DongHwa Entec

‘World Class Company’ with Heat Transfer Technology
World class company contributing to its customers, employees, shareholders and the society by efficiently providing the energy & environment industry with supreme quality goods.

Contents

04  Company Overview
08  History & Awards
10  Noksan Factory
12  Hwajoen Factory
14  R&D Center
16  Shanghai Corporation
18  Business Field
19  Marine
28  Plant
36  Quality /HSE Management
37  Quality Management
38  Environment, Safety and Health Management
39  Quality Management Certificate
40  Maintenance
41  Subsidiary Company
42  Sales A/S Network of DongHwa Entec
Welcome to DongHwa Entec. Since its foundation in 1980, DongHwa Entec has been specializing in manufacturing a wide range of heat-exchangers, from marine heat-exchanger repairing service to heat-exchangers for power-generation and plant industry. Currently, we are heading into new arena of special heat-exchanger for LNG liquefaction & gasification plant. Besides domestic market, we also successfully diversified overseas business in Southeast Asia, Middle-East and Europe. Subsequently, we generated more than 80% of sales in abroad, and today we have become the leading heat-exchanger manufacturer in Korea.

In a preparation for our future success, DongHwa Entec focuses on cultivation of human-resources, as an internal determinant. However, surely it cannot be accomplished in short period time, but the cultivation of employee can be fruitful only after making a long-term investment in systemic support program along-with patience.

DongHwa Entec aspires towards becoming a ‘World Class Company’ with Heat Transfer Technology. Therefore, we have been implementing the Empowered Management which focuses on happiness of our employees, and this could be the most distinguishable virtue of DongHwa Entec.

We keep the slogan “Once be customer, always be customer” in our mind. In a preparation for our future success, DongHwa Entec places top priority on “customer” as an external determinant. We will exert ourselves to fulfill customer’s “needs”, touch customer’s heart and keep in tune with customer throughout manufacturing, delivery and follow-up service of all products.
Company Overview

Management Activity

Management Innovation DPS

• DPS (DongHwa Entec Production System)

‘DPS’ is a genuine production system of DongHwa Entec to achieve production competitiveness through cost-saving and consistent renovation activities as well as culture of basic principle compliance that are based on humanity.

• Basic Principle of DPS

- 01. Humanity
  Human-resource Cultivation: Good product is made by good person.

- 02. Consistent Renovation
  Waste Elimination

- 03. Zero Defects
  Do not take defective goods, Do not produce defective goods, and Do not deliver defective goods.

- 04. ‘Real Place’-oriented Management
  Genchi Genbutsu: Go where work is being done and See what is real

Ethical Management

• Purpose of Ethical Management

The term ‘Ethical Management’ is the fundamental management philosophy of DongHwa Entec. We established the "ethics" as core value in business management and activities, and every business matter shall be carried out in accordance with "Code of Ethics of DongHwa Entec".

• 6 Principles of Ethical Management

1. Customer Respect Management
   Respecting customers, providing value to customer, implementing promise with customer, protecting customer’s interest

2. Law-abiding Management
   Complying with law, respecting free and competitive market principle, legitimate collecting and utilizing information

3. Partner Respect Management
   Providing equal opportunity, fair business, pursue of mutual development, positive interaction

4. Clean Management
   Complying with fundamental ethics, accomplishing mission, self-development, fair business, prohibiting bribery between employees, prohibiting money lending and borrowing between employees, prohibiting sexual harassment at workplace, prohibiting use of illegal software, safety management and preventive measurement against potential risk, mutual respecting between employees, prohibiting disclosure of confidential information of Company and customer

5. Employee-Oriented Management
   Respecting dignity of employees, cultivating human resources, fair treatment, promoting creativeness

6. Social Responsibility Management
   Rational business, protecting shareholder’s interest, contributing to social development, protecting environment

Sustainability Management

Purpose of Establishment of Empowered Management System and Definition of Empowered Management

Based on the managerial philosophy of DongHwa Entec, Empowered Management, we established supplemented and amended management system for organization, cultivation of employee as well as performance evaluation system.

The theory of ‘Empowered Management’ is a combination of productivity, quality, creativeness and cooperation, and in order to follow up, the management should be decentralized and the organization should become autonomous. The Empowered Management can be efficiently carried forward only when the subordinate organizations make performances autonomically. In other words, the process of transition should be shifted from ‘centralization, integration and structuralization’ towards ‘decentralization, separation and de-construction’. Through taking advantage of information technology, we can easily recognize these transitions everywhere and we may figure out the way how to make such transition.

