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Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels — Liquefied Natural Gas (LNG) as marine fuel — Measurement on board LNG bunkering ship

Hydrocarbures réfrigérés et combustibles gazeux liquéfiés à base non pétrolière — Utilisation du Gaz Naturel Liquéfié (GNL) comme combustible marin — Mesurage à bord des navires avitailleurs de GNL

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Foreword

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Introduction

Efforts such as the restriction of sulfur content in marine fuel oil introduced by IMO MARPOL ANNEX IV[23] and growing trends towards decarbonisation have promoted cleaner marine fuel.

Liquefied natural gas (LNG) is one of the most practical marine fuel choices. It is considered cleaner than conventional fuel oils. The conventional trade volume of LNG transported by one shipment is large, with a total capacity of 170 000 m^3 at the time of publication of this document. The trade quantity is calculated according to the method defined by the sales and purchase agreement between the cargo supplier and receiver.

On the other hand, the trade quantity of LNG as a marine fuel by one shipment can be smaller than the conventional trade volume of 170 000 m^3. Furthermore, the LNG containment system of the LNG bunkering ship is unlike the systems of conventional LNG carriers, especially the pressure in the tanks, which is relatively higher than that of the conventional carrier type. Tank types, including IMO type C, membrane, and SPB type, are available.

In addition to the difference in trade quantity and the cargo containment system between LNG bunkering shipments and conventional shipments, the energy transferred during the operations also differs. Determining the amount of energy transfer involves calculating not only the quantity but also the quality of transferred liquid and vapour, as well as the gas used during the transfer operation. This document provides the data treatment, calculation methods and calculation examples.