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Jsmea News

JAPAN JSMEA Japan Ship Machinery and Equipment Association

# JAPAN PACKAGE FOR MULTI PURPOSE SUPPLY VESSEL


## CONTENTS



THE OSV DEVELOPED BY TECHNOLOGY AND EXPERIENCE OF THE JAPANESE SHIP MACHINERY AND EQUIPMENT INDUSTRIES

# THE OSV DEVELOPED BY TECHNOLOGY AND EXPERIENCE OF THE JAPANESE SHIP MACHINERY AND EQUIPMENT INDUSTRIES

## Outstanding Features of the OSV

- Optimized for the operation at higher temperature, humidity and moderate sea states in shallow water, as opposed to the North Sea environment, as well as achieved affordable price by increasing cost effectiveness
- Higher reliable and save-energy Japanese equipment to be fully applied
- Eight packages are system-integrated, which sumplify shipbuilding process including engineering and ensure higher performance of the OSV.
- Global service stations established by Japanese Manufacturers can be used at emergency conditions as well as regular maintenance.
- ABS has reviewed the General Arrangement and Midship Section of this project "JAPAN PACKAGE FOR MULTI PURPOSE SUPPLY VESSEL" and granted "Approval in Principle (AIP)" to the concept of the design for the reviewed items under this project.

- OSV owners and operators pointed out that prevailing design of OSVs might have adopted higher specifications assuming operations in the North Sea, resulting in higher building cost.
  In our study, design and specifications of the OSV are optimized to suit the operation at higher temperature, humidity and moderate sea states in shallow water, different from the North Sea environment, employing reliable and save-energy Japanese ship machinery and equipment, which have been proven on merchant vessels,
- JSMEA may provide drawings and documents free of charge to owners who are interested in the construction of this OSV subject to a certain cooperation agreement.
- The OSV basic engineering and packaging project has been studied to contribute to the development mainly for the global offshore market in line with the policy of the JSMEA Offshore Development Strategy Review Board in corporation with 30 member companies for a couple of years in 2018 and 2019, which has been supported by Ministry of Land, Infrastructure, Transport and Tourism of Japanese Government ( MILT ) as well as basic drawings were made in cooperation with Shipbuilding Research Center of Japan ( SRC ).
- Upon completion of ABS final approval of the further submitted drawings, the OSV design will be eligible for ABS classification of ✠ A1, Offshore Support Vessel ( FFV 1 ) , AMS, DPS-2, SPS, UWILD.

## JAPAN PACKAGE PARTICIPATING COMPANIES

BEMAC Corporation
Daihatsu Diesel Mfg.Co., Ltd.
IBUKI KOGYO CO., LTD.
IHI Power Systems Co.,Ltd.
Kashiwa Co.,Ltd.
Manabe Zoki Co., Ltd.
MIURA CO.,LTD.
NAKASHIMA PROPELLER CO., LTD.
Naniwa Pump Mfg. Co., Ltd.
Nippon Hakuyo Electronics.Ltd.
Nishishiba Electric Co.,Ltd.
SEMCO LTD.
TAIYO ELECTRIC CO.,LTD.
TOKYO KEIKI INC.
Ushio Reinetsu Co.,Ltd.
Yanmar Power Technology Co., Ltd.

## VENDORS FOR JAPAN PACKAGE

Chugoku Marine Paints, Ltd.
COAST Corporation
Furuno Electric Co., Ltd.
HSN-KIKAI KOGYO CO.,LTD.
Hien Electric Industries, Ltd.
Hisaka Works, Ltd.
Japan Radio Co., Ltd.
Kamome Propeller Co., Ltd.
NIPPON PAINT MARINE COATINGS Co., Ltd.
SASAKURA ENGINEERING CO., LTD.
TAIKO KIKAI INDUSTRIES CO., LTD.
Teramoto Iron Works Co., Ltd.
Terasaki Electric Co., Ltd.
Volcano Co., Ltd.

Designed by
Shipbuliding Research Center of JAPAN (SRC)
Shipbuilding Research Centre of Japan

Supported by
Ministry of Land, Infrastructure, Transport and Tourism (MLIT)
Ministry of Land, Infrastructure and Transport and Tourism

# MPSV – OUTLINE PARTICULARS

| ITEM | PARTICULARS |
|---|---|
| **GENERAL** | |
| **Kind of the Vessel** | Offshore Support Vessel ( Multi Purpose Supply Vessel ) |
| **Navigation Area** | Ocean Going, Worldwide |
| **Operation Area** | Mainly shallow water area of Asia, Middle East, Africa |
| **Classification** | ABS, ✠ A1, Offshore Support Vessel ( FFV 1 ), AMS, DPS-2, SPS, UWILD |
| **Regulations** | SOLAS, MARPOL ( NOx : Tier III, SOx : Suitable FO ), ILLC, COLREG, MLC, BWM, AFS |
| **Standard, Workmanship** | JIS, JSCS or other authorized standard in general |
| **PRINCIPAL DIMENSIONS** | |
| **Length ( o.a. )** | approx. 71 m |
| **Length ( p.p. )** | 63.0 m |
| **Breadth ( mold )** | 16.6 m |
| **Depth ( mold )** | 6.5 m |
| **Draught ( designed )** | 3.8 m |
| **Draught ( scantling )** | 4.5 m |
| **CAPACITY** | |
| **Gross Tonnage** | approx. 2,700 |
| **Deadweight ( d = 3.8 m )** | approx. 1,300 t |
| **Deadweight ( d = 4.5 m )** | approx. 1,900 t |
| **Tank** | |
| Fuel Oil ( for cargo ) | approx. 1400 $m^3$ ( Flashpoint > 60°c ) |
| Fuel Oil ( for sailing of the vessel ) | approx. 180 $m^3$ ( Flashpoint > 60°c ) |
| Fresh Water ( for cargo ) | approx. 450 $m^3$ |
| Fresh Water ( for the vessel ) | approx. 80 $m^3$ |
| **Cargo Deck ( Upper Deck )** | |
| Deck Area | approx. 500 $m^2$ ( approx. 13.6 m ( B ) x 37 m ( L ) ) |
| **COMPLEMENT** | |
| **Crew** | 16 persons |
| **PERFORMANCE** | |
| **Speed** | approx. 12.5 kts |
| **MACHINERY** | |
| **Main Generator Set** | 4 sets |
| Rated Revolution | Medium Speed ( 720 or 900 $min^{-1}$ ) |
| Fuel | Marine Diesel Oil ( Low sulfur fuel ) |
| Cooling | Central Fresh Water Cooling |
| SCR | 1 set / engine Catalytic reactor using urea water, IMO Tier III |
| Generator | 1 set / engine, AC450V, 60Hz, 3 Phase<br>approx. 4,500 kW in total ( approx. 1,125 kW each ) |
| **Propulsion System** | |
| **Azimuth Thruster** | 2 sets |
| Driver | Electric Motor |
| Propeller | 2 sets, FPP |
| Revolution | approx. 220 to 240 $min^{-1}$ |
| Electric Motor | 2 sets |
| Output | approx. 1,750 kW / set ( approx. 3,500 kW in total ) |
| Rated Revolution | 6P, 1,200 $min^{-1}$ ( based on 60 Hz ) |
| Control of Revolution | Inverter |
| **Bow Thruster** | 2 sets |
| Type | Electric Motor Driven |
| Propeller | CPP |
| Electric Motor | approx. 550 kW / set, 4P, 1,800$min^{-1}$ ( based on 60Hz ) |
| **Deck Crane** | |
| Type, Capacity | Electro Hydraulic Jib Type, 1 set, 10 t at 15 m |

