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Foreword

Dear Sirs,

We are pleased to introduce our company - HI AIR KOREA - and our products to you.

HI AIR KOREA is the leading supplier of offshore and marine applications, and at our headquarters located in Gimhae, South Korea, we are manufacturing air handling units (AHU), refrigerating system for AHU and provision plants, ventilating equipment, packaged air conditioners as well as spiral ducts based on a long list of accomplishments in the global HVAC business.

Today, and since the establishment of HI AIR KOREA in 1988, our management and dedicated staff concentrate all their efforts on identifying the problem, develop solutions with the total picture in mind, and participate with our customers to ensure top-class HVAC systems including world-wide after sales service.

We hope having raised your interest, and should be pleased to give you all our attention in solving your HVAC problem whatsoever. Please do not hesitate to contact HI AIR KOREA!

Sincerely yours,

K. B. Kim / Chairman
Challenge for World Wide!

HI AIR KOREA new vision consist of development of new technique and research. The Best Quality and Service, They are promised with HI AIR KOREA.

HI AIR KOREA air conditioning plants of high pressure, high velocity systems were developed and designed in the early fifties, pioneering for providing stable, optimum climatic conditions for passengers and crew onboard plenty of the ships sailing the seven seas. The marine installations include giant super tankers, container ships, offshore project, FPSO, Re-Ro vessels, naval vessels and advanced passenger ferries.
Air Conditioning Systems

Air Handling Unit Type HKA

**HI AIRKOREA** air handling unit can establish SINGLE-Pipe AC System, TWIN-Pipe AC system and RE-HEAT AC System (electric reheater or hot water reheater) with the combination of different types of cabin units.

The HKA unit is built upon a sturdy bedframe made of steel and will include all sections required to suit very individual specifications. It is manufactured in eleven sizes with air capacities ranging from 0.53 to 13.61m³/s.

**HI AIR KOREA** air handling unit type HKA is specially designed for marine installations for air conditioning. Each section is designed as a modular system and consists of a rigid framework made of square pipes with specially assembled corners. The sections are made of galvalume*1 and internally well insulated.

Equipment such as fan, motor and filter mat can be simply removed from its section through inspection doors fitted to ensure easy maintenance.

The condensed water from cooler, humidifier and water eliminator drops onto drip pan and drains out through drain pipe. The unit can be hooked up by means of eyebolts mounted in each corner of the bed frame. Each component comprising air handling unit is high-quality equipment designed for marine application.

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Refrigeration Plant

Compressor’s open or semi-hermetic reciprocating type. The cooling capacity of open type ranges from 80kW to 830kW. The cooling capacity of semi-hermetic type ranges from 80kW to 300kW. Also, some compressor is available. The automatic unloading system regulates the compressor capacity by controlling or exhaust the cylinder, in pairs. The capacity regulation is done by solenoid valves mounted on the compressor. The solenoid valves are activated by suction pressure.

Condenser is of horizontal shell & tube type. The refrigerant vapors in shell side are condensed by seawater or fresh water in tube side. The condenser has a special feature that the refrigerant vapors from cooler pass through the tubes located at lower part of the condenser, so the condenser acts as a liquid separator. The liquid vapor by changing the heat between condensation vapor coming from the cooler and the hot refrigerant from the compressor. The cooling water tube is made of copper for fresh water service, and Cu/Ni (90/10) for seawater service to prevent corrosion.

Safety pressure control - Pressure switch for capacity regulation - Low / High pressure control switch - Oil differential pressure control switch

For Air Conditioning System

Refrigeration technology has been an indispensable pre-condition in the constant improvement of living conditions on board. Without this it would not be possible to provide a balanced and healthy environment in comfortable living quarters with a controlled and pleasant climate.

Depending on size, operating conditions and general arrangement of the air conditioning systems, various system layouts are available:

- Simple condensing unit operating usually connected to the more complex MICROCOM of condenser.
- Unit cooler units operating a number of air coolers. In the latter case a highly advanced microprocessor or PLC based regulation and control systems is available.

