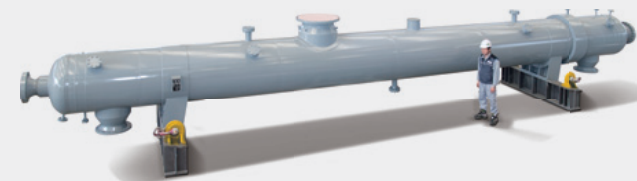


HP/LNG Vaporizer



An LNG carrier uses the BOG generated in a carto tank as propelling fuel or for the gasification of the LNG and uses it if the BOG is insufficient. The low-pressure LNG vaporizer is a heat exchanger necessary when using gasified LNG as fuel, and it can be used with various heat sources including steam heating and glycol water heating. As essential equipment for LNG cargo handling, we supply a system to control the amount of oil supplied and the temperature together. In an LNG carrier, the equipment is used as the main LNG vaporizer and the forcing LNG vaporizer. The control valve for the amount of oil and the temperature control, the in-line mixer, the mist separator, and the gas heater are supplied together, and so an optimal cargo handling system is implemented.

Energy Saving System



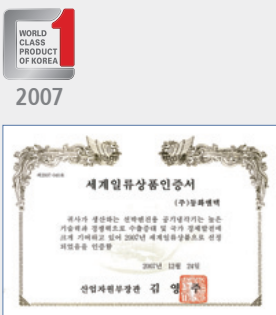
ESS (energy saving system) is an intelligent control system to optimize the ship's central seawater cooling system (CSCS). The ESS monitors marine environment conditions during the ship's navigation, and it efficiently manages the operation of the CSCS pump. If ESS is used in combination with Donghwa Entec's plate cooler, the innovative energy saving of the CSCS is implemented. ESS can be applied to various motors and pumps used on a ship, and energy efficiency can be improved according to the environmental conditions through professional technical support.

Fresh Water Generator



The FWG (fresh water generator) is a device that makes the required fresh water on a ship from seawater using low pressured evaporation, and it was designated as a world class product. The seawater evaporation heat source includes jacket water (waste heat source after engine cooling), or steam. By using the water ejector, the inside of the chamber is maintained in a vacuum state. Depending on the heater changer type used for seawater evaporation and condensing process, the FWG is divided into the plate type and the S&T type, and the model is classified according to the amount of fresh water required on a ship. There are 20t, 25t, 30t, 35t, and 40t/d models, and an individual design is possible, if necessary. We provide a higher level FWG operating system through a necessary performance value controlling system that measures fresh water's salt concentration, and self-cleaning system, and an alarm system notices when parts need replacing.

Air Cooler



Since its establishment in 1980, Donghwa Entec has been supplying air coolers used for low and high speed engines, and our air cooler was selected as a world class product. The engine's combustion efficiency can be improved by supplying more compressed air by cooling the compressed air supplied through a turbo charger. Based on our air cooler technology for ship engines, the air cooler is also used for EGR equipment, a NOX (a discharged gas from a ship) reduction equipment.

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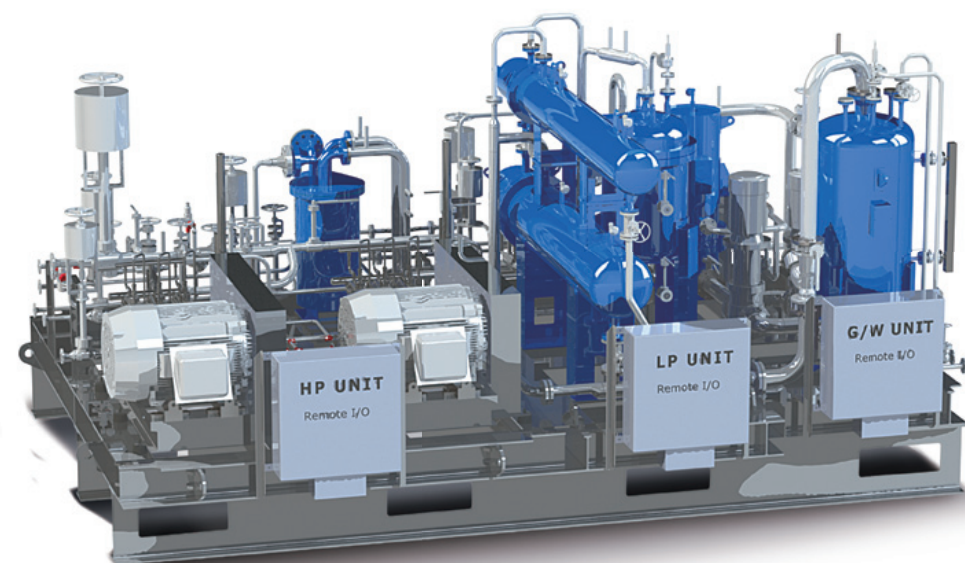
Cryogenic Heat Exchanger and System Engineering Global Leader