Human resources management

Related Competencies Reinforcement

- Basic Human Nature & Courtesy Training
- Common Capability Education: Planning Ability, Creativity etc.
- Legal Education

Self Improvement

- Language Education
- Cyber Training Institute

Professional Engineers Promote

- Business Items Field Professional Knowledge / Technical Education
- Specialized Training on Manufacturing Sites
- Other Departments / Duty Technical Education

01 Human-Resource Cultivation
02 Related Competencies Reinforcement
03 Self Improvement
04 Professional Engineers Promote

 outlines of DongHwa Entec

Employee-oriented System

Performance-oriented System

Empowered Management

Responsibility and Authority

Sustainable 4 Way

01 02 03 04

Capability Strengthening
- Trust among employees
- Strengthening of responsibility and authority
- Challenge and creation

Increase of customer’s value
- Objective-directed system

HR System

Manager Training

- In Company MBA

Energy, Environment, Engineering & Technology

6 / 7
Company Overview

1980 12 Established Donghwa Precision Industries. Co., Ltd.
1981 07 Developed Air Cooler Product with Korea Institute of Ships
1993 03 Developed Fresh Water Generator with technical assistance of Hyundai Heavy Industries
1996 06 Received the Industrial Award on the 1st Marine Day
2001 06 Moved to NokSan National Industrial Complex in Busan
09 Changed Company’s name from Donghwa Precision Industries, Co., Ltd. to Donghwa Entec, Co., Ltd.
2002 11 Received the Busan Industrial Peace Award

2003 11 Selected as Parts & Materials Specialized Company
2004 11 Announced as the Best Innovative Company
2007 03 Concluded R&D Center in Jisa Science Park
06 Concluded C4A for Heat-Exchanger for Next-generation Aircraft with Rolls-Royce
11 Selected as the Advanced Technology Center
12 Air Cooler, selected as a first class item in the world

2008 02 Constructed Donghwa Entec (Shanghai) Co., Ltd., in China
04 Received ‘Single PPM’ Presidential Prize
11 Received the 100 Million Dollar Export Trophy
12 Selected as "LNG Plant Heat-Exchanger Developer"
12 Received the Busan Export Award

2009 09 Selected as the Best HRD
09 Registered Service Trademark of Quality Innovation Movement “Four Nine”
12 F.W.Generator, selected as a first class item in the world and Product Company
2010 05 Selected as the Hidden Champion
06 Selected as the Best Labor-Management Culture Company
11 Recognized as the Family-friendly Company
12 Recognized as the Best Job-Creator
11 Received the Busan Industrial Award
11 Received the Korea National Quality Award for the eleventh years in row
11 Constructed Hwaenam Factory in Hwaenam Industrial Complex
12 Selected as the Strategic Industry Leader

2014 05 Selected as the World Class 300 Company
2015 01 Selected as small but strong businesses
03 Busan Metropolitan City regional business selection
10 2015 the selection of contributed benefits as a company national merit for outstanding
capital goods development
2016 03 G-pass business selection
05 Youth friendly small but strong business
10 Received the Korea-Japan Industrial Cooperation Award
11 Selected as WORLD CLASS 300 leading enterprise

Energy, Environment, Engineering & Technology > 8 / 9
Company Overview

DongHwa Entec is making ceaseless effort to realize customer satisfaction with production line, flexible payment, customer service, and follow-up service considering optimized design and cost reduction to satisfy customer specification based on know-how for 35 years. Currently, we are focusing on development, design, production, and delivery of ship equipments related to offshore, emerging LNGC and LNG Fuel line due to increased demand for LNG by environment regulation, and developing ceaseless research on size compact and package based on Customer’s Needs.

Main Products

DongHwa Entec supplies products to increase energy efficiency and prevent overheating of the engine in the field of heat-exchanger for the ship. We provide a wide range of energy saving systems such as Energy Saving System which increases energy saving efficiency of ship engine, LNG/LPG Vaporizer, HP Vaporizer for FSRU, Re-liquefaction Heat Exchanger and FGSS(Fuel Gas Supply System) for BOG liquefaction, and MGO(Marine Gas Oil) Cooling Unit.

