

# ANNEXES

## TO THE RULES

### FOR THE CLASSIFICATION

### AND CONSTRUCTION OF SHIPS

### CARRYING LIQUEFIED GASES IN BULK

ND No. 2-020101-157-E



**St. Petersburg**  
**2022**

# **ANNEXES TO THE RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SHIPS CARRYING LIQUEFIED GASES IN BULK**

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The Annexes being a part of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk of Russian Maritime Register of Shipping have been approved in accordance with the established procedure and come into force on 1 January 2022.

The Annexes are based on the 2021 edition taking into account the amendments developed immediately before publication.

**REVISION HISTORY**

(purely editorial amendments are not included in the Revision History)

For this version, there are no amendments to be included in the Revision History.

## TABLE OF TECHNICAL REQUIREMENTS

### Explanatory notes to the Table of Technical Requirements

1. Product names (column 1) are listed in alphabetic order of their Latin names.
2. Chemical formula (column 2) is given for information only.
3. Density (column 3) is given for information only and shall be refined according to the shipper's data.
4. Type of LG carrier (column 4) according to the definition in Part I "Classification" of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk<sup>1</sup>.
5. Definition of the type C independent tank (column 5) is given in Section 23, Part IV "Cargo Containment".
6. Requirements for control of vapour space within cargo tanks (column 6) are given in Part V "Fire Protection":  
Inert = inert gas;  
Dry = dry air.
7. Vapour detection system (column 7):  
F = flammable vapour detection;  
T = toxic vapour detection;  
O = oxygen detection (oxygen analyzer);  
F+T = flammable and toxic vapor detection.
8. Gauge type (column 8):  
R = restricted type;  
C = closed type;  
I = indirect type (see 2.2, Part VIII "Instrumentation and Automation Systems").
9. MFAG (Medical First Aid Guide (MFAG) of the International Maritime Organization (IMO)) numbers (column 9) are provided for information on the emergency procedures in accidents associated with the products covered by the LG Rules requirements.  
Where any of the products listed are carried at the low temperature from which frostbite may occur, MFAG No. 620 is also applicable.
10. Special requirements (column 10), unless otherwise specified, see chapters and sections of Part X "Special Requirements".
11. Products marked "\*" are also covered by the requirements of the Rules for the Classification and Construction of Chemical Tankers.

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<sup>1</sup> Hereinafter referred to as "the LG Rules".

*Annexes to the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk (Annex 1)*

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Product name	Chemical formula	Density (kg/m <sup>3</sup> ) at temperature in brackets	Ship type	Type C independent tank required	System for control of vapour space within cargo tanks	Cargo vapour detection system	Gauge type	MFAG table No.	Special requirements
Acetaldehyde	CH <sub>3</sub> CHO	780 (20,8°C)	2G/2PG	–	Inert	F+T	C	300	2.1, 4.7.1 of Part V, 5.1, Section 8
Ammonia Anhydrous	NH <sub>3</sub>	771 (–33,4°C)	2G/2PG	–	–	T	C	725	Section 2, Section 3, Section 19
Butadiene	CH <sub>2</sub> CHCHCH <sub>2</sub>	646 (0°C)	2G/2PG	–	–	F+T	R	310	Section 2, 3.2, 5.2, 5.3, Section 8, Section 10
Butane	C <sub>4</sub> H <sub>10</sub>	600 (0°C)	2G/2PG	–	–	F	R	310	
Butane/Propane mixture (LPG)			2G/2PG	–	–	F	R	310	
Butylenes	CH <sub>3</sub> CH <sub>2</sub> CHCH <sub>2</sub>	670 (0°C)	2G/2PG	–	–	F	R	310	
Chlorine	Cl <sub>2</sub>	1560 (–34°C)	1G	Yes	Dry	T	I	740	Section 2, 4.2, 5.1, Section 7, Section 9, Section 15 Section 22
Diethyl Ether*	(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> O	640 (34,6°C)	2G/2PG	–	Inert	F+T	C	330	2.1, 3.6, 4.1, Section 8, Section 22, Section 23, 29.2, 29.3
Dimethylamine	(CH <sub>3</sub> ) <sub>2</sub> NH	680 (0°C)	2G/2PG	–	–	F+T	C	320	Section 2, Section 3
Ethane	CH <sub>3</sub> CH <sub>3</sub>	550 (–88°C)	2G	–	–	F	R	310	
Ethyle Chloride	CH <sub>3</sub> CH <sub>2</sub> Cl	921 (0°C)	2G/2PG	–	–	F+T	R	340	
Ethylene	C <sub>2</sub> H <sub>4</sub>	560 (–104°C)	2G	–	–	F	R	310	
Ethylene Oxide	CH <sub>2</sub> CH <sub>2</sub> O	882 (10°C)	1G	Yes	Inert	F+T	C	365	Section 2, 3.2, 4.2, 5.1, Section 7, Section 8, Section 12
Ethylene Oxide/Propylene Oxide mixture with Ethylene Oxide content of not more than 30 % by weight*			2G/2PG	–	Inert	F+T	C	365	2.1, 4.1, 5.1, Section 8, Section 18, Section 22, Section 23
Isoprene*	CH <sub>2</sub> CHC(CH <sub>3</sub> )CH <sub>2</sub>	680 (34°C)	2G/2PG	–	–	F	R	310	2.1, Section 10, Section 22, 29.1
Isopropylamine*	(CH <sub>3</sub> ) <sub>2</sub> CHNH <sub>2</sub>	710 (34°C)	2G/2PG	–	–	F+T	C	320	2.1, 3.4, Section 6, Section 22, Section 23, 29.1
Methane (LNG)	CH <sub>4</sub>	420 (–164°C)	2G	–	–	F	C	620	
Methylacetylene/ Propadiene mixture			2G/2PG	–	–	F	R	310	Section 13
Methyl Bromide	CH <sub>3</sub> Br	1730 (0°C)	1G	Yes	–	F+T	C	345	Section 2, 3.3, 4.2, 5.1, Section 7
Methyl Chloride	CH <sub>3</sub> Cl	920	2G/2PG	–	–	F+T	C	340	3.3
Monoethylamine* (Ethylamine)	C <sub>2</sub> H <sub>5</sub> NH <sub>2</sub>	706 (0°C)	2G/2PG	–	–	F+T	C	320	Section 2, Section 3, 4.1, Section 6, Section 22, Section 23, 29.1

