Amended Guidances for the Classification of Steel Ships

(Part 7 Ships of Special Service)

Dec. 2019

KR

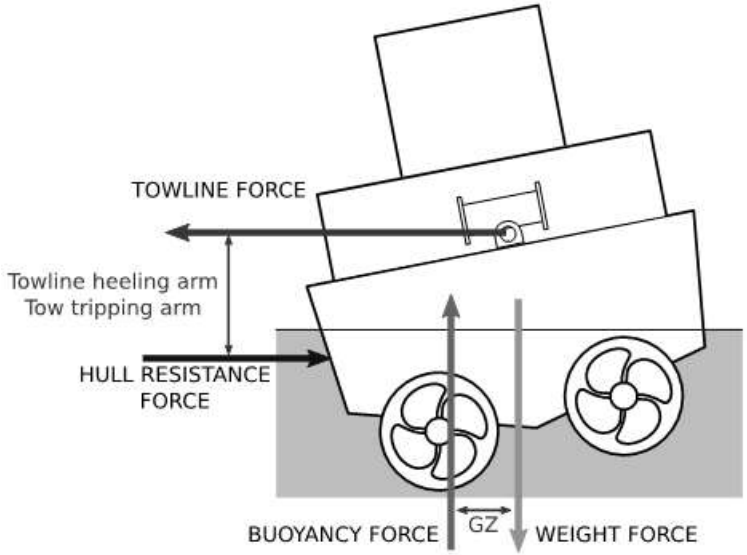
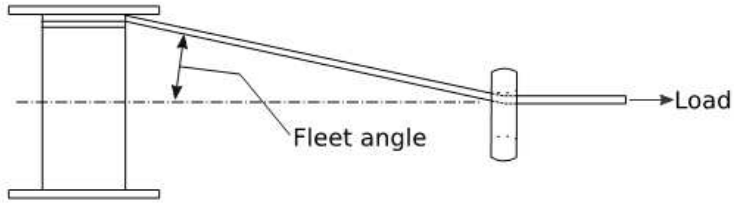
Effective date : 1 Jan. 2020

(1) Date of which the contract for construction is signed

◉ To reflect IACS UR M79(New Oct 2018)

- It has been reflected for requirements relating to towing winch's emergency release device.

Present	Amendment
<New>	**CHAPTER 9 TUGS** **Section 8 Towing Winch Emergency Release Systems** **801. General** **1.** Scope (1) This Section defines minimum safety standards for winch emergency release systems provided on towing winches that are used on towing ships within close quarters, ports or terminals. (2) This Section is not intended to cover towing winches on board ships used solely for long distance ocean towage, anchor handling or similar offshore activities. **2.** Definitions (1) Emergency release system refers to the mechanism and associated control arrangements that are used to release the load on the towline in a controlled manner under both normal and dead-ship conditions. (2) Maximum design load is the maximum load that can be held by the winch as defined by the manufacturer (the manufacturer's rating). (3) Girting means the capsize of a tug when in the act of towage as a result of the towline force acting transversely to the tug (in beam direction) as a consequence of an unexpected event (could be loss of propulsion/steering or otherwise), whereby the resulting couple generated by offset and opposing transverse forces (towline force is opposed by thrust or hull resistance force) causes the tug to heel and, ultimately, to capsize. This may also be referred to as 'girthing, 'girding' or 'tripping'. See **Fig 1** which shows the forces acting during towage operations. (4) Fleet angle is the angle between the applied load (towline force) and the towline as it is wound onto the winch drum, see **Fig 2**.

Present	Amendment
	 **Fig 1 Force during towing**  **Figure 2: Towline 'fleet angle'** **802. General requirements** **1.** The in-board end of the towline is to be attached to the winch drum with a weak link or similar arrangement that is designed to release the towline at low load. **2.** All towing winches are to be fitted with an emergency release system.

