

GUIDANCE NOTES ON

FAILURE MODE AND EFFECTS ANALYSIS (FMEA) FOR CLASSIFICATION MAY 2015

CORRIGENDA/EDITORIALS – 1 July 2015

CORRIGENDA/EDITORIALS – 1 September 2017

Page No.	Paragraph	Comments
Section 7	System-Specific FMEA Requirements	
97	7/1.11	Under “Technical Notes”, revise last sentence of first paragraph to read “Validation Testing is to be conducted for each manufactured unit for all equipment/control systems...”.
113	7/1.14	Rule/Guide to read “Rules for Building and Classing Steel Vessels Part 5C, Chapter 13 “Vessels Using Gases or other Low-Flashpoint Fuels””.
113	7/1.14	Rule Reference to read: “Part 5C Specific Vessel Types Chapter 13 Vessels Using Gases or other Low-Flashpoint Fuels Section 6, Appendix 2 Reliquefaction Systems (ABS) Subsection 7 Instrumentation and Safety Systems *** Section 6, Appendix 3 Gas Combustion Units (ABS) Subsection 5 Gas Burner Unit and Burner Management System *** Section 9 Fuel Supply to Consumers Subsection 4 Regulations on Safety Functions of Gas Supply System Subsection 10 Vaporizers, Heaters and Pressure Vessels (ABS) *** Section 10 Power Generation Including Propulsion and other Gas Consumers Subsection 3 Regulations for Internal Combustion Engines of Piston Type *** Section 10, Appendix 1 Dual Fuel Gas Turbine Propulsion System (ABS) Subsection 3 Electrical, Automation, Instrumentation and Control Systems *** Section 14 Electrical Installations Subsection 3 Regulations - General *** Section 15 Control, Monitoring and Safety Systems Subsection 3 Regulations for Gas Engine Monitoring”.

Page No.	Paragraph	Comments
Section 7	System-Specific FMEA Requirements	
113	7/1.14	Rule Requirements to read: “5C-13-6A2/1.5 Plans and Data to be Submitted - Failure Modes and Effects Analysis (FMEA) to determine possible failures and their effects in the safe operation of the reliquefaction system [see 5C-13-6A2/7.1ii)] 5C-13-6A2/7.1 General ii) An analysis is to be carried out for the reliquefaction system identifying component criticality. *** 5C-13-6A3/1.3 Plans and Data to be Submitted - Failure Modes and Effects Analysis (FMEA) [see 5C-13-6A3/5i)] 5C-13-6A3/5 Gas Burner Unit and Burner Management System i) The gas burner management control philosophy for all modes of operation is to be submitted. This should be accompanied by a safety analysis identifying the modes of failures and shutdown and startup sequences of the system. *** 5C-13-9/4.14 (ABS) Where the auxiliary heat exchange circuits are likely to contain gas in abnormal conditions as a result of a component failure (refer to FMEA), they are to be arranged with gas detection in the header tank. Alarm is to be given when the presence of gas is detected. Vent pipes are to be independent and to be led to a non-hazardous area and are to be fitted with a flame screen or flame arrester. 5C-13-9/10.4 (ABS) Where the auxiliary heat exchange circuits are likely to contain gas in abnormal conditions as a result of a component failure (refer to FMEA), they are to be arranged with gas detection in the header tank. Alarm is to be given when the presence of gas is detected. Vent pipes are to be independent and to be led to a non-hazardous area and are to be fitted with a flame screen or flame arrester. *** 5C-13-10/3.1.4 Interpretation – Auxiliary System Venting (ABS) Auxiliary system circuits, such as cooling water or dry/wet sump lubricating oil systems, that are likely to contain gas in normal conditions or abnormal conditions as a result of a component failure (refer to FMEA) are to be arranged in accordance with the following requirements: i) Auxiliary system circuits are to be arranged to avoid cross connection between engine systems and to avoid the migration of gas to non-hazardous areas; ii) Vent pipes are to be independent and to be led to a safe location external to the machinery space and to be fitted with a flame screen or flame arrester. 5C-13-10/3.1.14 Protection Against Explosion (ABS) A Failure Modes and Effects Analysis (FMEA) is to be carried out by the engine manufacturer in order to determine necessary additional safeguards to address the hazards associated with the use of gas as a fuel. This is in addition to the FMEA required by 4-2-1A1/Table 1.