter dimension is allowed.
- “Permanent inclined ladders shall be inclined at an angle of less than 70 degrees” – which means that inclined ladders cannot exceed 70 degrees, but inclined ladders can be at less of an angle.

Additionally, there are instances where no dimensional aspects of the means of access requirements are provided.

- “*Inclined ladders shall be provided with handrails of substantial construction on both sides fitted at a convenient distance above the treads*” – No dimensional requirements are provided for the size of the handrail or the handrail’s height above the tread or any intermediate rails.

6.4 IMO Means of Access Requirements **versus** Ergonomic Practices (1 April 2016)

There are other instances of IMO means of access requirements, which *could* be enhanced through the application of ergonomic practices, but **cannot** because the specific wording of the IMO means of access requirements prohibits any modification of these requirements. These instances include the design of guardrail heights, openings in horizontal stringers, and the tread design and spacing of inclined ladders. These are discussed in more detail in the following Subparagraphs.

Note: The discussion in the following Subparagraphs (1/6.4.1, “Guardrail Heights”, 1/6.4.2, “Openings in Horizontal Stringers”, 1/6.4.3, “Tread Spacing (Inclined Ladders)” and 1/6.4.4, “Tread Design (Inclined Ladders)”) are **not PMA+** requirements. These Subparagraphs discuss examples of where ergonomics practices should be applied but **cannot** due to the specific wording of the IMO means of access requirements.

6.4.1 Guardrail Heights (1 April 2016)

MSC.158 (78), Technical Provisions 3.3, requirement states that “...*Guardrails shall be 1,000 mm (39.5 in.) in height and consist of a rail and an intermediate bar 500 mm in height and of substantial construction...*” This specific wording allows no opportunity to apply ergonomic principles to the design of guardrails.

From an ergonomics and safety perspective a guardrail’s height **should be** 1070 mm (**approximately** 42.0 in.). The rationale for this change in guardrail height is based on the biomechanics (including center of gravity) of a worker leaning or falling over a guardrail. Biomechanical analyses show that the center of gravity of a human body is approximately 75 mm (3.0 in.) above the midpoint of a person’s stature (the center of gravity varies slightly among individuals and genders).

Biomechanical analyses also show that if the center of gravity of a human body acts *above* a guardrail, a person falling against the rail would have a higher tendency to rotate *over the top* of the railing. Additionally, if the center of gravity of a human body acts *below* the top of a rail, a person would have a tendency to rotate *under* the railing. This action (rotating under) along with intermediate rail(s) will help prevent a fall to a lower surface.

To illustrate this point, a person 1830 mm (72.0 in.) tall would have a center of gravity of approximately 1000 mm (39.5 in.). This means that **people** with a stature greater than 1830 mm (72.0 in.), including footwear, would have a higher likelihood of rotating over the top of a 1000 mm (39.5 in.) guardrail than a 1070 mm (42.0 in.) guardrail.

The requirement for a guardrail height of **at least** 1000 mm (39.5 in.) is more effective for personnel less than 1830 mm (72.0 in.) tall (including footwear), leaving those workers who are taller at a safety disadvantage. Current ergonomics design practices for the height of guardrails take into consideration taller potential workers (up to **2130 mm (84.0 in.)** in height). When considering the taller potential worker population, a guardrail height of 1070 mm (42.0 in.) will help protect approximately 99% of all workers.

6.4.2 Tread Spacing (Inclined Ladders)

MSC.158 (78), Technical Provisions 3.6, “...*The treads shall be equally spaced at a distance apart, measured vertically, of between 200 mm and 300 mm...*” From an ergonomic perspective, the range provided for the spacing of treads should be expanded to 180 mm – 300 mm (7.0 in. – 12.0 in.).

It is noted that there is not much difference between the MSC requirements and the current ergonomic practice for the tread spacing for inclined ladders. The reasoning behind the current ergonomic practice is based on designing for the 5th percentile (shorter) female and to provide a wider range and opportunity to make sure the inclined ladder treads are equally spaced throughout the flight of the ladder.

6.4.3 Tread Design (Inclined Ladders) (1 April 2016)

MSC.158 (78), Technical Provisions 3.6, "... When steel is used, the treads shall be formed of two square bars of not less than 22 mm by 22 mm in section, fitted to form a horizontal step with the edges pointing upward..."

Walking on the corner edges of square bars provides for less contact with the foot and the stepping surface and an increased opportunity for slipping. Also, standing on the corner edges for extended period of time (e.g., performing an inspection) causes pressure points and pain on the bottom of the foot.

The **preferred** tread design should be a solid plate or circular cross section bars. Treads should be formed of a solid step (not less than 100 mm (4.0 in.) in depth) with non-slip surface or non-slip circular cross section bars (not less than 25 mm (1.0 in.) in diameter). If the steps are constructed using circular cross-section bars (which is preferred so as to minimize sludge accumulations on treads of ladders fitted in cargo oil tanks), they should consist of two or more parallel bars arranged on the same horizontal plane, with the distance between the centers of adjacent bars being not less than 65 mm (2.5 in.) and not more than 75 mm (3.0 in.). IMO does not provide any guidance with respect to step depth or the spacing of the adjacent bars.

7 Documentation (1 April 2016)

7.1 Plans, Certifications, and Documentation

One set of the official (design and construction agents) electronic copies of the following plans and information shall be submitted to ABS Engineering for the purpose of review in the context of the notation being sought.

- i) Details of arrangements of the components and structures appropriate for the notation(s) being sought
- ii) Diagrammed details of each of the above components and structures
- iii) Any vendor documentation or certifications pertinent to applying the requirements to the design.