# PACKAGE EXAMPLES

Japan Ship Machinery and Equipment Association

## Propulsion / Power System Package

Azimuth Thruster *1 / Bow Thruster — Electric Motor *2 — Starter *2 — Transformer *2 (Including Inverter) — Electric Power Distribution *3 — Generator *2 — Engine *4 — Cooling Water / FO / LO Pump

Generator *2 → Emergency Generator

Engine *4 → MGO Cooler

*1 You can select from IHI Power System or Nakashima Propeller.

*2 You can select from Nishishiba Electric or Taiyo Electric.

*3 You can select from BEMAC or Taiyo Electric.

*4 You can select from Daihatsu Diesel Mfg, IHI Power Systems or Yanmar Power Technology.

MANUFACTURERS CONSIST FROM

BEMAC / DAIHATSU / NIIGATA / NAKASHIMA / naniwa pump / NISHISHIBA / TAIYO ELECTRIC CO.,LTD. / USHIO / YANMAR

## DPS / Navigation package

Propulsion *5 — DPS — Navigational Equipment

*5 Propulsion refer to "Propulsion / Power System package".

MANUFACTURERS CONSIST FROM

BEMAC / TOKYO KEIKI

## Mooring Package

Windlass / Mooring Winch / Capstan — Electric Motor (for hydraulic oil pump) — Control System

MANUFACTURERS CONSIST FROM

BEMAC / MAEBE / NISHISHIBA / TAIYO ELECTRIC CO.,LTD.

## Accommodation Package

Air conditioning system — Hot Water Boiler — Refrigerating Machine — Communication Equipment

MANUFACTURERS CONSIST FROM

NHE / MIURA / USHIO

## Cargo Handling Package

### 1. Liquid Cargo part

Cargo pump — Electric Motor — Cargo Control & Monitoring system — Tank Level gauge

Cargo Control & Monitoring system — Ballast Water Treatment System

MANUFACTURERS CONSIST FROM: BEMAC, MIURA, naniwa pump, NISHISHIBA, SEMCO, TAIYO ELECTRIC CO.,LTD.

### 2. General Cargo part

Deck Crane / Tugger Winch — Electric Motor ( for hydraulic oil pump ) — Control System

MANUFACTURERS CONSIST FROM: BEMAC, MANABE, NISHISHIBA, TAIYO ELECTRIC CO.,LTD.

## Firefighting Package

### 1. External Firefighting System part

Fire Monitor / Water Spray — FiFi Pump — Engine *6 — Control System

*6 You can select from Daihatsu Diesel Mfg, IHI Power Systems or Yanmar Power Technology.

MANUFACTURERS CONSIST FROM: BEMAC, DAIHATSU, NIGATA, Kashiwa Co., Ltd., naniwa pump, YANMAR

### 2. Firefighting System for the Vessel

Fire Detection and alarm — Control System — Fixed local application firefighting system

Fixed high-expansion foam fire-extinguishing system

MANUFACTURERS CONSIST FROM: Kashiwa Co., Ltd., NHE

## Others

| | |
|---|---|
| IBUKI | Whistle, Navigation and Signal light, Lighting, Navigation and Communication, Bell, Gong, General & Fire Alarm system, Internal communication system etc |
| TAIYO ELECTRIC CO.,LTD. | Mechanical Ventilation<br>( Engine Room, Propulsion room, Bow Thruster room, etc ) |