- LNG System & Cryogenic Heat Exchanger
- World Class Product of Korea
- Onshore Product

DH-FGSS

Fuel Gas Supply System for MEGI / XDF / DFDE

The fuel gas supply system (DH-FGSS) is a gas-propelled ship's fuel supply system. It is a system that makes LNG and BOG within the ship's tank into a proper engine fuel supply. The fuel gas supply system consists of an LNG fuel tank, an LNG pumping system, a BOG compressing system, an LNG heating system, a BOG heating (cooling) system, a heating medium circulation system, a bunkering system, and a venting system. We supply the system through system engineering that is optimized for project characteristics including small and large ships, high pressure and low-pressure engines.



HP FGSS

Fuel gas supply system for ME-GI engine.



LP FGSS

Fuel gas supply system for X-DF & DFDE, DF GENSET (FG Heater & Separator are optional equipment of engines)



Glycol Water Heating System for FGSS

Supply heat source for vaporizers and fuel gas heater



PFHE

Plate Fin Heat Exchanger



PFHE (plate fin heat exchanger) is a core piece of equipment in the cryogenic process and the oil and gas industry, and it is manufactured with aluminum, stainless steel, and inconel. It is a special type of heat exchanger used for the multi stream process based on high temperature accessibility, and the high concentration compared to volume. We are supplying highly reliable products through the performance predicting technology, structure, and reliability analysis technology.

PCHE

Printed Circuit Heat Exchanger



The PCHE (printed circuit heat exchanger) is a product that bonds basic materials using an interfacial diffusion phenomenon caused from the surface between basic materials at high temperatures and a pressure and vacuum environment. Although the heat exchange type is similar to the plate type, the structure of the plates maintains the mechanical properties of the basic material means it can be used at a high temperature, an ultralow temperature, and in a high-pressure environment. As a compact heat exchanger, it is used as to reliquify an LNG carrier's BOG (cryogenic), high pressure vaporizer, and compressor cooler. For onshore use, the equipment is used for waste heat recovery, reforming hydrogen fuel cells, SCO2 power generation, and hydrogen charging stations. We are supplying a high quality H2 pre cooler (700bar) for hydrogen stations.

Eco Care U1

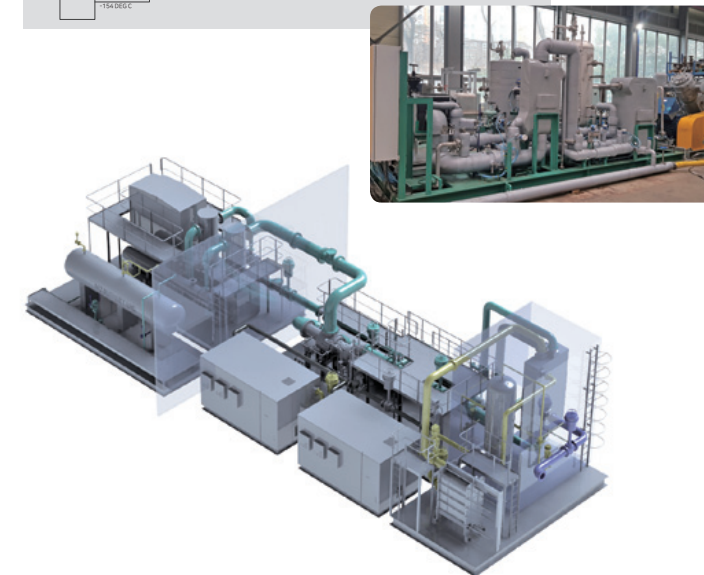
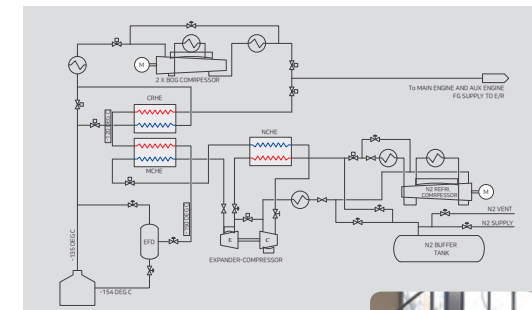