For new construction, the drawings shall be provided to ABS Engineering during the detailed design phase. For existing vessels, the arrangement drawings and plans reflecting the current configurations (e.g., topsides, below decks, etc.) shall be provided to, and approved by, ABS Engineering in advance of ABS Surveyor verifications.

ABS Engineering shall review the submitted accommodations documentation. ABS Engineering shall report any deviation from criteria to the Owner/shipyard for resolution and shall also identify any criteria that the ABS Surveyors must field-verify.

The ABS Surveyor shall verify that the submitted drawings match the constructed vessel. The ABS Surveyor shall also verify any criteria that are outstanding from the ABS Engineering review and document deviations from criteria.

8 Surveys after Construction (1 April 2016)

It is intended that all surveys after construction are to be **aligned** with Classification Surveys. **Harmonization** of surveys it to be carried out at the first available opportunity.

8.1 Annual Surveys

The following information shall be reviewed by the attending ABS Surveyor for issues that could **affect** the **PMA** or **PMA+** notation.

- i) Hull maintenance records since **the** previous hull survey or date of build
- ii) Repair and damage reports since **the** previous hull survey or date of build
- iii) Previous hull classification reports
- iv) Approved copy of the Ship's Structure Access Manual

- v) A list of all means of access alterations/repairs to the vessel since the previous hull survey or date of build
- vi) General condition of means of access as accessible in any tanks that are internally examined as part of the applicable annual survey

During the attending ABS Surveyor's review of the submitted information, a determination will be made as to whether changes or alterations have taken place that could affect the PMA or PMA+ notation. As a result, the details of any modification or alterations may need to be submitted for review and approval by ABS.

8.2 Intermediate Survey

In addition to the requirements of the Annual Survey, means of access are to be surveyed as part of the Intermediate Survey – Hull, as follows:

- Examination of means of access in all tanks that are examined internally as part of the intermediate hull survey.

8.3 Special Periodical Surveys

In addition to the requirements of the Annual Survey, means of access are to be surveyed as part of the Special Periodical Survey – Hull, as follows:

- Examination of all means of access in all tanks.

8.4 Requirements for Vessel Alterations

No alterations which affect or may affect the PMA or PMA+ notations being awarded are to be made to the vessel unless plans of the proposed alterations are submitted and approved by ABS before the work is commenced. If ABS determines that the alteration will affect the means of access notation, the altered vessel shall be subject to the review and verification requirements of this Guide.

9 Units of Measure (1 April 2016)

The Guide uses both SI and US units of measure. Within this document the SI unit is listed first with the US unit of measure in parentheses. The SI unit indicates the driving measure, *not* the US unit. The US units are provided for the convenience of general users.

To maintain consistency between other ABS ergonomics and human factors documentation, the same US unit of measure rounding scheme has been used in this document. US units of measure expressed in inches (in.) are rounded to the nearest half inch (0.5 in.). US units of measure expressed in feet (ft) are rounded to the one-half foot (0.5 ft).

10 Alternatives (1 April 2016)

10.1 General

ABS will consider alternative arrangements or criteria which can be shown to meet the intent of criteria directly cited or referred to in this Guide. The demonstration of an alternative's acceptability can be made through either the presentation of satisfactory service experience or systematic analysis based on valid engineering principles.

10.2 Other Regulations

ABS may consider for its acceptance, alternative arrangements and details which can be shown to comply with standards recognized in the country (flag State) in which the vessel is registered or operated, provided they are deemed not less effective.

10.3 Departures from Criteria

It is recognized that unusual or unforeseen conditions may lead to a case where one or more of the parameters of interest in granting a notation may temporarily fall outside the range of acceptability.

When a departure from criteria is identified during either the notation's initial issuance or reconfirmation process, it shall be reviewed by ABS in consultation with the Owner. When the ergonomic design contains departures from the stated criteria, these will be subject to special consideration upon the receipt of details about the departure. Depending on the degree and consequences of the departure, the shipyard or Owner may be required to provide an assessment and remediation plan to obtain or maintain the notation. Failure to complete the agreed remediation by the due date will lead to withdrawal of the notation.



SECTION 2 Means of Access Requirements and Interpretations

1 Introduction

This Section presents the means of access requirements set forth in MSC Resolution MSC.151(78), MSC Resolution MSC.158(78), and the associated IACS Unified Interpretations.

Subsection 2/3, “Overview of Means of Access Requirements” presents a summary of the IMO requirements in tabular form. Subsection 2/4, “Specific Means of Access Requirements for Oil Tankers” and Subsection 2/5, “Specific Means of Access Requirements for Bulk Carriers” present the actual requirements and interpretations contained in the MSC and the IACS documentation.

Where appropriate, additional guidance, via text and graphics, has been provided to further promote the interpretation and application of the means of access requirements.

2 Associated Documentation *(1 April 2016)*

The following documents provide specific details about the IMO requirements for means of access contained in this Section:

- SOLAS regulation II-1/3-6, “Access to and Within Spaces in, and Forward of, the Cargo Area of Oil Tankers and Bulk Carriers”
- **IMO** Resolution MSC.151 (78) (adopted on 20 May 2004), “Adoption of Amendments to the International Convention for the Safety of Life at Sea, 1974, as Amended”
- **IMO** Resolution MSC.158 (78) (adopted 20 May 2004), “Amendments to the Technical Provisions for Means of Access for Inspections”
- IACS Unified Interpretation (UI) SC 191 for the application of amended SOLAS regulation II-1/3-6 (resolution MSC.151 (78)) and revised Technical provisions for means of access for inspections (resolution MSC.158 (78))

3 Overview of Means of Access Requirements

This Subsection summarizes the means of access requirements for oil tankers and bulk carriers as presented in MSC.158(78).