# Recent activties of ISO standard by Ship Smart Application Platform (SSAP)

## Outline of SSAP

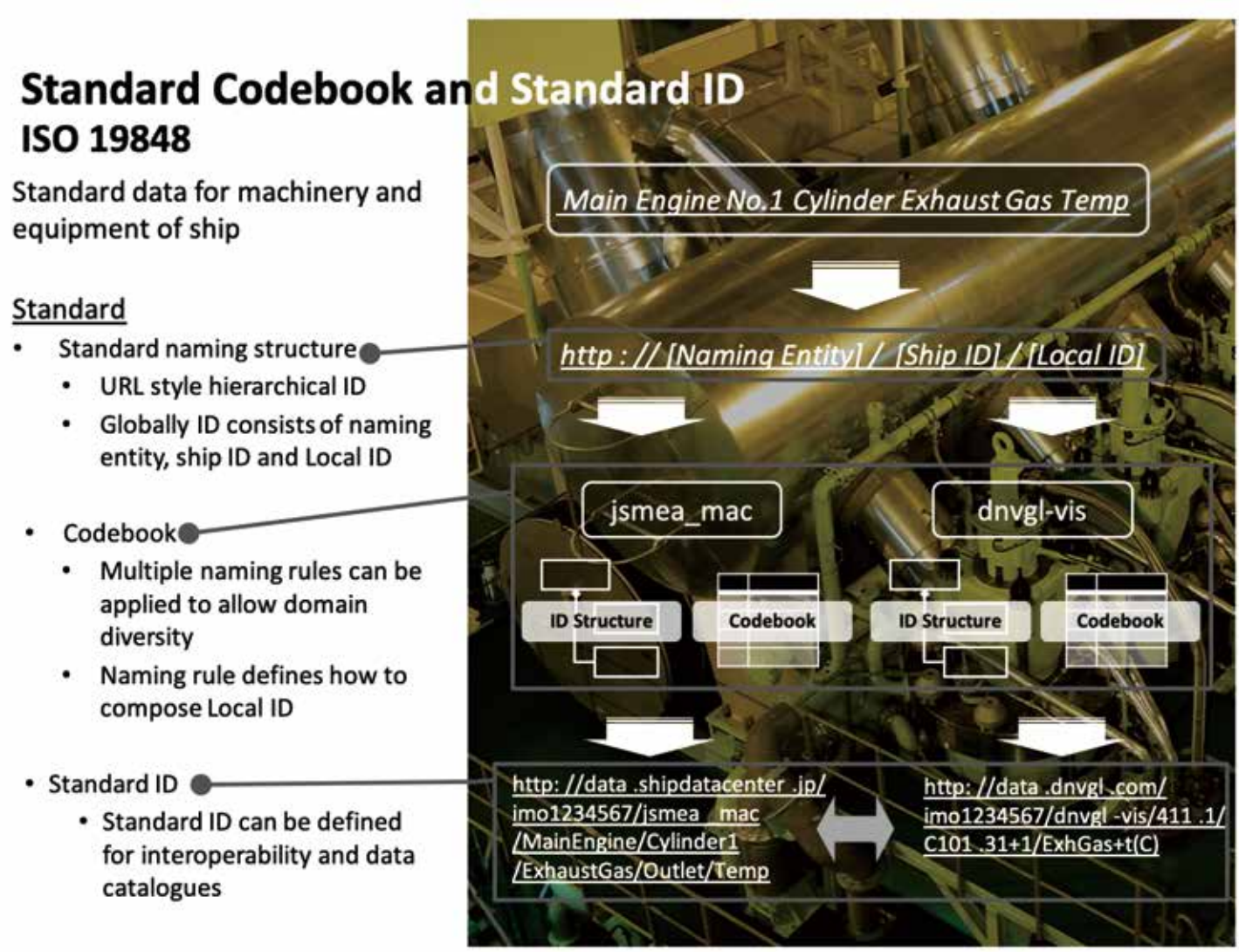
Japan Ship Machinery and Equipment Association (JSMEA) has been proceeding with technological development, running the Ship Smart Application Platform (SSAP) under its umbrella from 2012. The SSAP consists of JSMEA members; shipping, shipbuilding and ICT companies; and a classification society.

Assuming information integration with related systems of other fields of business, the SSAP has developed on-board and ship-to-shore information infrastructure to realize information sharing between onboard devices/systems and various application services.

SSAP proposed two ISO formats as follows:

- **ISO 19847** : Shipboard data server to share field data on the sea
- **ISO 19848** : Standard data for machinery and equipment part of ship

This paper introduces the activities of publishing codebook, standard ID, and data catalog used in ISO19848 and revising ISO16425 for corresponding to recent development in IT/OT/IoT onboard.



## Publishing Codebook, Standard ID and Data Catalog used in ISO 19848 by JSMEA

ISO 19848 'Ships and marine technology — Standard data for shipboard machinery and equipment' was published in October 2018, formalizing years of research and development work originally carried out as part of a Smart Ship Application Platform (SSAP) joint industry project launched in Japan in 2012. The standard provides a common codebook and naming rule convention that can be used by different organizations to create a harmonized framework for maritime data and applications, allowing different systems to more easily share shipboard data without the need for additional customization. SSAP published Codebook, Standard ID, and Data Catalog used in ISO 19848 by JSMEA as the following URL.

