Application

HHI-EMD provides complete
LNG package solutions
for LNG fueled ships and LNG carrier

Certificates

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HYUNDAI | ENGINE & MACHINERY
HEAVY INDUSTRIES

1000, Bangeojinsunhwan-doro, Dong-gu, Ulsan, South Korea

Marine Engine & Machinery Sales Dep't
Tel : +82-52-202-7281 ~ 9
E-mail : enginesales@hhic.co.kr

Marine Machinery Design & Engineering Dep't
Tel : +82-52-202-7265 / 9071
E-mail : k2f0a@hhi.co.kr

HHI-EMD
Korean-English 24/7 Call Center
+1-212-845-9803
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Global Leader

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Hi-GAS

Hyundai integrated GAS supply system

HYUNDAI | ENGINE & MACHINERY
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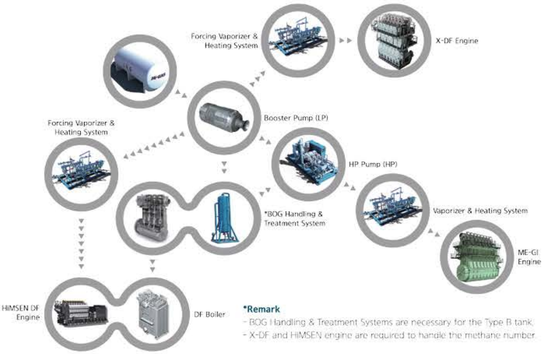
Gas Fuel Supply System

Hi-GAS is a remarkable design of the LNG gas fuel supply system for dual fuel engines based on high and low pressure supply. Hi-GAS can effectively supply high pressure CNG to the ME-GI engine while also supplying low pressure CNG to the 4-storke DF Gensets. For X-DF engines, Hi-GAS can supply gas at the engine's required pressure and temperature. In 2012, HHI-EMD developed a prototype and tested the ME-GI engine with the same system, which demonstrated that Hi-GAS is capable of achieving best-in-class performance.



***Remark**
- BOG Handling & Treatment Systems are necessary for the Type B tank.
- X-DF and HIMSEN engine are required to handle the methane number.

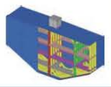
Benefits of Hi-GAS

Reliability	1. Verification of reliability through HAZID meeting with GL classification 2. Hi-GAS was verified and proven during ME-GI full scale test 3. Hi-GAS is ready for ME-GI engines & HIMSEN DF Genset
Proven Technology	1. ME-GI full scale test for 8S70ME-C8.2-GI in combination with Hi-GAS 2. AIP(Approval In Principle) from major classification societies through TAT
Design & Documents	1. Heat & mass calculation and dynamic simulation on Hi-GAS 2. Full automatic interface between Hi-GAS and DF engines (ME-GI / HIMSEN DF) 3. General guidance for operating ME-GI with Hi-GAS as an in-situ manual is available
Service & Engineering	1. Qualified & proven sub-suppliers for key components of Hi-GAS 2. Provided service and total engineering on Hi-GAS

LNG Tank

Features of LNG Fuel Tank

HHI has developed a wide variety of LNG fuel tanks optimized for different types of gas fuelled ships offering greater flexibility to respond to the market demand. The LNG fuel tanks include IMO Type B, Type C and Membrane Type.

Description		IMO Type B (Prismatic)	IMO Type C (Cylindrical)	Membrane Type (Mark III FLEX)
Configuration				
Materials for Tank	Inner	Aluminum or 9 % Ni Steel	Stainless Steel or 9 % Ni Steel	Stainless Steel
	Outer	-	Carbon Steel	Aluminum Foil with Glass Cloth
Design Vapor Pressure		0.25 barG	5 barG	0.25 barG
Insulation System	Material	Polyurethane Foam / Expanded Poly Styrene	Perlite + Vacuum (0.1 Torr)	Reinforced Polyurethane Foam
	Location	Tank Outside	Inner Tank Outside	Tank Inside
	Thickness	300mm	400mm	400mm
Secondary Barrier		Partial Barrier	None	Full Barrier
Splash Barrier		Required	None	None
BOG Handling System		- LD Compressor - GCU, Boiler	- No Provision - Venting	- LD Compressor - GCU, Boiler