(주)동화엔텍은 35년간의 생산 노하우를 바탕으로 고객사람에
만족하는 최적화된 설계와 비용절감을 고려한 생산라인, 단계적인 납기방식, C/S, A/S 체계를 원색하게 맞추고
고객만족을 실현하기 위해 걸임없이 노력하고 있습니다.
현재는 환경규제 등에 따른 LNG 수요증가에 부응되는 LNGC 및 LNG 연료선, OFFSHERE 관련 선박의기기의 개발, 설계, 생산, 납품에 전력하고 있으며, 고객 NEEDS에 맞는 SIZE
COMPACT화와 PACKAGE화 연구개발에 박차를 가하고 있습니다.

주요 생산제품 _Main Products

선박용 열교환기 분야에서 최고의 기술을 자랑하는
(주)동화엔텍은 연신의 과열을 막고 에너지 효율을 높이는
제품과 LNG/LPG 용조재 열교환기를 생산하고 있습니다.
주요제품으로는 선박 관리의 에너지절감효과를 높이는 Energy
Saving System과 LNG/LPG Vaporizer, FSRU용 HP
Vaporizer, BOG제품을 위한 Re-liquefaction Heat Exchanger
및 FGSS(Fuel Gas Supply System, MGO(Marine Gas
Oil) Cooling Unit등 다양한 선박용 에너지 절감 시스템을 개발
공급하고 있습니다.

With best technology, DongHwa Entec supplies products to increase energy efficiency and prevent overheating of the engine in the field of heat-exchanger for the ship. We provide a wide range of energy saving systems such as Energy Saving System which increases energy saving efficiency of ship engine, LNG/LPG Vaporizer, HP Vaporizer for FSRU, Re-liquefaction Heat Exchanger and FGSS(Fuel Gas Supply System) for BOG liquefaction, and MGO(Marine Gas Oil) Cooling Unit.
Company Overview

As a leader in the land energy field, DongHwa Entec is developing, designing, manufacturing, and supplying core equipments for energy efficiency of development plant and petro-chemistry plant based on Customer’s Needs with an open mind and creative thinking.

Currently, we supply our heat-exchanger for large rotation equipments such as steam turbine, gas turbine, compressor which can be the heart of plant to the top shipbuilding company in accordance with various safety requirements such as ASME Code and optimal basic design capability so as to obtain the best efficiency with minimal energy.

Also, all employees from headquarter are striving to fulfill the high level of customer service with the introduction of system engineering and packaging technology in keeping with new need of customer and development of new type heat-exchanger for high specification and downsizing in the future.

Hwajoen Factory of DongHwa Entec is seeking worldwide plant market using technology such as Fin Tube and Vacuum related technology which is core-competence of company. Main products are Surface Condenser, Ejector Condenser, Gland Condenser, Inter/After Cooler, Air Fan Cooler, Turbine Cooling Air Cooler, Fuel Gas Heater and we are doing our best effort to make localization of products as well as accumulation of technology through various products.
Company Overview

R&D Center

R&D Center was certified as an affiliated research institution by KOTIA (Korea Industrial Technology Association) in 1992, and it moved to Busan Jisa Science Industrial Complex in 2007. It has conducted a series of researches in various fields including Processing Engineering, Thermal / Mechanical Engineering, and Manufacturing Engineering, and especially, it focused on technology related to Gas. Also, DongHwa Entec R&D Center was selected as an ATC (Advanced Technology Center) by Ministry of Industry, Commerce and Energy.

Research Records

- Development of Heat-exchanger for LNG Plant:
  Funded by Ministry of Land, Transportation and Maritime Affairs
- Development of Marine High Pressure LNG Vaporizer:
  Funded by Ministry of Industry, Commerce and Energy
- Developments of BOG Liquefaction System for LFS:
  WC 300 R&D
- Development of Plate-Fin Heat-exchanger (70bar-class) for Marine Plant:
  Funded by Ministry of Industry, Commerce and Energy
- Developments of Fuel Gas Supply System for Small Scale LFS:
  Funded by Ministry of Industry, Commerce and Energy
- Development of Heat-exchanger for aircraft gas turbine
- Cryogenic Heat Exchanger
- Desalination system

Main Products

- Gas-Processing Engineering
- Compact Heat Exchanger
- Heat-exchanger for aircraft gas turbine
- High Temperature Heat Exchanger
- High Pressure Heat Exchanger
- Cryogenic Heat Exchanger
- Desalination system

R&D Facility and Equipment

DongHwa Entec has various types of performance test facilities and equipments for Heat-exchanger as well as liquid, gas, oil, and extremely low temperature condition. These facilities and equipments enable us to develop new technology, and we do our best to create value to our customers.