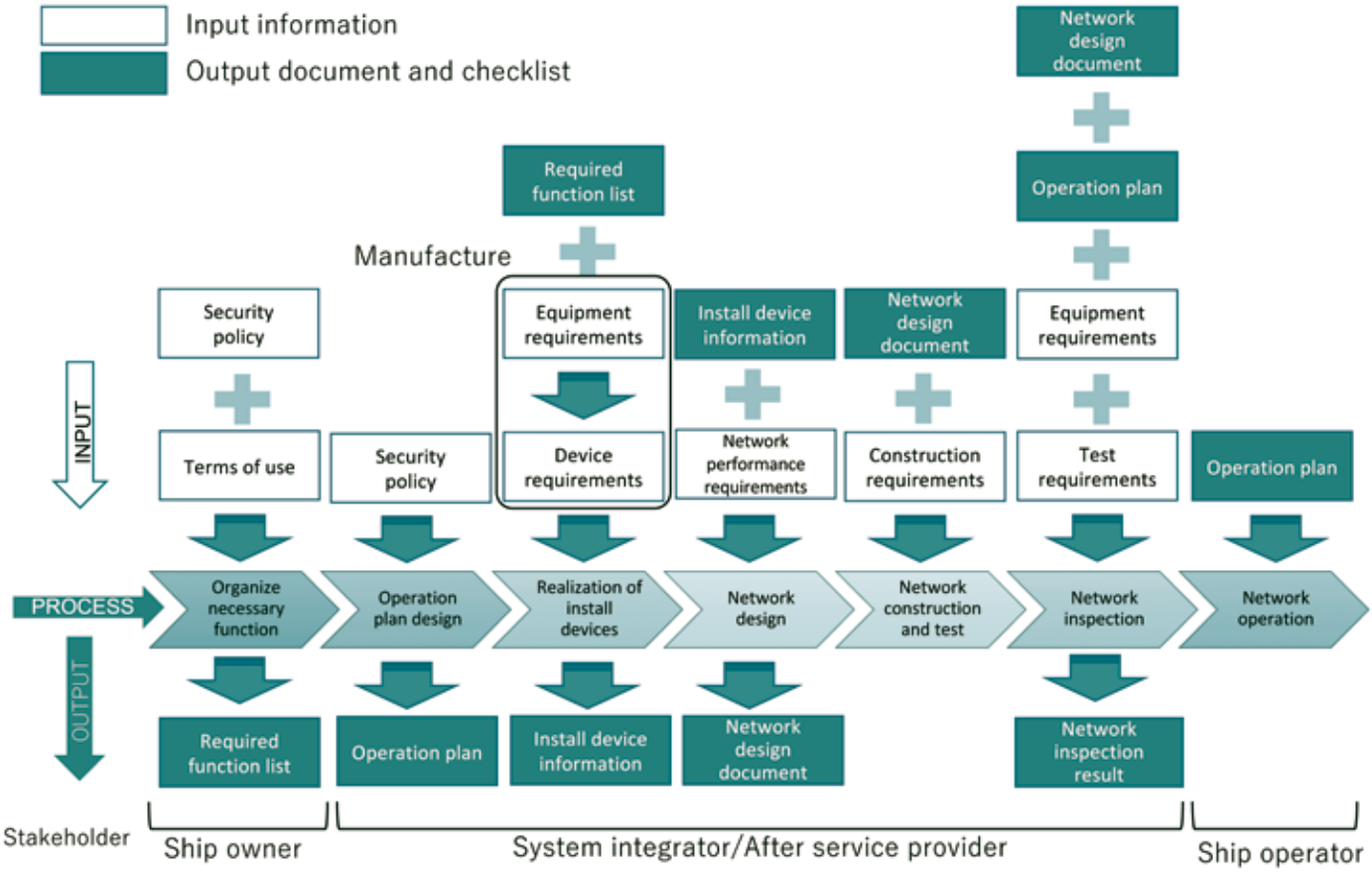
● http://www.jsmea.or.jp/ssap/topics/jsmea_iso19848.html

The Smart Maritime Council, the cross-industry membership group created by the Smart Maritime Network to improve technology interoperability in the industry, has announced its intention to support the use of the ISO 19848 data standard for shipboard machinery and equipment following a unanimous vote at the Council's most recent meeting in Rotterdam.

## Necessity of ISO16425 revision

With the development of IT/OT/IoT onboard, we can use the network and VLAN for various purposes including sharing network and system integration. In this situation, cyber security is one of the important issues for safe and reliable operation. ISO 19847 compliant shipboard data server plays a gateway role between OT & IT. However, ISO 19847 compliant shipboard data server is supposed to be installed in the network which is defined by ISO16425 'Ships and marine technology — Guidelines for the installation of ship communication networks for shipboard equipment and systems' published in 2013. The vulnerability of ISO 19847 compliant shipboard data server will increase the risk of OT machineries and proper protection for the cyber security of ISO 19847 compliant shipboard data server is necessary. QoS (guaranteed bandwidth to each communication) and physical requirements (wiring, coupling, etc.) need to be revised as well. Now, SSAP are studying about ISO16425 revision and developing a test standard for network systems in accordance with ISO16425.

## Shipboard network design processes



JSMEA
Japan Ship Machinery and Equipment Association

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JAPAN SHIP MACHINERY AND EQUIPMENT ASSOCIATION

# JAPANESE MARINE ECO PRODUCTS

Japan Ship Machinery and Equipment Association (JSMEA) has published a booklet called **Japanese Marine ECO-Products**, which introduces products that member companies manufacture and sell that contribute to saving energy and helping the environment. Copies are distributed widely among ship owners and shipbuilding companies worldwide.

The **Japanese Marine ECO-Products** booklet carries information on more than 40 items, such as engines, propellers and other energy-saving products as well as emission-gas and ballast-water treatment systems and other ecologically friendly products. As such, the booklet is a useful reference when ship owners, shipyards and other customers select machinery and equipment for new projects, as it contains product features and specifications as well as contact and other information.

The online edition of **Japanese Marine ECO-Products** is available at

https://www.jsmea.or.jp/eco-products

*Energy saving*

## Boiler Burners

### VOLCANO CO., LTD.

**Proportional control type oil burner**

TYPE: MJE-M

Design and development of "MJ II-M" fully automated pressure jet proportional control burner allows energy saving operation with composite boiler. Features are as followings.

- Proportional control (turn down ratio / 3:1) allows for reducing the burner ON / OFF switching and improving the boiler efficiency
- Combustion of both HFO and MGO fuels without changing atomizers.
- Easy and quick replaceable coupler attached on fuel line allows for less maintenance time.
- "MJII-M" is apposed for 1~3t/h boiler.

**INQUIRIES**

**Sales Department, Combustion Engineering Division**
1-3-38 Nunaka-kita, Yodogawa-ku, Osaka, 532-0004, Japan
Tel : +81-6-6302-5541 Fax : +81-6-6396-7839
E-mail : info-m@volcano.co.jp

*Dual Fuel, Medium Speed, Diesel, Gas, Tier II*

## Dual Fuel Engines, Propulsion

### IHI Power Systems Co., Ltd.

**28AHX-DF**

Total six (6) Dual Fuel Tugs with NIIGATA 28AHX-DF are now in operation in the world, such as in Japan, Singapore Indonesia, and China.
28AH-DF is an environmentally friendly engine, satisfying IMO Tier III NOx regulations.
It uses clean gas combustion, making it possible to meet the new regulations without the need for an exhaust gas processing reactor.
28AHX-DF offers both gas and diesel operation modes.
It can be instantly switched at fuel load from gas to diesel operation, ensuring safe ship operation even in emergency situations.
We successfully delivered the world's first 4 stroke Dual Fuel engine direct drive Fixed Pitch Propeller for LNG fueled harbor tugboat.
It offers high dynamic performance equivalent to that of diesel engine mode even during gas mode in tug operation.
Niigata Power Systems Co., Ltd. has integrated all the power systems division of IHI group into one company and newly started as IHI Power Systems Co., Ltd. from July 1st 2019.