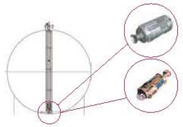
LNG Tank monitoring system

Name	Quantity	Descriptions
Tank level gauge	1	• Type: Radar • Material: ANSI 316L • Ex-classification: Eex ia IIC T4 • Protection: IP67 • Tank level monitoring
Tank HiHi Alarm sensor	1	• Type: Radar • Material: ANSI 316L • Ex-classification: Eex ia IIC T4 • Protection: IP67 • Tank level HiHi shutdown
Temperature Sensor	3	• One(1) for vapor temperature • One(1) for middle temperature • One(1) for liquid temperature
Pressure Transmitter	2	• Remote function with local display

Main Equipment of Gas Fuel Supply System

LNG Supply (Booster) Pump

The LNG supply pump is installed inside the LNG tank to reduce unnecessary cool down and net positive suction head (NPSH). It is important to maintain sufficient feed flow and pressure for high pressure pumps. Two sets of pumps are supplied for redundancy operation.



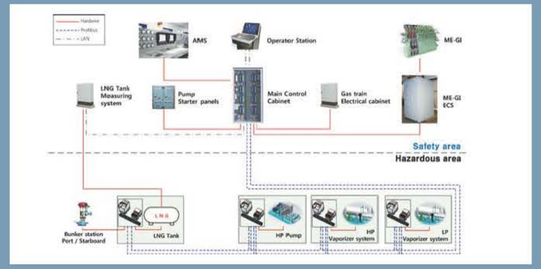
High Pressure Pump (for ME-GI Engine)

The high pressure (HP) pump increases LNG flow pressure up to the required 300 bar for the ME-GI engine. The pump covers the full range pressure from the minimum fuel gas load to the maximum. The motor for the HP pump is controlled by the variable frequency drive (VFD). The pump can be gear or belt driven. Valves and instruments for the HP pump are included in the skid.

Vaporizer and Glycol Water Heating System

The pressurized LNG is vaporized through the LNG fuel vaporizer in a LNG/brine heat exchanger. The heat exchanger uses water/glycol brine as the heating medium. LNG enters the heat exchanger at approximately -150° C and leaves at 45 ±10° C, which is the required temperature level for the ME-GI engine. As for the X-DF engine and HiMSEN DF engine a certain level of methane number is required. To meet that requirement, a forcing vaporizing system and mist separator shall be used.

Electric equipment

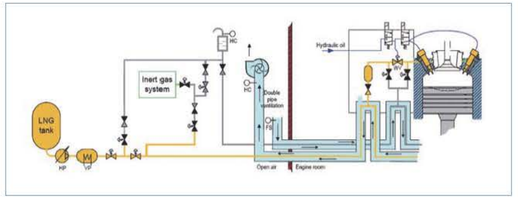


BOG Handling system

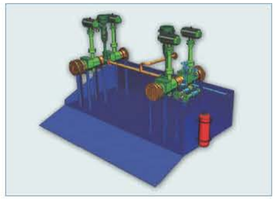
BOG compressor

BOG Liquefaction system

Aux. system for ME-GI engine

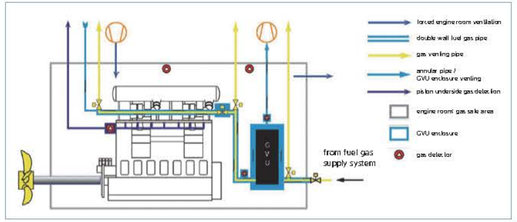


LNG bunker station



Size	Flow
4	Abt.280m³/h
5	Abt.425m³/h
6	Abt.600m³/h
8	Abt.1050m³/h

Aux. system for X-DF engine



ESDS

Manual push button

Gas Detector Monitoring

Ship shore communication system