Condensing unit type MCU

Each unit is built up on a sturdy bed frame and composed of compressor block, electric motor, oil separator, condenser and blower, etc. Full complement of operating and fail-safe controls and devices, to protect against extreme operating conditions and breakdown of machinery, renders automatic operation, including automatic capacity regulation to minimize operating costs.
Refrigeration Plant

**Compressor**
- Open or semi-hermetic reciprocating type.
- The cooling capacity ranges from 3.0kW to 16.5kW.

**Condenser**
- A horizontal shell & tube type.
- The refrigerant vapors in shell side are condensed by seawater or fresh water in tube side.
- The cooling water tubes are made of copper for fresh water service, and Cu/Ni(90/10) for seawater service to prevent corrosion.

**Safety Pressure Control**
- Low pressure control switch.
- High pressure control switch.
- Oil differential pressure control switch.

**Controller**
- The refrigerating system for provision stores can also be supplied with a microprocessor based regulation and control system substituting the traditional electric controls with the following functions:
  - Temperature monitoring and regulation
  - Automatic defrosting
  - Automatic start / stop of compressor
  - Indication of malfunctions.

For Provision Plant

Refrigeration systems for this purpose consist of wall-mounted air coolers and two condensing units, one operating on both the chilled and the freezing rooms, and one as stand-by. However, in some cases a system with three condensing units, one operating in the chilled rooms, another on the freezing rooms, and a third as stand-by, will be more suitable. Within temperature, plant operation and switching cycles are controlled automatically. The control and regulation system can be supplied either as traditional electric control or as the microprocessor.

The unit is built up on a sturdy bed frame and composed of compressor block, electric motor, oil separator, condenser and drier, etc.

Design and Execution

The design of the factory-assembled units is especially adapted to marine conditions, requiring a minimum of space, field design and installation work in accordance with the shipowners’ demands. Components on special marine execution guarantee a long life cycle and low maintenance costs. The units are manufactured and supplied in accordance with the rules of the leading classification societies.

### HI AIR KOREA System

**Cabin Units**

HI AIR KOREA cabin units are specially designed for the supply of conditioned air to ship’s accommodation via the spiral duct piping system. For each type of HI AIR KOREA system (Single-pipe, Twin-pipe, Re-heat), there is a comprehensive range of cabin units comprising units for bulkhead mounting or ceiling suspension, units supplying the conditioned air through a grill, a ceiling diffuser or a punkah louver.

HI AIR KOREA cabin units are made in sizes to suit the ventilation requirements as well as the heating and cooling loads. All units have an air volume control device by means of which the air flow delivered can be varied from nil to a predetermined maximum. Besides, units intended for Twin-pipe and Re-heat installation provide individual temperature control, independent of the air flow control.

In the design of the units, special attention has been devoted to sound attenuation, and in relation to the ambient sound levels on board ships, very satisfactory sound levels have been achieved.

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Air Terminal Devices
Marine use packaged type air conditioner is designed in consideration of special conditions on board ship. These units are executed in a high-quality finish and specially designed for placing in both accommodation areas and technical spaces.

**Usage**
- Welding and painting works in factory
- Welding and painting works in tank
- Construction site
- Exhibition hall

**Packaged Air Conditioner**

**Deck Unit**
The Deck Unit comprises of 4 models with cooling capacities ranging from 75,000 to 146,000 kcal/h. Thus, a large capacity of different versions is available. The Deck Unit is specially designed for marine installations for air conditioning. Deck Unit is a flexible and compact system for combination of air handling components into complete units.

**Spot Cooler / Dehumidifier**
Spot cooler prevents heat strokes, heat cramps, thermal fatigue, etc. that occur during high temperature, high humidity and windless working sites. It is used at roof level of ships, especially during summer season and the high-speed temporary site construction areas. Dehumidifiers control humidity and temperature in a paint shop thus provide the best conditions for the painting jobs inside the paint shop. There are three types: Refrigerated, Dry type dehumidifier, composite pre-cooler type dehumidifier and composite pre-cooler type dehumidifier and composite pre-cooler type dehumidifier. Dehumidifiers can be customized based on customer’s requirements and satisfaction.

**Compressor**
The compressors are of hermetic reciprocating type. They are fitted with heating elements and an internal suction accumulator for long running.