The following two (2) tables, Section 2, Table 1 “Application of Resolution MSC.158(78) Table 1 for Oil Tankers” and Section 2, Table 2, “Application of Resolution MSC.158(78) Table 2 for Bulk Carriers” were created to simplify the use and application of the extensive tables containing the MSC means of access requirements.

These tables are arranged with column and row headings for different areas of vessel tanks and holds/spaces as well as tank or hold/space dimensions (heights and widths). This format allows for the quick identification of means of access requirements.

To reduce potential confusion for users of this Guide who may already be familiar with the MSC.158(78) tables, the requirements contained in this Guide's Section 2, Table 1 summarize the requirements contained in the MSC.158(78) Table 1. This Guide's Section 2, Table 2 summarizes the requirements contained in the MSC.158(78) Table 2.

To further simplify the use of these tables, the numbering scheme used in the MSC tables has been preserved. For example, in Section 2, Table 1, in the Underdeck Structure row, tanks with a height of 6 meters or more are required to meet MSC.158(78) Table 1 requirements of 1.1.1, 1.1.2, and 1.1.3. The same rational has been applied to MSC.158(78) Table 2.

TABLE 1
Application of Resolution MSC.158(78) Table 1 for Oil Tankers*

<i>Cargo/Ballast Tanks</i>	<i>Tank Height ≥ 6 m (19.5 ft)</i>	<i>Tank Height < 6 m (19.5 ft)</i>	
Underdeck Structure	1.1.1, 1.1.2, 1.1.3	1.2	
Longitudinal Bulkhead	1.1.4 or 1.1.6 ⁺		
Cross Tie (≥ 6 m (19.5 ft) above tank bottom)	1.1.5		
<i>Ballast Tank and Double Side Skin Space</i>	<i>Tank/Space Width ≥ 5 m (16.5 ft)</i>	<i>Tank/Space Width < 5 m (16.5 ft)</i>	
		<i>Height ≥ 6 m (19.5 ft)</i>	<i>Height < 6 m (19.5 ft)</i>
Wall-sided Mid-Depth Portion (Between Topside and Hopper Portions)	1.1.4 or 1.1.6 ⁺	2.1	Not Applicable
Lower Hopper Portion/Tank	1.1.5	2.2	2.3
Fore Peak Tanks	1.3	1.3	

* = Numbers in this table correspond to MSC.158 (78) Table 1, "Means of Access for Ballast/Cargo Tanks of Oil Tankers".

⁺ = If Height < 17 m (56.0 ft)

TABLE 2
Application of Resolution MSC.158(78) Table 2 for Bulk Carriers*

<i>Cargo Holds</i>	<i>Hold Height ≥ 17 m (56.0 ft)</i>	<i>Hold Height < 17 m (56.0 ft)</i>
Underdeck Structure	1.1, 1.2, 1.3, 1.4	1.5
Side Shell	1.6 ⁺ or 1.8, 1.7, 1.9 ⁺ , 1.10 ⁺	Not Applicable
Vertical Bulkhead	1.7	
<i>Ballast and Double Side Skin Spaces</i>	<i>Tank/Space Height ≥ 6 m (19.5 ft)</i>	<i>Tank/Space Height < 6 m (19.5 ft)</i>
Wall-sided Mid-Depth Portion (Between Topside and Hopper Portions)	2.8	2.8
Upper Topside Tank	2.1, 2.2, 2.3	2.4
Lower Hopper Portion/Tank	2.5 and 2.6	2.7
Fore Peak Tanks	2.9	2.9

* = Numbers in this table correspond to MSC.158 (78) Table 2, "Means of Access for Bulk Carriers".

⁺ = Single side skin construction only.

4 Specific Means of Access Requirements for Oil Tankers

The specific means of access requirements for oil tankers displayed in Section 2, Table 1 “Application of Resolution MSC.158(78) Table 1 for Oil Tankers”, as interpreted by IACS UI SC 191, are presented in this Subsection.

Note: Those requirements that relate to permanent means of access are prerequisites for the **PMA** notation. The **PMA** notation does not include the IMO requirements or allowances for alternative or temporary means of access.

Each MSC requirement is presented in its entirety along with any associated IACS unified interpretation. Graphical representations for some of the means of access requirements have been provided to help clarify or demonstrate the requirement’s intent. Also, additional guidance related to the design of the means of access is provided.

Note: Graphics are for demonstrative purposes only and are not to scale.

In some of the figures, specific dimensions are provided. These dimensions will help clarify the means of access requirement and/or the interpretation. Where appropriate, IMO, **PMA** and **PMA+** dimensional requirements are provided. These dimensions are to be used in conjunction with the additional guidance contained in the following Sections:

- Section 3, “Walkways, Ramps and Work Platforms”,
- Section 4, “Vertical Ladders, Inclined Ladders and Handles”, and
- Section 5, “Hatches.”