Software Infra

- System Design: Aspentech HYSYS
- Basic Design: HTRI, Aspentech
- Mechanical Design Program: PV-ELITE, COMPRESS, Nozzle Pro, Auto Pipe
- CFD(Computational Fluid Dynamics)/FEM(Finite Elements Method)
- ANSYS

Compact Heat-exchanger Manufacturing facility for Compact Heat-exchanger
Company Overview

DongHwa Entec’s Chinese subsidiary, (Company named ‘DongHwa Entec Heat-Technology Co.) was founded in 2007, at Luchaoqang Shanghai(No.2508 JiangShan Road, Lingang New City, Shanghai 201308, P.R.China) with Plant Size 10,000Pyung(3.3m2), Building Size 5,000 Pyung(1.8m2) of area. It is specialized in manufacturing and supplying of Energy System with heat-exchanger (shipbuilding and power plants), and supply a heat exchanger to third country. By combined Shanghai Corporation’s price competitiveness, which is based on quality, and DongHwa Entec’s order competitiveness, which has been based on its 30-year history, it will be able to provide products (sustainable product development), simplification / standardization / optimization products(mass production of small items), and is expanding its market share by diversifying its market(Specialization Production).

Main Products

Experienced product know-how based on thermal fluid technology provides high efficiency. We provide world-class products to a wide range of customers. Major products include Air Cooler, S&T Heat Exchanger, COPT Vacuum Condenser, Fresh Water Generator, Tank Cleaning Heater, Plate Heat Exchanger, Inter Cooler, Gas Cooler, Oil Cooler, Air Receiver Tank etc. In order to provide better products and satisfactory service, We will do our best for research and development.
DongHwa Entec, a leading company of materials for shipbuilding/maritime heat exchangers, puts customer satisfaction on top based upon its leading technologies and continuous R&D. Especially, it designs / produces goods of various fields intended to maximize their efficiency such as Energy Saving System and ultra-low temperature heat exchangers for LNG / LPG.

Fuel Gas Supply System

LNG that is being supplied from RV/FSRU(combination of LNG Tanker, Re-gasification facility and Gas unloading facility) by HP LNG Pump, is vaporized by HP Vaporizer. The seawater is utilized as a source of heat that vaporizes LNG, and also if the seawater temperature falls down, it will be heated by with Seawater Heating System. In such case, DongHwa Entec’s Seawater Heater may be used.

Fuel Gas Supply System(FGSS) is used to supply a fuel gas to ME-Gi engine. The high pressure LNG is being supplied by HP liquefied natural gas pump and then, vaporized to natural gas. Glycol Water is generally used to heat-source for vaporizing liquefied natural gas, and Glycol Heating System is accompanied including Glycol Tank and Glycol Pump.

Fuel Gas Supply System

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LNG Vaporizer / Forcing Vaporizer

Cargo Handling System에 사용되는 Vaporizer로 LNG 성분혀벽시 LNG/N2를 가열하는 장비이며, 변압/보일링 등 행목으로 사용되는 BOG 발생능의 적을 경우 감염해 역전압가스를 가열하여 공급하는 장비。
Unloading Mode, Purga Mode, N2 Mode, Emergency Forcing Mode의 각각 가와운 프로세스를 사용되며, HD Gas Heater, LD Gas Heater, Forcing Vaporizer, Mist Separator/Drain Pot 등은 각 운전 Mode에 따라 유압, 온도가 Control/Valve로 함께 제어/공급되는 방비.

LNG Vaporizer is an equipment vaporizing LNG / N2 while LNG is being transported, if BOG generation used to fuel in engine / boiler is low, this supplies by vaporizing liquefied natural gas in force. B.O.G(Boil-off gas) is generated while LNG is being transported, and this gas is utilized as fuel in steam turbine for sailing of LNG Carrier. Therefore, water-feeding shall be maintained very strictly on LNG Carrier. Meanwhile, the general-purpose-steam is supplied from the main boiler, and utilized to operate various auxiliary components of the ship. However, if those auxiliary component are defaulted or being operated incorrectly, feed-water could be mixed with boiler water, and eventually the life-time of boiler could be shorten. In this reason, the steam for mail boiler and general-purpose-steam are separated.