The purpose of this eco-care U1 is to make and service as an automatic real time the aqueous urea solution at 40 % concentration(AUS 40), which is needed to operate SCR (selective catalytic reduction) converters at onboard during sailing. We eco-care U1 is not need the big urea tank with additional chiller system and we can save cost for AUS40.

DH-Reli

BOG Reliquefaction System with N2 reverse Brayton cycle

The BOG (boil off gas) reliquefaction system (DH-reli) is a system that reliquefies the BOG generated in a tank storing fluids at ultralow temperatures. The system is an optimum system to collect the BOG generated in large cargo tanks of LNG carriers. Based on the system design technology, we use a compact heat exchanger (PFHE, PCHE), and combine optimum compressors through our affiliated company Donghwa Pneutec, and guarantee the best performance. We also supply control and monitoring systems and safety systems for optimum operation in addition to machine equipment.



- Pilot plant - Development of 2ton/day BOG re-liquefaction
- Development of BOG treatment system of LNG fuel tank for gas propulsion ship
- Optimization of BOG processing system process for LNG
- Compact size with high density heat exchanger
- Automatic Control System

Surface Condenser



The surface condenser is a heat exchanger that forms a vacuum back pressure at the rear end of a steam turbine used in many industries including generator operation in power stations, compressor

operations in chemical factories, and the LNG ship propulsion. It ensures the turbine output and condenses the waste steam that operates the turbine. The condensed water here is recirculated to the boiler through a water supply pump, water supply heater, and deaerator. There is a top entry type and a side entry type depending on the position from the turbine. For small and medium sized power plants, the circular condenser is used, and the square condenser is used for big power plants.

Inter/After Cooler



Inter Cooler



After Cooler

This is installed at the rear end of the compressor to finally cool the compressed gas of the compressor, and this is a heat exchanger that increases the compressor's efficiency and cuts the amount of power required by cooling the temperature of the air or gas and removing moisture. This is a heat exchanger installed at the rear end of the compressor to cool the finally compressed gas from the compressor. This is actually a heat exchanger to increase the compressor's efficiency and cut the amount of power required in an ASU plant or an oil and gas plant by cooling the temperature of the air or gas, and removing moisture. The air or gas is used after being cooled at the required temperature through the after cooler, after the air or gas is compressed by the final cooler. A small amount of pressure can be lost, and a demister is installed inside to remove moisture when cooling. For the air or gas side to increase the efficiency of the heat exchanger, the plate fin or high fin type is applied.

Fuel Gas Heater



A heat exchanger that heats the fuel gas of a gas turbine, a major piece of equipment for combined cycle power plants, to the required temperature. A gas turbine generates power using energy rotating turbine

wings with heat energy of high temperatures and pressure fuel gas. The fuel gas heater is a heat exchanger increasing the temperature of fuel gas to enhance the heat energy of fuel gas. It is applied as a TEMA BFU type (low-finned u-tube type). For high-pressure operation conditions and compact spatial restriction, the PCHE (printed circuit heat exchanger) type can be supplied.

Closed Cooling Water Cooler (CCW)



A heat exchanger that cools the cooling water of a turbine axis-lubricant oil supply device, a turbine axis' airtight device, a generator's hydrogen cooling device, and the cooling device of generator's top part fixing equipment.

Feed Water Heater (HP/LP)



LP Feed Water Heater



HP Feed Water Heater

Reheating the water supplied is essential to enhance the power cycle, and the equipment heats the water supply to the maximum allowable amount using the steam controlled or uncontrolled by the steam turbine. The water supply heater consists of 3 zones maximum: de-superheating-zone, condensing-zone, and sub-cooling-zone.