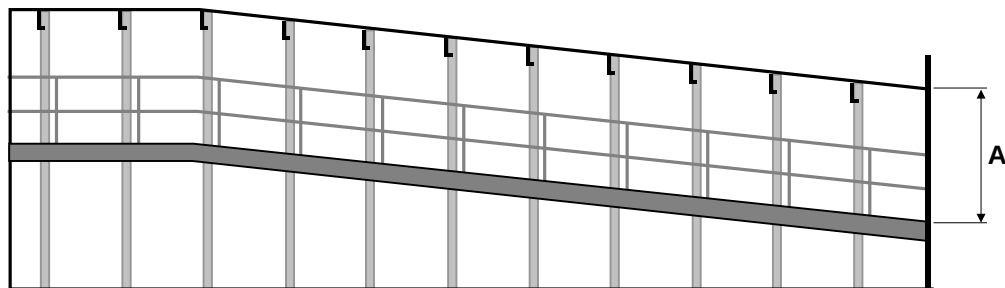
4.1 Means of Access Requirements for Table 1/1.1 of MSC.158(78) for Oil Tankers (Tanks with a Height > 6 m (19.5 ft) and Containing Internal Structures)

<i>Means of Access Requirements for Table 1/1.1 of MSC.158(78) for Oil Tankers</i>		
PMA Requirement	Means of Access Requirement	“For tanks of which the height is 6 m and over containing internal structures, permanent means of access shall be provided in accordance with .1 to .6:”
	IACS Interpretation	• Sub-paragraphs .1, .2 and .3 define access to underdeck structure, access to the uppermost sections of transverse webs and connection between these structures. • Sub-paragraphs .4, .5 and .6 define access to vertical structures only and are linked to the presence of transverse webs on longitudinal bulkheads. • If there are no underdeck structures (deck longitudinals and deck transverses) but there are vertical structures in the cargo tank supporting transverse and longitudinal bulkheads, access in accordance with sub-paragraphs from .1 through to .6 is to be provided for inspection of the upper parts of vertical structure on transverse and longitudinal bulkheads. • If there is no structure in the cargo tank, section 1.1 of Table 1 is not to be applied. • Section 1 of Table 1 is also to be applied to void spaces in cargo area, comparable in volume to spaces covered by the regulation II-1/3-6, except those spaces covered by Section 2. • The vertical distance below the overhead structure is to be measured from the underside of the main deck plating to the top of the platform of the means of access at a given location. • The height of the tank is to be measured at each tank. For a tank the height of which varies at different bays, item 1.1 is to be applied to such bays of a tank that have height 6 m (19.5 ft) and over.
PMA+ Requirement		No additional PMA+ requirements.
Additional Guidance		• Detailed walkway design guidance is available in Section 3, “Walkways and Ramps.” • Detailed ladder and handle guidance is available in Section 4, guidance “Vertical Ladders, Inclined Ladders, and Handles” • Detailed guidance for hatch design is available in Section 5, “Hatches.”

4.2 Means of Access Requirements for Table 1/1.1.1 of MSC.158(78) for Oil Tankers (Tanks with a Height > 6 m (19.5 ft) and Containing Internal Structures) (1 April 2016)

<i>Means of Access Requirements for Table 1/1.1.1 of MSC.158(78) for Oil Tankers</i>			
PMA Requirement	Means of Access Requirement	“Continuous athwartship permanent access arranged at each transverse bulkhead on the stiffened surface, at a minimum of 1.6 m to a maximum of 3 m below the deck head.”	
		<i>Dimension</i>	<i>MSC.158(78) Requirement</i>
		A Distance below deckhead	≥ 1600 mm (63.0 in.) and ≤ 3 m (10.0 ft)
	IACS Interpretation	“The vertical distance below the overhead structure is to be measured from the underside of the main deck plating to the top of the platform of the means of access at a given location.”	
PMA+ Requirement	<i>Dimension</i>		PMA+ Requirement
	A	Distance below deckhead	≥ 2130 mm (84.0 in.) and ≤ 3 m (10.0 ft)
Additional Guidance		- Section 2, Figure 1, “Access at Transverse Bulkhead on Stiffened Side of an Underdeck Structure for Ballast/Cargo Tanks ≥ 6 meters in Height” is provided to help illustrate this requirement. - Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps.” - Continuous athwartship PMA is usually arranged at the same level as integrated structural members (horizontal girders).	

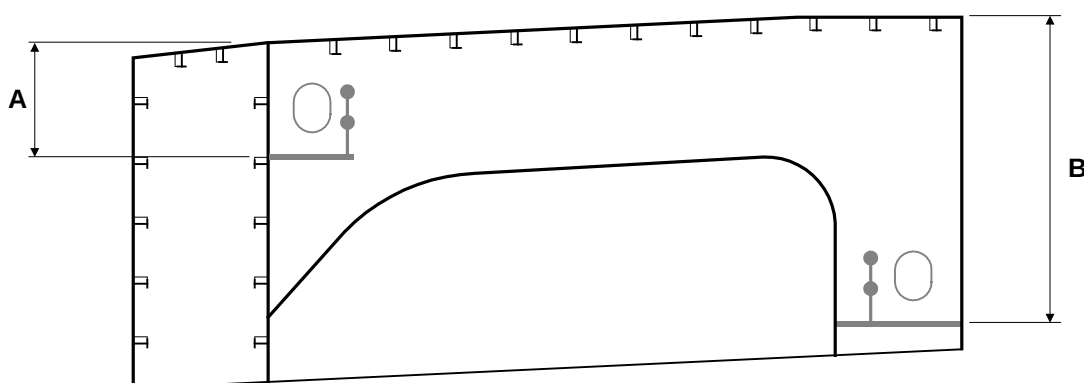
FIGURE 1
Access at Transverse Bulkhead on Stiffened Side of an Underdeck Structure for Ballast/Cargo Tanks ≥ 6 m (19.5 ft) in Height