**Condenser**
A cleanable shell and tube type condenser with Cu/Ni(90/10) anti-corrosive tube is used for seawater.

**Evaporator**
A Cu/Al coil treated with epoxy to resist the saline air is standard.

**Filter**
A washable flat filter is placed in front of the evaporator.

**Fan**
A direct coupled centrifugal fan with motor is provided. Mounted fans can ensure an extra low noise level and no vibration.

**Protection Control**
A thermostat with its sensor placed in the air flow ensures the correct temperature, which is adjusted on the small panel at the front of the unit. The electric panel includes automatic circuit breakers. The compressor safety equipment includes Refrigerant switches, a solenoid valve in liquid line, filter dryer and liquid refrigerant sight glass as well as fittings to plug in pressure gauges.

**Refrigerants**

**Casing**
The steel casing coated with synthetic resin powder is built on a rigid steel frame. The casing is thermally insulated to prevent condensation.

**Optional Equipment**
- Pleum chamber
- Fresh air intake damper
- Return air intake for duct connection
- Flexible connections and counter flanges for air intake and outlet
- Stainless steel casing
- Glycol cooling coil
- Electric heating coil
- Automatic steam valves
- Pressure gauges
- Electronic temperature control with LCD display

**Suction**
- Welding and painting works in tank
- Construction site
- Exhibition hall
Axial flow fans are widely used for marine and offshore installations. They are manufactured in various designs according to the specific requirements for the intended installation and application. The axial flow fans can be produced from 10 m³/min to 3,000 m³/min with static pressure from 10 mmAq to 100 mmAq. The nominal diameter of the axial flow fans are available from 300 mm to 2,000 mm.

**Rigid type Axial fan**
For direct installation in duct systems. Supplied with an impeller with adjustable pitch marine grade aluminum alloy blades, direct coupled to a motor. The fan housing and flanges are in heavy plate in accordance with the requirement of international classification society.

**Propeller type Axial Fan**
For direct exhaust through wall or bulkhead, relatively in small capacity with low pressure drop.

**Short Bell-mouse type Axial fan**
For direct supply or exhaust at duct end, for instance, in engine rooms requiring a high rate of air changes.

**Mushroom type Axial fan**
Combined explosion-proof axial flow fan and weather hood with explosion-proof motor placed above the hood. Suitable for supply air or for pumprooms in tankers and in offshore installations where an explosive atmosphere is likely to occur. Approved by "Lloyd’s Register of Shipping" and all other classification societies for installation in "IMO Class A Division.

**Swing-out type Axial fan**
For direct installation in duct systems. Supplied with an impeller with adjustable pitch marine grade aluminum alloy blades directly coupled to a motor, and easy access for motor servicing. The fan housing & flanges in heavy plate.
Ventilation Fans / Fire Damper

Centrifugal Fans

Centrifugal type fans are light-weight, compact and high-pressure fans with high-efficiency designed for universal installation. They are therefore well suited for marine or industrial ventilation and air conditioning systems where economic operation and a low sound are important factors. The impeller is made of broad, backward curved blades.

Centrifugal type turbo fan

Type TTF turbo fan is available diameter from 300 mm to 1400 mm. Backward curved blades are coupled directly or by v-belt.

Chamber type Centrifugal-Low/High pressure fan

Type CLC is available in nine standard sizes with impeller diameters from 250 mm to 1000 mm, and type CHC in seven sizes with impeller diameters from 400 mm to 1000 mm. Type CHC is designed for higher speeds and higher pressures than type CLC.

Fire Damper

Fire damper are type-approved class A and H for use in offshore and marine ventilation systems. HI AIR fire damper can be supplied to suit rectangular or circular ducts. HI AIR damper are used to prevent the spread of fire within the ventilation ductwork. All fire dampers have a fusible link and spring return failsafe actuator. When the blades are in the open position, the device does not cause significant pressure loss or flow disturbance. Fire dampers are set from outside and will be able to install in any position. An open-closed indicator is visible on the outside of the damper. Fire damper dimension of different versions is available.