Present	Amendment
	803. Emergency release system requirements **1.** Performance requirements (1) The emergency release system is to operate across the full range of towline load, fleet angle and ship heel angle under all normal and reasonably foreseeable abnormal conditions (these may include, but are not limited to, the following: vessel electrical failure, variable towline load (for example due to heavy weather), etc.). (2) The emergency release system shall be capable of operating with towline loads up to at least 100 % of the maximum design load. (3) The emergency release system is to function as quickly as is reasonably practicable and within a maximum of three seconds after activation. (4) The emergency release system is to allow the winch drum to rotate and the towline to pay out in a controlled manner such that, when the emergency release system is activated, there is sufficient resistance to rotation to avoid uncontrolled unwinding of the towline from the drum. Spinning (free, uncontrolled rotation) of the winch drum is to be avoided, as this could cause the towline to get stuck and disable the release function of the winch. (5) Once the emergency release is activated, the towline load required to rotate the winch drum is to be no greater than: (A) the lesser of 5 tonnes or 5 % of the maximum design load when two layers of towline are on the drum, or (B) 15 % of the maximum design load where it is demonstrated that this resistance to rotation does not exceed 25 % of the force that will result in listing sufficient for the immersion of the lowest unprotected opening. (6) An alternative source of energy is to be provided such that normal operation of the emergency release system can be sustained under dead-ship conditions. (7) The alternative source of energy required by (6) is to be sufficient to achieve the most onerous of the following conditions (as applicable): (A) sufficient for at least three attempts to release the towline (i.e. three activations of the emergency release system). Where the system provides energy for more than one winch it is to be sufficient for three activations of the most demanding winch connected to it. (B) Where the winch design is such that the drum release mechanism requires continuous application of power (e.g. where the brake is applied by spring tension and released using hydraulic or pneumatic power) sufficient power is to be provided to operate the emergency release system (e.g. hold the brake open and allow release of the towline) in a dead-ship situation for a minimum of five minutes. This may be reduced to the time required for the full length of the towline to feed off the winch drum at the load specified in (5) if this is less than five minutes.

Present	Amendment
	2. Operational requirements (A) Emergency release operation must be possible from the bridge and from the winch control station on deck. The winch control station on deck is to be in a safe location. (2) The emergency release control is to be located in close proximity to the emergency stop button for winch operation and both should be clearly identifiable, clearly visible, easily accessible and positioned to allow safe operability. (3) The emergency release function is to take priority over any emergency stop function. Activation of the winch emergency stop from any location is not to inhibit operation of the emergency release system from any location. (4) Emergency release system control buttons are to require positive action to cancel, the positive action may be made at a different control position from the one where the emergency release was activated. It must always be possible to cancel the emergency release from the bridge regardless of the activation location and without manual intervention on the working deck. (5) Controls for emergency use are to be protected against accidental use. (6) Indications are to be provided on the bridge for all power supply and/or pressure levels related to the normal operation of the emergency release system. Alarms are to activate automatically if any level falls outside of the limits within which the emergency release system is fully operational. (7) Wherever practicable, control of the emergency release system is to be provided by a hard-wired system, fully independent of programmable electronic systems. (8) Computer based systems that operate or may affect the control of emergency release systems are to meet the requirements for Category III systems of **KR Rules Pt 6, Sec 4.** (9) Components critical for the safe operation of the emergency release system are to be identified by the manufacturer. (10) The method for annual survey of the winch is to be documented. (11) Where necessary for conducting the annual survey of the winch, adequately sized strong points are to be provided on deck.

Present	Amendment
	804. Test requirements **1.** General (1) All testing defined within this paragraph is to be witnessed by a Classification Society surveyor. (2) For each emergency release system or type thereof, the performance requirements of **803.1** are to be verified either at the manufacturer's works or as part of the commissioning of the towing winch when it is installed on board. Where verification solely through testing is impracticable (e.g. due to health and safety), testing may be combined with inspection, analysis or demonstration in agreement with the Society. (3) The performance capabilities and operating instructions of the emergency release system are to be documented and made available on board the ship on which the winch has been installed. **2.** Installation trials (1) The full functionality of the emergency release system is to be tested as part of the shipboard commissioning trials to the satisfaction of the surveyor. Testing may be conducted either during a bollard pull test or by applying the towline load against a strong point on the deck of the tug that is certified to the appropriate load. (2) Where the performance of the winch in accordance with **803.1** has previously been verified, the load applied for the installation trials is to be at least the lesser of 30 % of the maximum design load or 80 % of vessel bollard pull.