**INQUIRIES**

14-5, Sotokanda 2-Chome, Chiyoda-ku, Tokyo, 101-0021, Japan
Tel : +81-3-4366-1226 Fax : +81-3-4366-1310
E-mail : gas-info_satest@ihi-g.com

*Sewage Treatment Equipment/Sewage Treatment Plant/Environment*

## Sewage Treatment Equipment

### TAIKO KIKAI INDUSTRIES CO., LTD.

**Sewage Treatment Equipment**

Our SSH series of marine sewage treatment plants are small, high-performance items that were developed by incorporating the sewage treatment technology we developed over many years in the business.
The products in the SSH series can be used on all ships with more than 400 gross tons and a crew of at least 15 as specified in Annex IV of the Marpol 73/78 Treaty.
We've also simplified operation and maintenance.

**INQUIRIES**

209-1 Shimoidebuse, Tatsuse-cho, Kumage-gun, Yamaguchi, 742-1596, Japan
Tel : +81-820-62-3113 Fax : +81-820-53-1001
E-mail : Please contact our website

*Energy Saving*

## Turbochargers

### MITSUBISHI HEAVY INDUSTRIES

**MET Turbochargers are the standard worldwide exhaust gas turbochargers used in large marine and stationary engines.**

**NEW Radial Turbocharger MET-ER Series**
The MET-ER Series has been developed based on high pressure ratio requirements for turbochargers, in order to improve the performance of and reduce the NOx emissions of four stroke engines. This turbocharger further increases the pressure ratio of the previous MET-SR/C Series and can support a maximum compressor pressure ratio of 6.0.The series features seven types, and a single turbocharger can handle engine outputs from approximately 500 kW to 5,800 kW.Furthermore, the series features improved responsiveness and reduces the number of parts to achieve a more compact design and increase maintainability. MET-ER turbochargers will be released to the market after conducting tests with engine manufacturers this year.

**New Axial Turbocharger MET-MBII Series**
The new MET-MBII Series launched this year provides turbochargers that are one or two models more compact when compared to previous models with the same engine output, thanks to its larger impeller capacity.In order to maintain high efficiency while achieving a large capacity, a new compressor impeller with an optimized blade count and blade angle distribution has been developed for the MET-MBII Series. Furthermore, the series also adopts a new turbine with optimized turbine blade throat distribution.On the other hand, casing components except for the silencer have not been changed from the previous MET-MB Series, which enables the product to inherit the high reliability and maintainability of that series.

**INQUIRIES**

**Mitsubishi Heavy Industries Marine Machinery & Equipment Co., Ltd.**
**Tokyo Branch Office**
Tel : +81-50-3848-4400 E-mail: info_meet@mhi-mme.com

## Propeller Boss Cap Fins

**MOL Techno-Trade, Ltd.**

PBCF (Propeller Boss Cap Fins)

PBCF is the pioneer and the best seller in an energy-saving device installed on a propeller to improve propulsive efficiency by eliminating hub-vortex and by reducing torque loss. In consequence, vessel fuel consumption will be reduced by up to 5%. Mitsui O.S.K. Lines (MOL) originally developed PBCF in 1987, and advanced PBCF was released in 2017. The total number of installation is now over 3,400 vessels all over the world.

**Principal Benefits of PBCF**

- Saving fuel up to 5%, the corresponding reduction of NOx, and $CO_2$ emissions.
- Reduces propeller-induced underwater-noise and vibrations.
- Simple and quick installation, just the replacement of the existing propeller boss cap.
- Suitable to both new buildings and retrofit applications.
- Pay-back time is less than 1 year, even at low fuel prices.

**INQUIRIES**

MOL Techno-Trade, Ltd. / Environment and Safety Related Devices Department
1-1, 1-Chome, Kyobashi, Chuo-ku, Tokyo, 104-0031, Japan
Tel : +81-3-6367-5080 Fax : +81-3-6367-5518
E-mail : pbcf@moltech.co.jp

## Paints

**CHUGOKU MARINE PAINTS, LTD.**

CMP BIOCLEAN PLUS

Foul-release coating (FRC) is one of the environmental choices of antifoulings and has proven application records since 2003.
"CMP BIOCLEAN" is in the CMP's silicone FRC product range. Its ultra-smooth surface which is regulated by the rheology control technology provides foul-release performance and fuel efficiency.

"CMP BIOCLEAN HB" is silicone finish coating with CMP's unique technology.

"CMP BIOCLEAN PLUS", the latest version in the CMP BIOCLEAN series, has been newly developed based on CMP BIOCLEAN HB. It's added "PLUS Technology" induces resisting and releasing slime.

**INQUIRIES**

Chugoku Marine Paints, Ltd.
Headquarter
Tel : +81-5-3506-3951
Contact URL : https://www.cmp.co.jp/global/contact_global.html