Fan House

Fan house is made of FRP or steel plate with painting and internally sound insulated with mineral wood. Covered with perforated seawater resistant SUS plate. Hinged door and davit installed for easy maintenance of fans & electric motor.
MGO Cooling System

“With all the experiences gathered from the past HVAC projects, HI AIR KOREA has acquired the skills to develop a high technology solution that will perfectly satisfy the process of Fuel Oil Cooling System. With the MGO Cooling System HI AIR KOREA assures the reliability and durability.”

Advantage of HI AIR KOREA MGO COOLING SYSTEM

- It easily controls the temperature and viscosity being transmitted by PLC.
- Hot gas by-pass system is able to control using a lower load.
- The evaporator is designed without leakage.

P & I Diagram

Spiral DUCT

HI AIR KOREA Spiral Duct System is available as a range of spiral-seamed tubes and fittings with factory-fitted sealing gasket that provides a tight and reliable joint.

HI AIR KOREA Spiral Duct System is available as a complete range with diameter from 80 mm up to and including 1,600 mm.

Application area for ventilation - Accommodation - Engine Room - Cargo Hold - Cable Way

The Leakproof HI AIR KOREA Spiral Duct System

HI AIR KOREA Spiral Duct System complies with Eurovent Class C specification. The high, uniform quality and the effective factory-assembled sealingsystem means that installation is fast and easy. HI AIR KOREA Spiral Duct System is leakproof when fitted.
Benefits of the system

- Fast and easy installation
- Adjustable - twisting and fine adjustment involve no risk of leakage.
- Environmentally friendly as it is fitted without sealant which contains solvents.
- Can be installed in all kinds of weather.
- Temperature resistant from -30°C to +100°C.
- Sealing minimises the risk of leakage in the event of damage.
- Withstands negative and positive pressure up to 3000 Pa.
- Internal and external production control.
- Aesthetic design - an advantage for visible installation.
- Unilume steel consists of aluminum(98% in weight ratio but 80% in surface volume ratio), zinc(43.4% in weight ratio), and silicone(0.8% in weight ratio) so it has both aluminum unique corrosion resistance and heat resistance and zinc unique "galvanic behavior". As outdoor exposure test (for 13 years), Unilume is at least 3-4 times superior to galvanized steel.
HI AIR KOREA has committed itself to take social responsibility recognizing that the environment is one of the most important factors in business management to establish the business strategy. The company has established an autonomous environmental management system based on the business philosophy that "the environment has the priority to the business", so we are doing careful management for the environment in every production process from the production to the disposal of wastes.

Technical License Agreement

- YORK Refrigeration for Refrigerating Plant at Jens Juuls Vej 28, 8260 Viby J, Denmark
- SABROE A/S was merged with YORK Refrigeration in 1999.
- The Company name changed to “YORK Refrigeration”
York Refrigeration (SABROE A/S) is our partner within operation and maintenance of refrigeration plants. Our expertise is based on almost 100 years of experience and more than 15,000 ships served by YORK Refrigeration equipment. Based on this, it is safe to say that we have truly mastered the art of refrigeration. This is also why we can offer professional service on not only YORK Refrigeration plants, but on all other types of refrigeration plants.

HI AIR KOREA is always on the move. With subsidiaries and an extensive network of qualified service agents around the globe, we are always in the centre of events and take pride in being at the forefront of marine refrigeration technology. The YORK Refrigeration network is tied together with HI AIR KOREA through common goals: Quality, high standards, strict technological requirements and service are guidelines in our everyday work. That is what we believe in and how we act.

Main Customer List

Hundal Heavy Industries, Ltd. [HHI] | Hyundai Samho Heavy Industries Co., Ltd. [HSII] | Hyundai Mipo Dockyard [HMD]
Daewoo Shipbuilding & Marine Engineering Co., Ltd. [DSME] | Samsung Heavy Industries Co., Ltd. [SHI] | STX Shipbuilding Co., Ltd. [STX]
Daehan Global Heavy Industries Co., Ltd. | The Century Shipbuilding Co., Ltd. | IHI Marine United, Inc.

Total Commitment

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HI AIR KOREA is your royal sparring partner in all respects - Total commitment is an essential part of our work.