BOG Reliquefaction System

LNG운송선의 경우 저장 Tank의 단열체가 적절히 시공됨에도 불구하고 외부로부터의 열유입으로 인하여 BOG(Boil-Off Gas)가 자발적으로 발생되는터를 제거하는 CARGO TANK에서 다시 저장시키는 설비로 LNG의 순상을 줄이기 위해 적용되는 장비.

In the case of LNG carriers, boil-off gas (BOG) is continuously generated due to heat input from outside, even though the insulation of the storage tank is properly installed. BOG Recondenser is to re-liquefy remained BOG and re-store them in cargo tank, so this facility can prevent LNG loss.

Trim Heater

LNG RV(Regasification Vessel), LNG FSRU(Floating Storage Regasification Unit)에서 핵전기를 사용하여 바람직한 양을 통해 의장 LNG Terminal을 가하기 떨 감고 Gas를 보내내며, 엔진사이로 운반하여 Gas를 운송용(Hull)에 내장된 ?Carboothermal Heating기에는 열교환기.
When regenerating liquefied natural gas from LNG RV (Regulation Vessel) and LNG FSRU (Floating Storage Regulation Unit) and sending the gas through the pipeline without going through the land LNG terminal, the temperature of the gas is lowered due to the pressure drop. Heat exchanger to heat gas temperature.

PCHE/PFHE

PFHE - 초저온 영역에서의 유용성과 효과적, 온도 접근성 등의 장점으로 인하여, LNG 액화 플렌트 등과 같은 초저온 액화 플렌트와 Etane, Propane, Ammonia 등 액화 중류 공정이 적용되는 화공 용도로, 고기 층에서 일반적 설계를 하지 않는 A.S 단열, 고가성질과 같이 시 재질을 통한 연마와 같은 방법에 사용되는 열교환기.
PFHE - Plate-fin heat exchanger consists of corrugated fins, separated parting sheets, nozzles and manifolds. Its principal use has been in oil & gas process, cryogenics and in aerospace where high performance with low mass and volume are important. Plate-fin heat exchanger can treat multistreams in only one unit.

LPG Cargo Heater(Vaporizer)

(DongHwa Entec)의 Cargo Heater 및 Vaporizer는 넓적도의 용적으로 운송되거나 동일한 Shell의 두 가지 형태로 밀합, 일반적으로 Cargo Heater는 특수 냉각을 위한 Shell 측의 바람돌과 부식에 강한 Ni 합금 스테인레스 스틸 904L, 유리로 설계한 도시어의 열교환기로 사용 가능.
DongHwa Entec cargo heaters and vaporizers are delivered as separate units or combined for both duties in the same shell. Typically cargo heaters are designed for seawater cooling with seawater on the shell side and tubes of corrosion resistant High Ni-alloy stainless steel 904L. Heat exchangers in all Titanium are also available.
Suction separator

Gas Separator is the equipment that is used to separate any vapor that arises in the flow will vent through top vent valve and which is collected in common vapor recovery tank. We have supplied this equipment for products like LPG to various oil marketing companies.

Economizer

Economizer is the equipment that is used to separate any vapor that arises in the flow will vent through top vent valve and which is collected in common vapor recovery tank. We have supplied this equipment for products like LPG to various oil marketing companies.

Vent Gas Cooler

Vent Gas Cooler is used to cool temperature of fuel oil for its smooth circulation of fuel oil (MGO) using refrigerants.

MGO Cooling Unit

MGO Cooling Unit is used to cool temperature of fuel oil for its smooth circulation of fuel oil (MGO) using refrigerants.

Fuel Switch

Fuel Switch is used to cool temperature of fuel oil for its smooth circulation of fuel oil (MGO) using refrigerants.
**Business Field**

**Plate Heat Exchanger**

Plate Cooler is making wrinkled-thin metal plates to transfer heat between two fluids using gaskets and this cooler can exchange large amount of heat in short period of time.

**Deaerator**

Deaerator is used to remove gas (oxygen, carbon dioxide) from feed-water for preventing corrosion inside of boiler, piping and heat-exchanger, and utilized to heat feed-water, and maintain stable NPSH (Net Positive Suction Head) of feed-pump.

**Fresh Water Generator**

M/E JACKET WATER to be supplied to engine required for making seawater into fresh water using M/E jacket water (S&T Type and Plate type).

