



GUIDE FOR BUILDING AND CLASSING

ASPHALT CARRIERS WITH INDEPENDENT TANKS

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Foreword

Asphalt (also commonly referred to as bitumen) is usually stored at an elevated temperature during transportation, which results in the design of asphalt carriers being quite different from conventional oil carriers. Asphalt carriers with independent cargo tanks have several advantages over the integral tank type (e.g., minimum thermal heat loss and less thermal stress in hull structure) and are now becoming a dominant ship type for carriage of asphalt solutions. This Guide is developed and issued in response to the market demand.

This Guide provides the requirements to verify the eligibility for the notation **✕ A1 Asphalt Carrier with Independent Tanks (temp°C)** for vessels designed for carriage of asphalt solutions within independent tanks.

The strength criteria contained herein are developed based on requirements of the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)* for fuel oil carriers and the *ABS Guide for Building and Classing Liquefied Gas Carriers with Independent Tanks (LGC Guide)* with due consideration of the influence from high temperature cargo. This Guide is to be used in conjunction with the *Steel Vessel Rules* and the *LGC 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.



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SECTION 1 Introduction

1 General

1.1 Classification

In accordance with 1-1-3/3 of the *ABS Rules for Conditions of Classification (Part 1)*, the classification notation **A1 Asphalt Carrier with Independent Tanks (*temp*°C)** is to be assigned to vessels designed for carriage of asphalt solutions with maximum design cargo temperature of *temp*°C in independent tanks (during loading, steady state, etc.), and built to the requirements of this Guide and other relevant sections of the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*.

In addition, the classification notation **SH, SHCM** is to be assigned to vessels having lengths of 150 m (492 ft) and above.

As used in the Guide, the term “asphalt solutions” refers to asphalt solutions listed in Appendix I to Annex I of MARPOL 1973 as modified by the 1978 and 1997 Protocols, and having flash points above 60°C (140°F), closed cup test.

1.3 Optional Class Notation for Design Fatigue Life

Vessels designed and built to the requirements in this Guide are intended to have a structural fatigue life of not less than 20 years. Where a vessel’s design calls for a fatigue life in excess of the minimum design fatigue life of 20 years, the optional class notation **FL (year)** will be assigned at the request of the applicant. This optional notation is eligible provided the excess design fatigue life is verified to be in compliance with the criteria in Appendix 3 of the *ABS Guide for Building and Classing Liquefied Gas Carriers with Independent Tanks (LGC Guide)*. The **(year)** refers to the fatigue life equal to 25 years or more (in 5-year increments) as specified by the applicant. The fatigue life will be identified in the *Record* by the notation **FL (year)** (e.g., **FL(30)** if the minimum design fatigue life assessed is 30 years).

Only one design fatigue life value is published for the entire structural system. Where differing design fatigue life values are intended for different structural elements within the vessel, the **(year)** refers to the least of the varying target lives. The “design fatigue life” refers to the target value set by the applicant, not the value calculated in the analysis.

1.5 Application

1.5.1 General

In view of the similarity of structural arrangements, this Guide has many cross-references to the general requirements for hull construction in Part 3 of the *Steel Vessel Rules*, the particular requirements in Part 5C, Chapter 1 and 2 of the *Steel Vessel Rules* for vessels intended to carry oil in bulk, and the *LGC Guide*.

These cross-references are presented in a simple format throughout the Guide in order to provide quick reference to the users, (i.e., 1-2-3/4.5.6 of the *Steel Vessel Rules* denotes Part 1, Chapter 2, Section 3, Subparagraph 4.5.6 of the *Steel Vessel Rules*, and 1/2.3 of the *LGC Guide* denotes Section 1, Paragraph 2.3 of the *LGC Guide*).

1.5.2 Size and Proportion

The requirements contained in this Guide are applicable to asphalt carriers with independent tanks intended for unrestricted service, having lengths of 90 m (295 ft) or more, and having parameters within the ranges as specified in 3-2-1/1 of the *Steel Vessel Rules*.

1.5.3 SafeHull Construction Monitoring Program

For the class notation **SH, SHCM**, a Construction Monitoring Plan for the critical areas, prepared in accordance with the requirements of Appendix 5C-A1 of the *Steel Vessel Rules*, is to be submitted for approval prior to commencement of fabrication.

1.7 Internal Members

The requirements in 1/1.7 of the *LGC Guide* are to be complied with.

1.9 Breaks

The requirements in 1/1.9 of the *LGC Guide* are to be complied with.

1.11 Variations

Asphalt carriers with independent tanks of a special type or design, differing from those described in this Guide, will be specially considered on the basis of equivalent strength.

1.13 Loading Guidance

The tanks are to be pre-heated when loading hot cargo in order to minimize the temperature discrepancies. In addition, loading guidance is to be as required by 3-2-1/7 of the *Steel Vessel Rules*.

1.15 Pressure-Vacuum Valve Setting

Where pressure-vacuum valves of cargo tanks are set at a pressure in excess of the pressure appropriate to the length of the vessel (see 5C-1-7/11.11.2 of the *Steel Vessel Rules*), the tank scantlings will be specially considered. Particular attention is to be given to a higher pressure setting of pressure-vacuum valves as may be required for efficient operation of cargo vapor emission control systems, where installed.