Amended Guidances for the Classification of Steel Ships

(Part 7 Chapter 5 Ships Carrying Liquefied Gas in Bulk)

Dec. 2019

KR

- Main Amendments -

(1) Effective date : 1 Jan 2020 (Date of Construction)

◉ To reflect IACS UI GC 25 (Rev.1, April 2019)
◉ To reflect IACS UI GC27(New Dec 2018)
◉ To reflect IACS UI GC 28 (New, Dec. 2018)

(1) Effective date : 1 Jan 2020

(Date of construction)

Present	Amendment
CHAPTER 5 Ships Carrying Liquefied Gas in Bulk	**CHAPTER 5 Ships Carrying Liquefied Gas in Bulk**
Section 5 Process Pressure Vessels and liquid, Vapour and Pressure Piping Systems	**Section 5 Process Pressure Vessels and liquid, Vapour and Pressure Piping Systems**
501. to 511. <omitted>	**501. to 511. <same as current Guidance>**
512. Materials [See Rule]	**512. Materials** [See Rule]
1. to **3.** <omitted>	**1.** to **3.** <same as current Guidance>
4. With reference to **3.** (1) of the Rules, the phrase 'a thermal insulation system as required to minimize heat leak into the cargo during transfer operations' means that the properties of the thermal insulation for cargo piping systems are to take into consideration the overall heat calculation undertaken for the tank containment system and the capacity of the proposed pressure/temperature control system (e.g. refrigeration plants) adopted on each ship in accordance with the requirements of **Ch.7** of the Rule. The phrase 'cargo piping systems are to be provided with a thermal insulation system as required ... to protect personnel from direct contact with cold surfaces' means that surfaces of cargo piping systems with which personnel is likely to contact under normal conditions are to be protected by a thermal insulation. with the exception for the following ones; (1) surfaces of cargo piping systems which are protected by physical screening measures to prevent such direct contact; (2) surfaces of manual valves, having extended spindles that protect the operator from the cargo temperature, (3) surfaces of cargo piping systems whose design temperature (to be determined from inner fluid temperature) is above minus 10 °C.	**4.** With reference to **3.** (1) of the Rules, the phrase 'a thermal insulation system as required to minimize heat leak into the cargo during transfer operations' means that properties of the piping insulation are to be taken into consideration when calculating the heat balance of the containment system and capacity of the pressure/temperature control system. The phrase 'cargo piping systems shall be provided with a thermal insulation system as required ... to protect personnel from direct contact with cold surfaces' means that surfaces of cargo piping systems with which personnel is likely to contact under normal conditions shall be protected by a thermal insulation, with the exception for the below examples: (1) surfaces of cargo piping systems which are protected by physical screening measures to prevent such direct contact; (2) surfaces of manual valves, having extended spindles that protect the operator from the cargo temperature, (3) surfaces of cargo piping systems whose design temperature (to be determined from inner fluid temperature) is above minus 10 °C.
<hereafter, omitted>	<hereafter, same as current Guidance>

Present	Amendment
Section 8 Vent System for Cargo Containment	**Section 8 Vent System for Cargo Containment**
801. General [See Rule] For the purpose of the requirements in **801.** of the Rules, the pressure relief system of hold spaces is to be in accordance with the following requirements : (1) to (3) <omitted>	**801. General** [See Rule] **1.** For the purpose of the requirements in **801.** of the Rules, the pressure relief system of hold spaces is to be in accordance with the following requirements : (1) to (3) <same as current Guidance> **2.** For the purpose of the requirements in **801.** of the Rules, the pressure relief system of interbarrier spaces is to be in accordance with **801. 1.**
802. Pressure relief systems **1. Pressure relief system for interbarrier spaces** (1) to (3) <omitted> (4) The relieving capacity of pressure relief devices for interbarrier spaces is to be determined as followings : (A) to (D) <omitted> (E) Interbarrier space pressure relief devices in the scope of this paragraph are emergency devices for protecting the hull structure from being unduly overstressed in case of a pressure rise in the interbarrier space due to primary barrier failure. Therefore, such devices need not comply with the requirements in **802. 10** and **802. 11** of the Rules.	**802. Pressure relief systems** **1. Pressure relief system for interbarrier spaces** (1) to (3) <same as current Guidance> (4) The relieving capacity of pressure relief devices for interbarrier spaces is to be determined as followings : (A) to (D) <same as the present Rules> ~~(E) Interbarrier space pressure relief devices in the scope of this paragraph are emergency devices for protecting the hull structure from being unduly overstressed in case of a pressure rise in the interbarrier space due to primary barrier failure. Therefore, such devices need not comply with the requirements in **802. 10** and **802. 11** of the Rules.~~
<hereafter, omitted>	<hereafter, same as current Guidance>