**Cargo Drain Cooler**

LNG tanker systems require that feed-water be made in the ship. Cargo Drain Cooler enables the re-use of feed-water by condensing saturated water which being used in LNG tanker system equipment.

**Drain Cooler**

Drain Cooler enables reuse of dumping steam and saturated water generated from various auxiliary components as feed-water of boiler.

**Oil Heater**

Oil heater is used to heat a fuel oil and lubricant oil for ships by using the steam generated from boiler.

**Cargo Drain Cooler**

Cargo Drain Cooler is making wrinkled-thin metal plates to transfer heat between two fluids using gaskets and this cooler can exchange large amount of heat in short period of time.

**Plate Type Tubular Type**

**Glycol Water Heater**

In order to protect body of the ship from extremely cold LNG Cargo, Glycol Water Heater is circulating Glycol water which is heated up to temperature of 90°C through heating coil that installed in temporary water-board between cargos. This is used to heat Glycol water supplied to the vaporizer.
DongHwa Entec is producing all kinds of heat-exchanger in our factory which are efficient facility and heat-recovery such as the petro-chemical industry, generating unit, textile factory and food industry. In particular, we have a great record on heat-exchanger for large rotation equipments, and submit an estimate from oil-water engineering and heavy industry and then delivery of manufactured goods.

**Business Field**

**Condensate Accumulator**

The function of Condensate accumulator in refrigeration system is to catch and hold any unused portion of the system charge.

**COPT Vacuum Condenser**

This vacuum condenser is installed to generate back-pressure for improving turbine performance, and this can be used to recollect Exhaust steam that discharged from tanker ship with inert gas system.

**Air Cooler**

An equipment cooling air provided in the engine, we have been developed / manufactured Air Cooler used for low and high speed engine for more than 20 years with taking 50% of market share.

**Tank Cleaning Heater**

Tank Cleaning Heater is used to heat S.W or F.W in order to clean the remaining oil and oil sludge inside of oil tanker as for safe transportation of cargo, storage of different kinds of consignments and prevention of contamination of product.

**Tank Cleaning Heater**

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**Condensate Accumulator**

The function of Condensate accumulator in refrigeration system is to catch and hold any unused portion of the system charge.
Surface Condenser

Surface condenser generates vacuum backpressure to ensure output of turbine, and also condenses a waste-steam while located at the end of steam turbine which is generally used in industries such as power generating in power plant, compressing in chemical plant as well as propelling of LNG tanker. The produced condensate is going to be re-circulated towards boiler passing through feed water pump, feed-water heater and deaerator. Depends on location of surface condenser against turbine, it is classified into Top-entry type and Side-entry type. The circular type surface condenser is used for small size and medium size while square type surface condenser is used for large size such as power plant.

Gland Condenser

Gland Condenser is used to collect condensate and calories of steam that used for sealing steam turbine, and it also creates a state of vacuum to help discharge of steam. The thermal energy is transformed to the kinetic energy as steam of high pressure-high temperature rotates steam turbine. Thus, Seal Steam System is necessary to prevent steam leakage from steam turbine and air infiltration into steam turbine. Gland Condenser collects condensate and steam calories as well as creation of vacuum state inside of Seal Steam System, and it also steam discharge.

Ejector Condenser

Ejector Condenser is a combination of Ejector which constantly ejects air to maintain a state of vacuum inside of Vacuum Steam Condenser, by using steam, and condenser which condensing and re-circulates the used steam. If air infiltrates into Vacuum Steam Condenser for Steam Turbine, it wraps surface of tube and subsequently, the heat-transfer efficiency drops and vacuum state of Surface Condenser is released. Consequently, the efficiency of turbine falls down. Therefore, Steam Ejector is used to eject air from Condenser, and Surface condenser is used to collect discharging steam accompanied with air, by using cooling water. For the reuse and efficiency, this condensate is mainly turned back to Surface Condenser through steam strap. Generally, Ejector Vacuum System is comprised of first stage Ejector and middle Surface Condenser, and second stage Ejector and final Surface Condenser. Since any rotating instrument is not included, it has advantage such as easy maintenance.
Turbine Cooling Air Cooler

Gas turbine is very important for the energy industry because it is the main equipment of the combined cycle power plant. The thermal energy is transformed to the kinetic energy as steam of high pressure-high temperature rotates steam turbine. Turbine Cooling Air Cooler is used to chill heated gas turbine for maintaining stabilized temperature.