1.17 Protection of Structure

For the protection of structure, see 3-2-18/5 of the *Steel Vessel Rules*.

1.19 Tank Design Pressures

The requirements of this Guide are for tanks intended for the carriage of liquid cargoes with design specific gravities not greater than 1.05. Where the specific gravity is greater than 1.05, the scantling head, h , is to be increased by the ratio of specific gravity to 1.05. See also 5C-1-7/11 of the *Steel Vessel Rules* with regard to pressure-vacuum valve setting and liquid level control.

1.21 Fire Protection, Fire Detection, and Fire Extinction

Asphalt carriers are typically considered tankers with cargo having a flashpoint exceeding 60°C (140°F), closed cup test. The requirements of SOLAS II-2 and Part 4 and 5C of the *Steel Vessel Rules* are to be complied with (See Regulation 1/6.4 of SOLAS II-2). If asphalt solutions are to be carried above their flashpoint, the fire safety measures are to comply with the requirements for tankers with cargo having a flashpoint below 60°C in SOLAS II-2 and Part 4 and 5C of the *Steel Vessel Rules*. The grades of bitumen to be carried and the flashpoint temperatures are to be included in the loading manual for guidance to the Master.

3 References

The following Rules, Guides, Codes and Standards are referenced in this Guide:

- *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*
- *ABS Guide for Building and Classing Liquefied Gas Carriers with Independent Tanks (LGC Guide)*



SECTION 2 Ship Arrangement

1 General

The ship arrangements are to comply with the requirements in Annex I of MARPOL 1973, as amended with regard to oil fuel tank protection (Regulation 12A), double hull and double bottom requirements (Regulation 19), pump-room bottom protection (Regulation 22), accidental oil outflow performance (Regulation 23), and slop tanks (Regulation 29). Asphalt carrier of 30,000 tonnes deadweight is also to comply with requirements of segregated ballast tanks (Regulation 18) in Annex I of MARPOL 1973, as amended.

As per Regulation 19 of Annex I of MARPOL 1973, as amended, the independent cargo tanks are to be so located that the distance from the molded line of the bottom shell and side shell is to be not less than the limits as required by the aforementioned regulation.

3 Supports of Independent Tanks

3.1 General

The supports of independent tanks are to be so designed that the loads from the independent tanks are effectively transmitted to the tank supports, while the independent tanks are allowed to expand in all directions without restraint to reduce thermal stresses in the structures of independent tanks. Generally, the supports of independent tanks are also to be designed to limit transmission of loads relative to global and local hull deflection from the hull structures to the independent tanks as required in 3/9.1.

The supports of independent tanks are usually consist of the following:

- Vertical supports
- Anti-rolling chocks
- Anti-pitching chocks
- Anti-flotation chocks

3.3 Documents to Be Submitted

For supports of independent tanks, the following information is to be submitted:

- The tank supporting arrangement indicating the positions, type, and details of each supports
- Detailed hull/tank supporting structures in way of each supports
- Evidence (e.g., test reports or certificates) showing mechanical properties of the materials of supports, which are to include at least the compressive strength, shear strength, frictional coefficient and elasticity
- Test report of interface temperature of hull support structures in way of pads and pads with chocking compound

3.5 Materials of Supports

Contact surfaces of supports (vertical supports, anti-roll and anti-pitch chocks, etc.) are usually made of synthetic material such as resin, plywood and adhesive. Those materials are to be type approved.

5 Access to Space in Cargo Area

Note: Text in *italics* comes from the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code).

5.1 General

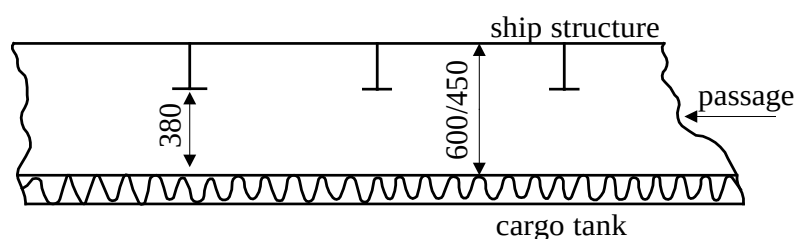
The access to space in cargo area of asphalt carriers with independent tanks is to comply with the requirements specified in 2/5.3 and 2/5.5. Asphalt carriers with independent tanks need not comply with SOLAS Regulation II-1/3-6, which is applicable to oil tankers having integral tanks for carriage of oil in bulk as contained in the definition of oil in Annex I of MARPOL 1973, as amended.

5.3 Access to Space Adjacent to Cargo Tank

5.3.1

Where it is required to pass between the surface to be inspected, flat or curved, and structures such as deck beams, stiffeners, frames, girders, etc., the distance between that surface and the free edge of the structural elements shall be at least 380 mm. The distance between the surface to be inspected and the surface to which the above structural elements are fitted, e.g. deck, bulkhead or shell, shall be at least 450 mm for a curved tank surface, or 600 mm for a flat tank surface. (See Section 2, Figure 1).

FIGURE 1



5.3.2

where it is not required to pass between the surface to be inspected and any part of the structure, for visibility reasons the distance between the free edge of that structural element and the surface to be inspected shall be at least 50 mm or half the breadth of the structure's face plate, whichever is the larger (See Section 2, Figure 2).

FIGURE 2