*Annexes to the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk (Annex 1)*

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Product name	Chemical formula	Density (kg/m <sup>3</sup> ) at temperature in brackets	Ship type	Type C independent tank required	System for control of vapour space within cargo tanks	Cargo vapour detection system	Gauge type	MFAG table No.	Special requirements
Nitrogen	N <sub>2</sub>	808 (-196 °C)	3G	-	-	O	C	620	Section 14
Pentanes (all isomers)*	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>3</sub>	626 (0 °C)	2G/2PG	-	-	F	R	310	Section 22, Section 29
Pentene (all isomers)*			2G/2PG	-	-	F	R	310	Section 22, Section 29
Propane	CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>	590 (-42,3 °C)	2G/2PG	-	-	F	R	310	
Propylene	CH <sub>3</sub> CHCH <sub>2</sub>	860	2G/2PG	-	-	F	R	310	
Propylene Oxide*	CH <sub>3</sub> CHOCH <sub>2</sub>	830	2G/2PG	-	Inert	F+T	C	365	2.1, 4.1, 5.1, Section 8, Section 18, Section 22, Section 23
Refrigerant gases:			3G	-	-	-	R	350	
Dichlorodifluoromethane	CCl <sub>2</sub> F <sub>2</sub>	1490 (-30 °C)							
Dichloromonofluoromethane	CHFC <sub>2</sub>	1480 (8,9 °C)							
Dichlorotetrafluoroethane	C <sub>2</sub> F <sub>4</sub> Cl <sub>2</sub>	1510 (3,8 °C)							
Monochlorodifluoromethane	CHClF <sub>2</sub>	1420 (-42 °C)							
Monochlorotetrafluoroethane	C <sub>2</sub> HF <sub>4</sub> Cl								
Monochlorotrifluoromethane	CF <sub>3</sub> Cl	1520 (-81,4 °C)							
Sulphur Dioxide	SO <sub>2</sub>	1460 (-10 °C)	1G	Yes	Dry	T	C	635	Section 2, 4.2, 5.1, Section 7, Section 9
Vinyl Chloride*	CH <sub>2</sub> CHCl	970 (-13,9 °C)	2G/2PG	-	-	F+T	C	340	2.1, 3.2, 3.3, 4.1, Section 8, Section 16
Vinyl Ethyl Ether	CH <sub>2</sub> CHOC <sub>2</sub> H <sub>5</sub>	755	2G/2PG	-	Inert	F+T	C	330	2.1, 3.2, 4.1, Section 8, Section 10, Section 22, Section 23, 29.2, 29.3
Vinylidene Chloride*	C <sub>2</sub> H <sub>2</sub> CCl <sub>2</sub>	1250	2G/2PG	-	Inert	F+T	R	340	2.1, 3.5, Section 8, Section 10, Section 22, Section 23
Dimethyl Ether	C <sub>2</sub> H <sub>6</sub> O	1,716	2G/2PG	-	-	B+T	C	-	
Mixed cargoes C4			2G/2PG			B+T	3. K		Section 2, 3.2, 5.2, 5.3, Section 8, Section 26
Carbon dioxide (high purity)	CO <sub>2</sub>	771	3G			O	3		Section 27
Carbon dioxide (high purity)	CO <sub>2</sub>	771	3G			O	3		Section 28

**INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT  
OF SHIPS CARRYING LIQUEFIED GASES IN BULK**

Refer to Chapter 18 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code).

## **NON-METALLIC MATERIALS**

Refer to Appendix 4 to the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code).

**STANDARD FOR THE USE OF LIMIT STATE METHODOLOGIES  
IN THE DESIGN OF CARGO CONTAINMENT SYSTEMS OF NOVEL  
CONFIGURATION**

Refer to Appendix 5 to the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code).

Russian Maritime Register of Shipping

**Annexes to the Rules for the Classification and Construction  
of Ships Carrying Liquefied Gases in Bulk**

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