4.3 Means of Access Requirements for Table 1/1.1.2 of MSC.158(78) for Oil Tankers (Tanks with a Height > 6 m (19.5 ft) and Containing Internal Structures) (1 April 2016)

Means of Access Requirements for Table 1/1.1.2 of MSC.158(78) for Oil Tankers				
PMA Requirement	Means of Access Requirement	“At least one continuous longitudinal permanent means of access at each side of the tank. One of these accesses shall be at a minimum of 1.6 m to a maximum of 6 m below the deck head and the other shall be at a minimum of 1.6 m to a maximum of 3 m below the deck head.”		
		Dimension		MSC.158(78) Requirement
		A	Distance below deckhead	≥ 1600 mm (63.0 in.) and ≤ 3 m (10.0 ft)
		B	Distance below deckhead	≥ 1600 mm (63.0 in.) and ≤ 6 m (19.5 ft)
	IACS Interpretation	“There is need to provide continuous longitudinal permanent means of access when the deck longitudinals and deck transverses are fitted on deck but supporting brackets are fitted under the deck.”		
PMA+ Requirement		Dimension		PMA+ Requirement
		A	Distance below deckhead	≥ 2130 mm (84.0 in.) and ≤ 3 m (10.0 ft)
		B	Distance below deckhead	≥ 2130 mm (84.0 in.) and ≤ 6 m (19.5 ft)
Additional Guidance		- Section 2, Figure 2, “Continuous Longitudinal Access on Each Side of the Tank of the Underdeck Structure for Ballast/Cargo Tanks ≥ 6 meters in Height” is provided to help illustrate these requirements. - Distances “A” and “B” below the deckhead are measured from the underside of the plating to the top of the platform. - Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps”. - Detailed hatch design guidance is available in Section 5, “Hatches”.		

FIGURE 2
Continuous Longitudinal Access on Each Side of the Tank of the Underdeck Structure for Ballast/Cargo Tanks ≥ 6 m (19.5 ft) in Height



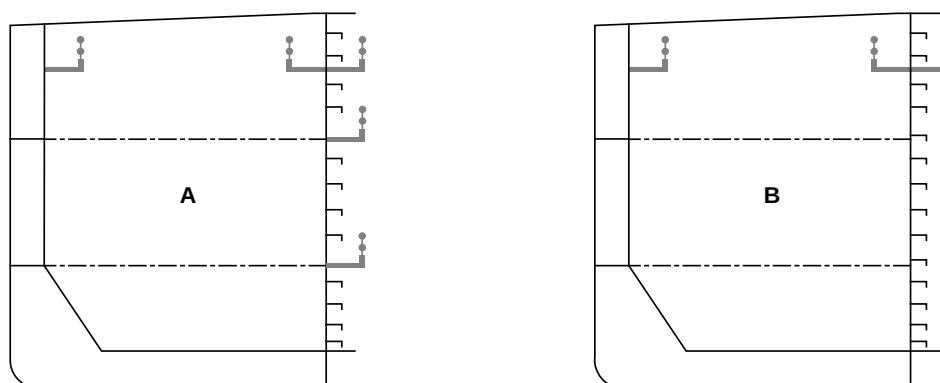
4.4 Means of Access Requirements for Table 1/1.1.3 of MSC.158(78) for Oil Tankers (Tanks with a Height > 6 m (19.5 ft) and Containing Internal Structures)

<i>Means of Access Requirements for Table 1/1.1.3 of MSC.158(78) for Oil Tankers</i>		
PMA Requirement	Means of Access Requirement	“Access between the arrangements specified in 1.1.1 and 1.1.2 and from the main deck to either 1.1.1 or 1.1.2.”
	IACS Interpretation	“Means of access to tanks may be used for access to the permanent means of access for inspection.”
PMA+ Requirement		No additional PMA+ requirements.
Additional Guidance		- Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps”. - Detailed hatch design guidance is available in Section 5, “Hatches”.

4.5 Means of Access Requirements for Table 1/1.1.4 of MSC.158(78) for Oil Tankers (Tanks with a Height > 6 m (19.5 ft) and Containing Internal Structures) (1 April 2016)

<i>Means of Access Requirements for Table 1/1.1.4 of MSC.158(78) for Oil Tankers</i>		
PMA Requirement	Means of Access Requirement	“Continuous longitudinal permanent means of access which are integrated in the structural member on the stiffened surface of a longitudinal bulkhead, in alignment, where possible, with horizontal girders of transverse bulkheads are to be provided for access to the transverse webs unless permanent fittings are installed at the uppermost platform for use of alternative means, as defined in paragraph 3.9 of the Technical provisions, for inspection at intermediate heights.”
	IACS Interpretation	“The permanent fittings required to serve alternative means of access such as wire lift platform, that are to be used by crew and Surveyors for inspection shall provide at least an equal level of safety as the permanent means of access stated by the same paragraph. These means of access shall be carried on board the ship and be readily available for use without filling of water in the tank. Therefore, rafting is not acceptable under this provision.” “Alternative means of access are to be part of Access Manual, which is to be approved on behalf of the Flag State.” - For water ballast tanks of 5 m or more in width, such as on an ore carrier, side shell plating shall be considered in the same way as “longitudinal bulkhead”.
PMA+ Requirement		No additional PMA+ requirements.
Additional Guidance		- Section 2, Figure 3, “Integrated Continuous Longitudinal Access of a Longitudinal Bulkhead of Cargo Tanks or Holds”, shows two views of this requirement. - Graphic “A” shows the intent of this requirement. - Graphic “B” shows an alternative design if permanent fittings (e.g., to accommodate a wire lift platform) are installed at the uppermost platform to obtain access to the vertical web. - Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps”.