Fuel Gas Heater

Fuel Gas Heater is a heat-exchanger that increases the heat of the gas turbine. It is used to heat fuel gas for gas turbine (the main equipment of the combined cycle power plant) up to required temperature. The thermal energy is transformed to the kinetic energy as steam of high pressure-high temperature rotates steam turbine. Turbine Cooling Air Cooler is used to chill heated gas turbine for maintaining stabilized temperature.

Gas Turbine Air Heater & Cooler

Gas Turbine Air Heater & Cooler is a heat-exchanger that increases the heat of the gas turbine for combustion of gas turbine. The thermal energy is transformed to the kinetic energy as steam of high pressure-high temperature rotates steam turbine. The allowable pressure drop is very limited, and demister is installed inside to remove moistures. Also, for plant or oil & gas plant, and removes moisture accordingly. Consequently, the efficiency of compressor can be improved and energy can be saved. These air or gas is compressed by cooler at the last stage, and then to be cooled to its required temperature after passing through After Cooler.

Gas Turbine Air Heater & Cooler

Compressor operates at the end of compressor to chill the compressed gas. This heat-exchanger chills the air or gas discharged from compressor in industrial ASU plant or oil & gas plant, and removes moisture accordingly. Consequently, the efficiency of compressor can be improved and energy can be saved. These air or gas is compressed by cooler at the last stage, and then to be cooled to its required temperature after passing through After Cooler.

Lube Oil Cooler

Lube Oil Cooler is used to chill lubricant oil that used for lubrication process of various rotating equipments such as generator and compressor in plant, by using cooling water. Also, 3-way valve is adopted for timely replacement of Working Cooler and Stand-by Cooler. Generally, it is manufactured in Shell & Tube type, but Plate type is also available.

Fin Tube Type Inter / After Cooler

Compressor operates at the end of compressor to chill the compressed gas. This heat-exchanger chills the air or gas discharged from compressor in industrial ASU plant or oil & gas plant, and removes moisture accordingly. Consequently, the efficiency of compressor can be improved and energy can be saved. These air or gas is compressed by cooler at last stage, and then to be cooled to its required temperature after passing through After Cooler. The allowable pressure drop is very limited, and demister is installed inside to remove moistures. Also, for increasing efficiency of heat-exchanger, the Plate Fin type or High Fin type is applied to where air or gas is being taken or discharged.
Steam Coil Air Heater

Air Heater is a heat exchanger for preheating of combustion air to protect from low temperature corrosion of internal heating element. Generally, it is comprised of Fin Tube, Head and Duct.

Fuel Gas GGH Cooler & Reheater

This Heat-exchanger is installed at the front and rear of absorption tower in wet desulfurization unit, and used to make an exhaust gas suitable for reaction by cooling or heating proper to environment regulation. The tube material is made of fluorine contained resin to protect low-temperature corrosion by sulfuric acid.

Other Types

Brazed Aluminum Plate Fin Heat Exchanger

This Heat-exchanger has many advantages of usefulness in extremely low temperature, compactification and temperature accessibility, so it is used in many areas; Liquefied plant where extremely low temperature is maintained, such as LNG liquefied plant; Chemical plant where liquefication process is being applied to distill the Ethane, Propane or Ammonia; A.S. aviation industry where useful elements are need to be separated from the air; and High-speed railway system where weight lightening is required by using Al material.

H2 / Air Cooler for Generator

Hydrogen is used as a cooling medium since it has high heat capacity. H2 / Air Cooler for Generator is used to chill the discharged hydrogen from cooling generator, by using cooling water. Generally, it is manufactured in Plate Fin Tube Type.
Surface Condenser

A steam surface condenser is a critical component of a power plant. The generating capacity of a power plant is dependent on the performance of the steam surface condenser. Condenser of DongHwa Entec is designed to provide the lowest back pressure which, in turn, maximizes the output from the power plant. Each condenser is designed in accordance with the client’s specifications to provide the lowest back pressure which, in turn, maximizes the output from the power plant. The design is in accordance with the following codes and standards.

Heat Exchange Institute (HEI)
Electric Power Research Institute (EPRI)
American Society of Mechanical Engineers (ASME)

Ejector Vacuum System

The vacuum degree is decreased if the air is penetrated to vacuum surface condenser for turbine and result the decrease of power of turbine. Therefore steam driving ejector is necessary in order to remove air in vacuum surface condenser and ejector condenser is necessary in order to condense the driving steam. Usually ejector vacuum system is consisted of 1st ejector, inter condenser, 2nd ejector and after condenser. Comparing to vacuum pump, it has advantage such as maintenance because there is not rotation machinery using electricity.