# JAPANESE MARINE ECO PRODUCTS 2020 CONTENTS

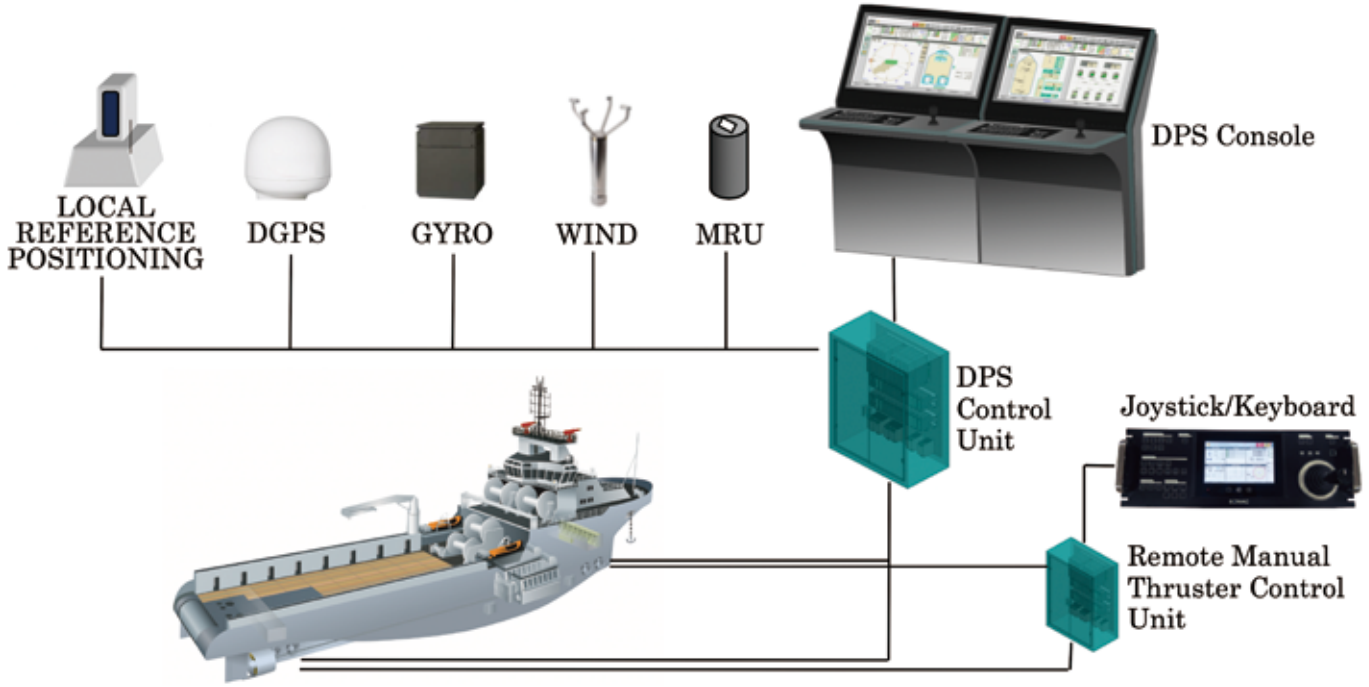
| | |
|---|---|
| Air Conditioner and Refrigerator | USHIO REINETSU CO., LTD. |
| Air Conditioners | NISSIN REFRIGERATION & ENGINEERING LTD. |
| Air conditioning and refrigeration equipment | DAIKIN MR ENGINEERING CO., LTD. |
| Antifouling Device | Port Enterprise Co., Ltd. |
| Autopilot | TOKYO KEIKI INC. |
| | YOKOGAWA DENSHIKIKI CO., LTD. |
| Ballast Water Inspection Equipment | MOL Techno-Trade, Ltd. |
| Ballast Water Management System | KUNIMORI ENGINEERING WORKS CO., LTD. |
| | JFE Engineering Corporation |
| | MIURA CO., LTD. |
| Batteries | BEMAC CORPORATION |
| | ECO MARINE POWER CO., LTD. |
| Bearings, Sterntubes | MIKASA CORPORATION |
| Bilge Discharge Monitor | TAIKO KIKAI INDUSTRIES CO., LTD. |
| Bilge Separator | TAIKO KIKAI INDUSTRIES CO., LTD. |
| Boiler Burners | VOLCANO CO., LTD. |
| Bolts, Anti-Corrosion Coating | TAKENAKA SEISAKUSHO CO., LTD. |
| Cables & Wires, Electrical | HIEN ELECTRIC INDUSTRIES, LTD. |
| Clutch | HITACHI NICO TRANSMISSION CO., LTD. |
| Condensers | YAMASHINA SEIKI CO., LTD. |
| Control Systems & Equipment | JRCS Co. Ltd. |
| | NISHISHIBA ELECTRIC CO., LTD. |
| | TAIYO ELECTRIC CO., LTD. |
| Coolers, Oil | USHIO REINETSU CO., LTD. |
| Diesel Engine | HITACHI ZOSEN CORPORATION |
| Diesel Engine, Propulsion | AKASAKA DIESELS LIMITED |
| Diesel Engines, Auxiliary | DAIHATSU DIESEL MFG. CO., LTD. |
| Diesel Engines, Propulsion | YANMAR POWER TECHNOLOGY CO., LTD. |
| | THE HANSHIN DIESEL WORKS, LTD. |
| Drone | KUNIMORI ENGINEERING WORKS CO., LTD. |
| Dual Fuel Boiler Burners | VOLCANO CO., LTD. |
| Dual Fuel Engines, Auxiliary | DAIHATSU DIESEL MFG. CO., LTD. |
| Dual Fuel Engines, Propulsion | IHI Power Systems Co., Ltd. |
| | YANMAR POWER TECHNOLOGY CO., LTD. |
| Dual Fuel Engines, Propulsion (Low-Speed) | IHI Power Systems Co., Ltd. |
| Eco-Friendly Product | MEIYO ELECTRIC CO., LTD. |
| | MOL Techno-Trade, Ltd. |
| Eco-Friendly Solar Power | ECO MARINE POWER CO., LTD. |
| Engine Telegraphs & Loggers | KEI SYSTEM CO., LTD. |
| F Fresh Water Generating Plant | SASAKURA ENGINEERING CO., LTD. |
| Galley Relative Equipment | HSN-KIKAI KOGYO CO., LTD. |
| Gas Combustion Unit for LNG Fueled Vessel | VOLCANO CO., LTD. |
| Gas Engine | KAWASAKI HEAVY INDUSTRIES, LTD. |
| Hydraulic Control Valve | Nabtesco Corporation |
| LNG Pump | SHINKO IND. LTD. |
| Monitoring & Control Systems | HSN-KIKAI KOGYO CO., LTD. |
| Navigation Equipments | UTSUKI KEIKI Co., Ltd. |
| Navigation Lights | NIPPON SENTO CO., LTD. |
| Oil Absorbents | Shimada & Co., Ltd. |
| Paints | CHUGOKU MARINE PAINTS, LTD. |
| | NIPPON PAINT MARINE COATINGS CO., LTD. |
| Propeller Boss Cap Fins | MOL Techno-Trade, Ltd. |
| Propellers, Controllable | KAMOME PROPELLER CO., LTD. |
| Propellers, Energy Saving Devices | NAKASHIMA PROPELLER CO., LTD. |
| Propellers, Fixed Pitch | KAMOME PROPELLER CO., LTD. |
| Pump, Inverter Control | NANIWA PUMP MFG. CO., LTD. |
| Pumps, Bilge | HEISHIN LTD. |
| Pumps, Deep Well | TAIKO KIKAI INDUSTRIES CO., LTD. |
| Reduction Gear | HITACHI NICO TRANSMISSION CO., LTD. |
| Rudders | JAPAN HAMWORTHY & CO., LTD. |
| Rudders, High Lift | KAMOME PROPELLER CO., LTD. |
| Seals, Sterntubes | EAGLE INDUSTRY CO., LTD. |
| Selective Catalytic Reduction System | IHI Power Systems Co., Ltd. |
| | YANMAR POWER TECHNOLOGY CO., LTD. |
| Sewage Treatment Equipment | SASAKURA ENGINEERING CO., LTD. |
| | TAIKO KIKAI INDUSTRIES CO., LTD. |
| Shaft Driven Generating System | NISHISHIBA ELECTRIC CO., LTD. |
| SOx Scrubber | Port Enterprise Co., Ltd. |
| Tank Sounding | SEMCO, LTD. |
| Thermal Insulation | KOBE KIZAI |
| Turbochargers | Turbo Systems United CO., LTD. |
| | Mitsubishi Heavy Industries Marine Machinery & Equipment Co., Ltd. |
| Underwater Robot | KUNIMORI ENGINEERING WORKS CO., LTD. |
| Valves, Safety | FUKUI SEISAKUSHO CO., LTD. |
| Winches, Mooring, Electric & Hydraulic | MANABE ZOKI CO., LTD. |