Present	Amendment
Section 9 – 12 <omitted>	**Section 9 – 12 <same as the present Rules>**
Section 13 Instrumentation and Automation Systems	**Section 13 Instrumentation and Automation Systems**
1301. <same as the present Rules>	**1301. <same as the present Rules>**
1302. Level indicators for cargo tanks [See Rule] **1. <same as the present Rules>** **<Newly added>** **2. <same as the present Rules>**	**1302. Level indicators for cargo tanks [See Rule]** **1. <same as the present Rules>** **2.** For the purpose of the requirements in **1302. 2** of the Rules, in order to assess whether or not only one level gauge is acceptable in relation to the aforesaid sentence, 'can be maintained' means that any part of the level gauge other than passive parts can be overhauled while the cargo tank is in service. However, passive parts are those parts assumed not subject to failures under normal service conditions. *(2020)* **2. 3. <same as the present Rules>**
1303. – 1307. <same as the present Rules>	**1303. – 1307. <same as the present Rules>**

- Main Amendments -

(1) Enter into force on 1 January 2020 (the contract date for ship construction)

◉ To reflect Request for Establishment/Revision of Classification Technical Rules

(1) Effective date : 1 Jan 2020

(the contract date for ship construction)

Present	Amendment
CHAPTER 1 SHIPS CARRYING LIQUEFIED GASES IN BULK	**CHAPTER 1 SHIPS CARRYING LIQUEFIED GASES IN BULK**
Section 1 ~ Section 3 <Omitted>	**Section 1 ~ Section 3 <Sames as the present guidance>**
Section 4 Cargo Containment	**Section 4 Cargo Containment**
401. ~ 418. <Omitted>	**401. ~ 418. <Sames as the present guidance>**
419. Materials [See Rule] **1. ~ 8. <Omitted>** **9. <New>**	**419. Materials [See Rule]** **1. ~ 8. <Sames as the present guidance>** **9. Materials of primary and secondary barriers** (1) The high manganese austenitic steel for cargo tank for the carriage of liquefied natural gases is to comply with **Annex 7A-4**. *(2020)*
Section 5 ~ Section 19 <Omitted>	**Section 5 ~ Section 19 <Sames as the present guidance>**

Present	Amendment
Annex 7A-1 ~ Annex 7A-3 <Omitted> **Annex 7A-4 High manganese austenitic steel for Cryogenic Service <New>**	**Annex 7A-1 ~ Annex 7A-3 <Omitted>** **Annex 7A-4 High manganese austenitic steel for Cryogenic Service** **Section 1 General** **101. Scope** **1.** This Annex provides the designer and manufacturer with practical information on the design and construction of cargo tanks using high manganese austenitic steel for cryogenic service to comply with the Design Conditions defined in **Pt7, Chapter 5, 418**. **102. Application** **1.** This Annex are not intended to replace any requirements of **Pt7, Chapter 5**. They are intended as complementary guidelines on how to utilize high manganese austenitic steel in the design and fabrication of cargo tanks complying with the **Pt7, Chapter 5**. **103. Definitions** **1. Under-matched welds** means for welded connections where the weld metal has lower yield- or tensile-strength than the parent metal. **Section 2 Application** **201. Design application** **1.** The relevant load conditions and design conditions should be established in accordance with **Pt7, Chapter 5, 418**. A guidance on special considerations to the high manganese austenitic steel is described beolw. **2.** For the selection of relevant safety factors for high manganese austenitic steels(see **Pt7, Chapter 5, 421 to 423**), the safety factors specified for "Austenitic Steels" should be applied both for base material and for as welded condition