FIGURE 3
Integrated Continuous Longitudinal Access of a Longitudinal Bulkhead of Cargo Tanks or Holds



4.6 Means of Access Requirements for Table 1/1.1.5 of MSC.158(78) for Oil Tankers (Tanks with a Height > 6 m (19.5 ft) and Containing Internal Structures) (1 April 2016)

Means of Access Requirements for Table 1/1.1.5 of MSC.158(78) for Oil Tankers				
PMA Requirement	Means of Access Requirement	“For ships having cross-ties which are 6 m or more above tank bottom, a transverse permanent means of access on the cross-ties providing inspection of the tie flaring brackets at both sides of the tank, with access from one of the longitudinal permanent means of access in 1.1.4.”		
		Dimension		MSC.158(78) Requirement
		A	Handrail height	≥ 1000 mm (39.5 in.)
	IACS Interpretation	No interpretation provided.		
PMA+ Requirement		A continuous walkway (as illustrated below) is provided for at least 25 percent of all cross-ties in a tank, or at least one (1) per tank, whichever is greater.		
Additional Guidance		- Section 2, Figure 4A, “Access for Cross-ties ≥ 6 m Above the Tank Bottom of Cargo Tanks or Holds” is provided to help illustrate this requirement. This figure shows a continuous walkway extending across the cross-tie. This ergonomic improvement will help enhance inspection and facilitate quicker access to flaring brackets on both sides of the tank. - Section 2, Figure 4B, “Access for Cross-ties ≥ 6 m Above the Tank Bottom of Cargo Tanks or Holds – Alternative Arrangement” is provided to help illustrate an alternative solution when longitudinal permanent means of access is provided at each end of the cross tie. - An important design consideration is the distance of the walkway below the top of the cross-tie. The distance of the walkway below the cross-tie shall be approximately 1000 mm (39.5 in.). This will help eliminate a potential falling hazard. - Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps”. - Detailed hatch design guidance is available in Section 5, “Hatches”.		

FIGURE 4A
Access for Cross-ties ≥ 6 m (19.5 ft) Above the Tank Bottom of Cargo Tanks or Holds

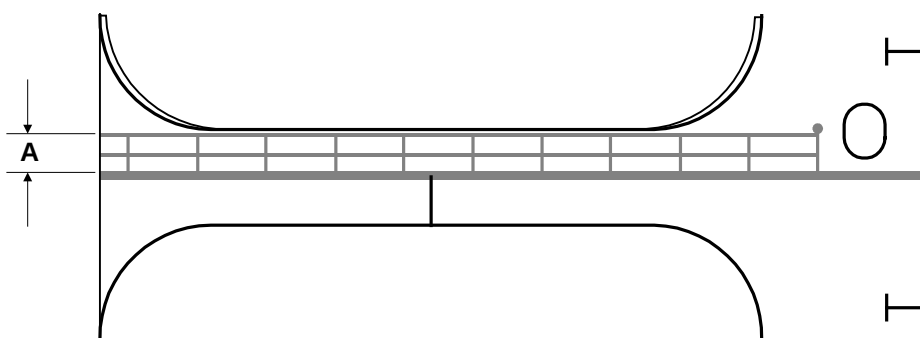
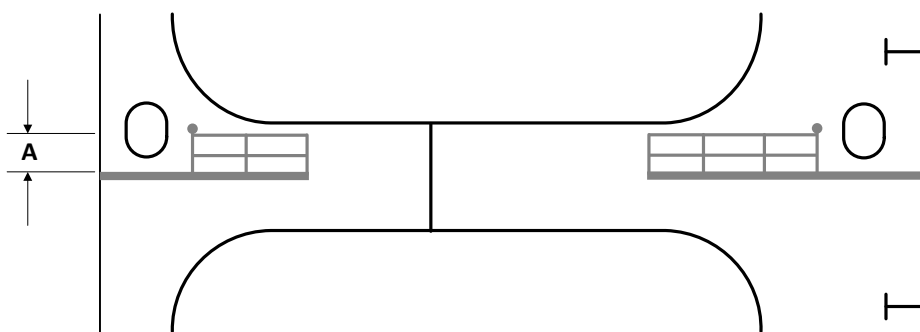


FIGURE 4B
Access for Cross-ties ≥ 6 m (19.5 ft) Above the Tank Bottom of Cargo Tanks or Holds – Alternative Arrangement (1 April 2016)



4.7 Means of Access Requirements for Table 1/1.1.6 of MSC.158(78) for Oil Tankers (Tanks with a Height > 6 m (19.5 ft) and Containing Internal Structures)

<i>Means of Access Requirements for Table 1/1.1.6 of MSC.158(78) for Oil Tankers</i>	
Means of Access Requirement	“Alternative means as defined paragraph 3.9 in the Technical provisions may be provided for small ships as an alternative to 1.1.4 for cargo oil tanks of which the height is less than 17 m.”
IACS Interpretation	No interpretation provided.
PMA+ Requirement	No additional PMA+ requirements.
Additional Guidance	Additional guidance on the design and selection of alternative means of access is available in Section 6, “Alternative Means of Access”.