BEMAC

# Integrated Dynamic Positioning System

## Overview

We have developed an original Dynamic Positioning System which automatically controls a vessel on a required position and heading. We can also supply alarm monitoring system and power management system as a package for the offshore support vessels working at the ocean energy development and the marine resources site. This system meets the standard ABS's "Guide for Dynamic Positioning System DPS-2 notation." Since the system is equipped redundant CPUs, communication line, power supply, and so on, it carries on control even if something goes wrong with the system.




## DPS Control Mode

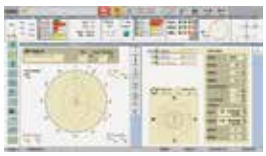
- Auto position/ Auto heading
- Joystick with auto position/ auto heading
- Model control
- Auto tracking
- Remote Manual Thruster Control

## Type Approval

The DP system has obtained the type approval of the ABS classification.


## Overview of Display

- Position Plot display
- Joystick display
- Thruster display
- Generator and Power line diagram display
- Sensor and position reference system display
- Trend display
- Alarm display



## DP System HIL Testing

We have been performing DP hardware-in-the-loop(HIL) test to verify proper functionality of our control system according to rules and regulations by connecting to the DNV-GL vessel simulator.

BEMAC

**BEMAC Corporation**

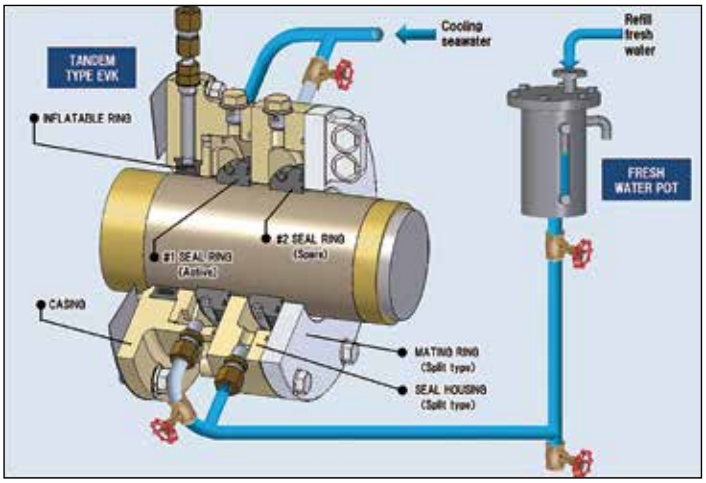
105 Noma, Imabari, Ehime, 794-8582, Japan
Tel.: +81-898-25-8282 E-MAIL: sales@bemac-jp.com
http://www.bemac-jp.com/en/

KEMEL

# Water Lubricated Stern Tube Sealing
# Tandem Type EVK Seal

KEMEL is a global company with its manufacturing facilities located in Japan. With changing markets and environmental guidelines, we have improved ourselves as a world leader in the innovation. Stern tube seal for ships are technically very complex equipment, and are required to be highly reliable. Utilizing its expertise and knowhow build up over many years, KEMEL has recently launched a new product called Tandem Type EVK Seal to contribute to the comfort and safety of navigation and to environmental conservation.

**NEW PRODUCT**




**ENVIRONMENTALLY FRIENDLY**

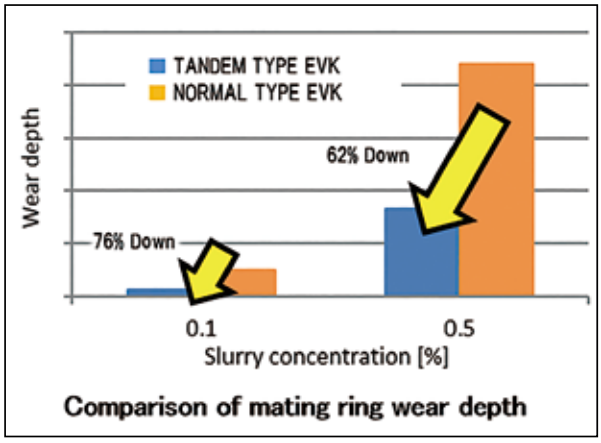
**PATENTED**

## Features

- **Improved Wear Resistance**
  The active #1 seal ring is always lubricated by self-controlled clean fresh water. This results in the significant reduction in wear of the mating ring, the seal housing and the seal ring.
- **Built in Spare Seal Ring**
  The spare #2 seal ring is incorporated in the seal housing as a spare. This is a standby seal and is idling under normal operation. It is cooled, lubricated & protected by fresh water.
- **Improved Operability**
  The spare #2 seal ring can be easily activated by closing the valves . The spare #2 seal ring can be activated without disassembling the seal unit.
- **Easy Upgrade from Existing EVK**
  Converting an existing EVK seal to a Tandem type just by replacing the seal casing. (Check with KEMEL for more details)