Feedwater Heater (HP/LP)

The feedwater heater is composed of 3 zones, which are high efficiency desuperheating zone, condensing zone and subcooling zone.

Deaerator

Deaerator is defined as a mechanical device for removal of dissolved gases, especially oxygen and carbon dioxide from feedwater. Spray & tray type is utilized for land-use deaerator, and spray & scrubber type is utilized for marine-use deaerator. Donghwa Entec developed major part like spray valve, tray, and scrubber and still research for more high efficiency of deaerator. Donghwa Entec has ability of thermal design, strength calculation, material procurement, and manufacturing.

Closed Cooling Water Cooler (CCW)

The function of a cooling system is to remove heat from cooling water of lubrication supply equipment of turbine’s axis, sealed equipment of turbine’s axis, hydrogen cooling equipment, cooling equipment of upper stator of generator etc.
Quality / HSE Management


품질경영 _Quality Management

We perform well planned and systemic quality assurance activity in every aspect including design, manufacturing, delivery and A/S, upon ISO9001:2008 Quality Management System, ASME Quality Control, KEPIQ Quality Assurance Scheme and AS9100 Aviation Quality Management System.

Furthermore, DongHwa Entec takes an object of world best class quality management activity by broadening our capability toward nuclear and aviation industry which requires highly advanced technology.
DongHwa Entec recognizes its leading role in environment, safety and health protection. Subsequently, we established the business structure as follow:

1. Compliance with environment, safety and health law, and other requirements defined by organization
2. Periodic surveillance on influence of all activities, products and service to environment, and nature of dangerousness of environment, safety and health as well as improvement activities
3. Continued improvement for accomplish objectives of environment, safety and health in efficient way
4. Efficient use of materials in production activities
5. Minimization of waste and pollutant, and strict control above legal standards
6. Establishment of counter-measurement against potential risk in environment, safety and health
7. Establishment of the best class management system regarding environment, safety and health, and spreading to every employee, and institutionalizing in daily work

### Table: Certifications

<table>
<thead>
<tr>
<th>Title of Certificate</th>
<th>Certification Agency</th>
<th>Description</th>
<th>Certification Date</th>
<th>Expiration Date</th>
</tr>
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<tbody>
<tr>
<td>ISO14001:2009</td>
<td>Korean Register of Shipping</td>
<td>Environmental Management System</td>
<td>2015.03.28</td>
<td>2018.03.27</td>
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<td>OHSAS18001</td>
<td>Korean Register of Shipping</td>
<td>Safety, Health and Environment Management System</td>
<td>2015.03.28</td>
<td>2018.03.27</td>
</tr>
</tbody>
</table>

**Quality Management Certificate**

- ISO9001
- ASME (UI)
- ASME (UI2)
- ASME (S)
- ASME (PP)
- KEPIIC - MN
- JS1000
- SEL - China
- DNV Cert
- NK Cert
- BV Cert
- KR Cert
We are striving to meet the needs of our customers with the optimized solution. Every customer might have a different set of needs, so it is necessary to provide the optimized solution and service to them respectively.

More faster and more accurate, the leader of the Heat-exchanger solutions market, DongHwa Entec The development of DongHwa Entec shall be attributable to our customer’s encouragement.

For customer’s satisfaction with A/S, DongHwa Entec always takes every breath with customers through providing technical advice, maintenance consultation and supplying related spare-parts. Also, our maintenance service can timely reach to every customer whether they are anchored or are sailing, so that our customers keep their fleets running in maximum efficiency. This is the fundamental principle of DongHwa Entec.

Maintenance team provides solutions and services either directly to the customer or through multiple partners. We contact our customers through a variety of channels including the Fuji Trading Group network of HANIL-FUJI Korea and Dintec’s global network.

Use Genuine Spare Parts
Take a long term view on quality and make an investment. This is the reason why you have to use the genuine spare parts from DongHwa Entec. Our genuine spare parts are optimized for our respective products and this is the only way to ensure the best performance and safety. We provide same quality assurance program for both original parts and genuine spare parts. Unauthorized spare parts other than genuine spare parts of DongHwa Entec may cause degradation of performance or malfunction.