4.8 Means of Access Requirements for Table 1/1.2 of MSC.158(78) for Oil Tankers (Tanks with a Height < 6 m (19.5 ft))

<i>Means of Access Requirements for Table 1/1.2 of MSC.158(78) for Oil Tankers</i>	
Means of Access Requirement	“For tanks of which the height is less than 6 m, alternative means as defined in paragraph 3.9 of the Technical provisions or portable means may be utilized in lieu of the permanent means of access.”
IACS Interpretation	No interpretation provided.
PMA+ Requirement	No additional PMA+ requirements.
Additional Guidance	Additional guidance on the design and selection of alternative means of access is available in Section 6, “Alternative Means of Access”.

4.9 Means of Access Requirements for Table 1/1.3 of MSC.158(78) for Oil Tankers (Fore Peak Tanks)

<i>Means of Access Requirements for Table 1/1.3 of MSC.158(78) for Oil Tankers</i>		
PMA Requirement	Means of Access Requirement	“For fore peak tanks with a depth of 6 m or more at the center line of the collision bulkhead, a suitable means of access shall be provided for access to critical areas such as the underdeck structure, stringers, collision bulkhead and side shell structure.”
	IACS Interpretation	No interpretation provided.
PMA+ Requirement		No additional PMA+ requirements.
Additional Guidance		- Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps”. - Detailed hatch design guidance is available in Section 5, “Hatches”.

4.10 Means of Access Requirements for Table 1/1.3.1 of MSC.158(78) for Oil Tankers (Fore Peak Tanks)

<i>Means of Access Requirements for Table 1/1.3.1 of MSC.158(78) for Oil Tankers</i>		
PMA Requirement	Means of Access Requirement	“Stringers of less than 6 m in vertical distance from the deck head or a stringer immediately above are considered to provide suitable access in combination with portable means of access.”
	IACS Interpretation	No interpretation provided.
PMA+ Requirement		No additional PMA+ requirements.
Additional Guidance		- Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps”. - Additional guidance on the design and selection of alternative means of access is available in Section 6, “Alternative Means of Access”.

4.11 Means of Access Requirements for Table 1/1.3.2 of MSC.158(78) for Oil Tankers (Fore Peak Tanks)

<i>Means of Access Requirements for Table 1/1.3.2 of MSC.158(78) for Oil Tankers</i>	
Means of Access Requirement	"In case the vertical distance between the deck head and stringers, stringers or the lowest stringer and the tank bottom is 6 m or more, alternative means of access as defined in paragraph 3.9 of the Technical provisions shall be provided."
IACS Interpretation	No interpretation provided.
PMA+ Requirement	No additional PMA+ requirements.
Additional Guidance	- Detailed walkway design guidance is available in Subsection 3/2, "Walkways and Ramps". - Additional guidance on the design and selection of alternative means of access is available in Section 6, "Alternative Means of Access".

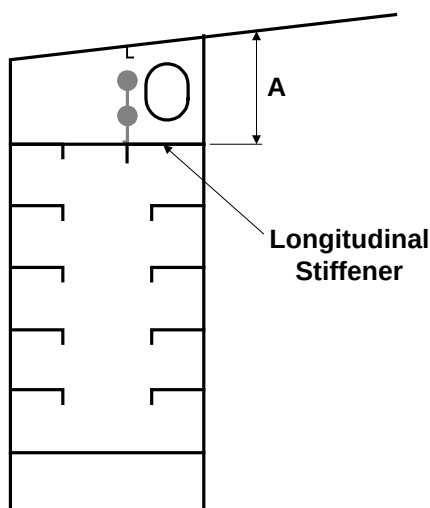
4.12 Means of Access Requirements for Table 1/2.1 of MSC.158(78) for Oil Tankers (Water Ballast Wing Tanks ≤ 5 m (16.5 ft) Width Forming Double Side Spaces and their Bilge Hopper Sections)

<i>Means of Access Requirements for Table 1/2.1 of MSC.158(78) for Oil Tankers</i>		
PMA Requirement	Means of Access Requirement	"For double side spaces above the upper knuckle point of the bilge hopper sections, permanent means of access are to be provided in accordance with .1 to .3:"
	IACS Interpretation	"Section 2 of Table 1 (The above requirement – 4.10 MSC Requirement 1.3.2 (Fore Peak Tanks) is also to be applied to wing tanks designed as void spaces."
PMA+ Requirement		No additional PMA+ requirements.
Additional Guidance		- Detailed walkway design guidance is available in Subsection 3/2, "Walkways and Ramps". - Detailed hatch design guidance is available in Section 5, "Hatches".

4.13 Means of Access Requirements for Table 1/2.1.1 of MSC.158(78) for Oil Tankers (Double Side Spaces < 5 m (16.5 ft) in Width Above the Upper Knuckle Point of the Bilge Hopper Sections) (1 April 2016)