Present	Amendment
	202. Ultimate design condition **1.** It should be noted that high manganese austenitic steels normally have under-matched welds and, therefore, it is of great importance that the design values of the yield strength and tensile strength are based on the "minimum mechanical properties" for the base material and as welded condition(see 6 Mechanical Properties). Note the limitation to under-matched welds defined in **Pt7, Chapter 5, 418.1.(3).(B)**. **203. Buckling strength** **1.** Buckling strength analysis should be carried out based on recognized standards. Functional loads as defined in **Pt7, Chapter 5, 403.4** should be considered. Note that design tolerances should be considered where relevant and be included in the strength assessment as required in **Pt7, Chapter 5, 606.2.(1)**. **204. Fatigue design condition** **1.** The fatigue design curves for base material and for butt weld joint should use S-N curve of D grade in IIW. **2.** The fatigue design curves for other weld joints except butt weld joint should be agreed with the Society. **3.** Design S-N curve given in Table 1 correspond to a probability of survival of 97.6%. Table 1 S-N curves in air | S-N curve | $N \leq 10^7$ cycles | | $N > 10^7$cycles | Fatigue limit at 10^7 cycle(MPa) | Thickness exponent k | | | m_1 | $\log \bar{a}_1$ | $\log \bar{a}_2$ $m_2 = 5.0$ | | | | D | 3.0 | 12.164 | 15.606 | 52.63 | 0.20 |

Present	Amendment
	205. Fracture mechanics analyses **1.** For a cargo tank where a reduced secondary barrier is applied, fracture mechanics analysis should be carried out in accordance with **Pt7, Chapter 5**. **2.** Fracture toughness properties should be expressed using recognized standards. Depending on the material, fracture toughness properties determined for loading rates similar to those expected in the tank system should be required. The fatigue crack propagation rate properties should be documented for the tank material and its welded joints for the relevant service conditions. These properties should be expressed using a recognized fracture mechanics practice relating the fatigue crack propagation rate to the variation in stress intensity, $\triangle K$, at the crack tip. The effect of stresses produced by static loads should be taken into account when establishing the choice of fatigue crack propagation rate parameters. **3.** Note that for the application where very high static load utilization is relevant, alternative methods such as ductile fracture mechanics analysis should be considered. **4.** A fracture mechanics analysis is required for type B tank(**Pt7, Chapter 5, 422.4**) where a reduced secondary barrier is applied. Fracture mechanics analysis may also be required for other tank types as found relevant to show compliance with fatigue and crack propagation properties. Note that CTOD values used in fracture mechanics analysis may in any case be an important property to analyze to ensure that materials are considered suitable for the application.

Present	Amendment
	206. Welding **1.** Welding should be carried out in accordance with **Pt7, Chapter 5, 605**. **2.** For welding the following points can be considered: (1) For reducing the heat input during production: (A) special attention should be given to the first root pass when applying flux-cored arc welding(FCAW); reduced amperage should be considered; (B) welding heat input is to be equal to 30 kJ/cm or below; (2) Distance between the weld and nozzle should be kept to a minimum to reduce the oxygen content at the vicinity of the weld pool; (3) Weld gas composition of FCAW should normally be an 80/20 mix of argon and carbon dioxide; and (4) Appropriate ventilation should be provided to reduce exposure to hazardous welding fumes. **207. Non-destructive testing(NDT)** **1.** The scope of non-destructive testing(NDT) should be as required by **Pt7, Chapter 5, 605.6**. NDT procedures should be in accordance with recognized standards to the satisfaction of the Society. For high manganese austenitic steel suitable NDT procedure normally applicable for austenitic steels should be used. **208. Corrosion resistance** **1.** High manganese austenitic steel is not considered a very strong corrosion resistant material in line with several similar materials such as 304 stainless steel Particularly for LNG cargo tanks that may not be in operation, appropriate environment should be maintained to prevent corrosion.