Means of Access Requirements for Table 1/2.1.1 of MSC.158(78) for Oil Tankers			
PMA Requirement	Means of Access Requirement	“Where the vertical distance between horizontal uppermost stringer and deck head is 6 m or more, one continuous permanent means of access shall be provided for the full length of the tank with a means to allow passing through transverse webs installed a minimum of 1.6 m to a maximum of 3 m below the deck head with a vertical access ladder at each end of tank.”	
		Dimension	MSC.158(78) Requirement
		A	Distance below deckhead
			≥ 1600 mm (63.0 in.) and ≤ 3 m (10.0 ft)
PMA+ Requirement	IACS Interpretation	“This paragraph (2.1.1) represents requirements for access to underdeck structures. - For a tank the vertical distance between horizontal upper stringer and deck head of which varies at different sections item 2.1.1 is to be applied to such sections that fall under the criteria. - The continuous permanent means of access may be a wide longitudinal, which provides access to critical details on the opposite side by means of platforms as necessary on web frames. In case the vertical opening of the web frame is located in way of the open part between the wide longitudinal and the longitudinal on the opposite side, platforms shall be provided on both sides of the web frames to allow safe passage through the web frame. - Where two access hatches are required by SOLAS regulation II-1/3-6.3.2, access ladders at each end of the tank are to lead to the deck.”	
		Dimension	PMA+ Requirement
		A	Distance below deckhead
			≥ 2130 mm (84.0 in.) and ≤ 3 m (10.0 ft)
Additional Guidance		- Section 2, Figure 5, “Access Where the Vertical Distance Between the Horizontal Uppermost Stringer and Deck Hold is ≥ 6 m” is provided to help illustrate these requirements. - Distance “A” below the deckhead is measured from the underside of the plating to the top of the platform. - Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps”. - Detailed hatch design guidance is available in Section 5, “Hatches”.	

FIGURE 5
Access Where the Vertical Distance Between the Horizontal Uppermost Stringer and Deck Hold is ≥ 6 m (19.5 ft)



4.14 Means of Access Requirements for Table 1/2.1.2 of MSC.158(78) for Oil Tankers (Continuous Longitudinal Means of Access)

Means of Access Requirements for Table 1/2.1.2 of MSC.158(78) for Oil Tankers			
PMA Requirement	Means of Access Requirement	Continuous longitudinal permanent means of access, which are integrated in the structure, at a vertical distance not exceeding 6 m (19.5 ft) apart.	
		Dimension	
		A	Access height
	IACS Interpretation	MSC.158(78) Requirement	
		≤ 6 m (19.5 ft)	
		“This paragraph (2.1.2) is a requirement for access for survey and inspection of vertical structures on longitudinal bulkheads (transverse webs). - The continuous permanent means of access may be a wide longitudinal, which provides access to critical details on the opposite side by means of platforms as necessary on web frames. In case the vertical opening of the web is located in way of the open part between the wide longitudinal and the longitudinal on the opposite side, platforms shall be provided on both sides of the web to allow safe passage through the web. A "reasonable deviation" as noted in TP/1.4, of not more than 10% may be applied where the permanent means of access is integral with the structure itself.”	
PMA+ Requirement		No additional PMA+ requirements.	
Additional Guidance		- Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps” and Subsection 3/3, “Work Platforms”. - Detailed hatch design guidance is available in Section 5, “Hatches”. - With the Administration’s approval, “reasonable deviations” may be applied to facilitate this means of access. IACS UI (SC) 191 has interpreted this to be no more than 10% for vertical distances exceeding 6 m (19.5 ft).	

4.15 Means of Access Requirements for Table 1/2.1.3 of MSC.158(78) for Oil Tankers (Continuous Longitudinal Means of Access)

<i>Means of Access Requirements for Table 1/ 2.1.3 of MSC.158(78) for Oil Tankers</i>		
PMA Requirement	Means of Access Requirement	Plated stringers shall, as far as possible, be in alignment with horizontal girders of transverse bulkheads.
	IACS Interpretation	No interpretation provided.
PMA+ Requirement		No additional PMA+ requirements.
Additional Guidance		Detailed walkway design guidance is available in Subsection 3/2, "Walkways and Ramps".

4.16 Means of Access Requirements for Table 1/2.2 of MSC.158(78) for Oil Tankers (Access for Distances ≥ 6 m (19.5 ft) from the Tank Bottom to the Upper Knuckle Point) (1 April 2016)

Means of Access Requirements for Table 1/2.2 of MSC.158(78) for Oil Tankers				
PMA Requirement	Means of Access Requirement	“For bilge hopper sections of which the vertical distance from the tank bottom to the upper knuckle point is 6 m and over, one longitudinal permanent means of access shall be provided for the full length of the tank. It shall be accessible by vertical permanent means of access at both ends of the tank.”		
		Dimension		MSC.158(78) Requirement
		A	Distance from the top of the bilge hopper	≥ 1600 mm (63.0 in.) and ≤ 3 m (10.0 ft)
		B	Hopper height	≥ 6 m (19.5 ft)
	IACS Interpretation	“Permanent means of access between the longitudinal continuous permanent means of access and the bottom of the space is to be provided. - The height of a bilge hopper tank located outside of the parallel part of vessel is to be taken as the maximum of the clear vertical distance measured from the bottom plating to the hopper plating of the tank. - The foremost and aft most bilge hopper ballast tanks with raised bottom, of which the height is 6 m (19.5 ft) and over, a combination of transverse and vertical MA for access to the upper knuckle point for each transverse web is to be accepted in place of the longitudinal permanent means of access.”		
PMA+ Requirement		Dimension		PMA+ Requirement
		A	Distance from the top of the bilge hopper	≥ 2130 mm (84.0 in.) and ≤ 3 m (10.0 ft)
Additional Guidance		- Section 2, Figure 6, “Access for Bilge Hopper Sections Where the Vertical Distance from the Tank Bottom to the Upper Knuckle Point is ≥ 6 m” is provided to help illustrate this requirement. - Distance “A” from the top of the bilge hopper is measured from the underside of the plating to the top of the platform. - Detailed walkway design guidance is available in Subsection 3/2, “Walkways and Ramps”. - Detailed hatch design guidance is available in Section 5, “Hatches”.		

FIGURE 6
Access for Bilge Hopper Sections Where the Vertical Distance from the Tank Bottom to the Upper Knuckle Point is ≥ 6 m (19.5 ft)