## Specification

- **Shaft Diameter Range**
  $\varphi$ 101 ~ $\varphi$ 500 (mm)
- **PV (Pressure-Velocity) Value**
  Max. 0.6 (MPa・m/s)
  (Water pressure in casing : Max. 0.15 MPa)




Comparison of mating ring wear depth

KEMEL

**EAGLE INDUSTRY CO.,LTD.**
2-4-1, SHIBAKOEN, MINATO-KU, TOKYO, 105-0011, JAPAN
TEL:+81-3-3436-4830 FAX: +81-3-3436-4890
URL: http://www.kemel.com E-MAIL: sales.tokyo@kemel.com

# FUJI JET FILTER

## ~ Dock to Dock Maintenance Free System contribute to maintenance time reduction, manpower reduction, and cost reduction ~

Since launched in 1992, fuel oil filter JET FILTER, designed as a "dock-to-dock maintenance-free" filter, has been serving over 2,000 ships and delivering numerous advantages to its users.

We offer total filtration engineering services for ships based on our proven performances with filters, not only for fuel oil but for LNG/FGSS, ballast water, sea water intake and desalination systems.

Fuji Filter Mfg is Total Filtration Engineering & Manufacturing company established on 1966.

FUJI FILTER

**Fuji Filter Manufacturing Co., Ltd.**
2-3-4,Nihonbashi,Chuo-ku,Tokyo,Japan
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- Enjoy the sight of green
- Good healing effect







- 160 pots of harvested green vegetable per 1cycle
- Cultivate by auto-control of liquid fertilizer
- Use LED as light source
- Easy maintenance
- No worry about rolling and pitching

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**HSN-KIKAI KOGYO (HEISHIN PUMP WORKS) CO., LTD.**
overseas@hsn-kikai.com
Tel: +81 78-391-2751

KOBE KIZAI

# Thermal Insulation

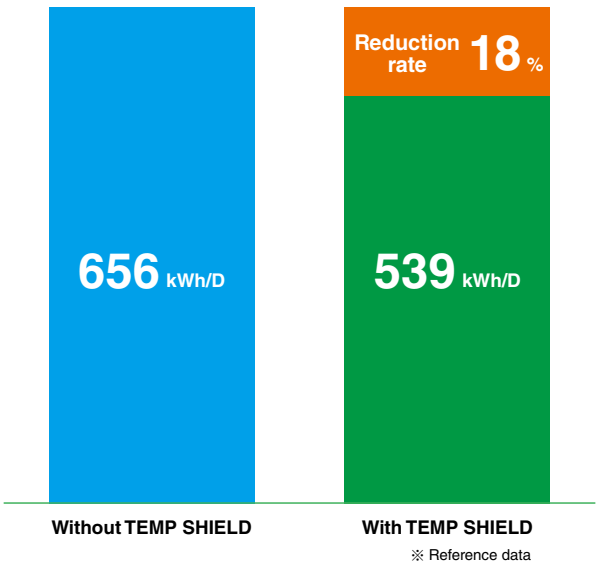
## ● TEMP SHIELD®

TEMP SHIELD® is a detachable thermal insulation cover which has been developed to our original design and utilizes custom sewing technology using knowledge and experience accumulated over 50 years of providing heat insulation solutions for marine diesel engines.

- Easy installation and detachment: it can shorten the construction period in dock and reduce life time maintenance costs
- The best thermal insulation: it is made-to-order to fit the specific machinery size and shape
- High product availability: Once the first made-to order is completed, then repeat production is simple since each component is manufactured utilizing its own individual drawing

### High energy saving effect

Measuring the target properly and directly and by choosing the best material suited to its form and usage, very good energy saving result can be realized.




KOBE KIZAI

**Kobe Kizai Co., Ltd.**

3-6-10, Nishinagasu cho, Amagasaki, Hyogo, 660-0805, Japan
Tel.: +81-6-6401-4351 FAX: +81-6-6401-3131
URL: https://www.kobekizai.co.jp/en/inquiry/

SINCE1976
N.Y. CO., LTD.

# Anti-Drop SAFETY BELT FOR YOUR CELL PHONE
# SAFETY FIRST

## INTRODUCTION

With safety belt for your cell phone “SAFETY FIRST”, the way you use your cell phone at the site will change dramatically! More convenient and more secure.

**Keep safe to use the safety belt for your cell phone “SAFETY FIRST” !**


## INSTALLATION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URL: http://www.ny-tokyo.com/ E-MAIL: hd-office@ny-tokyo.com

SEMCO

# SMART SOUNDING SCALE “HONESTY”
# For MGO (Marine Gas Oil) Support

SEMCO LTD. is a tank level gauge engineering and consulting company. We create Tank Level Gauge and Monitoring System with our customers. We have been manufacturing Tank Level Gauge since 1985. SEMCO Tank level gauge is adopted for almost all Japanese shipyards. Especially our float type level gauge has been standard for Engine room tanks in Japan. Today, we propose a wide range of level gauges and monitoring systems to meet customer’s needs for not only engine room tanks but also ballast tanks etc.. SEMCO's mission is to work with customers to solve problems and create new ones. SEMCO will continue to propose suitable tank level gauges and monitoring systems for various tank applications in the field of new shipbuilding and existing vessels from now on.

Smart sounding scale “Honesty” was developed with NYK and MTI to realize portable sounding with an ultrasonic sensor. As of January 1st. 2020,the IMO will put into effect new regulations on sulfur oxide in maritime exhaust gas, in which the limit on sulfur oxide content in fuel oil that is mainly for maritime use will be changed from 3.5% to 0.5%. In complying with the new regulations, there will be an increasing number of cases in which high transparency and low viscosity compatible fuels such as MGO are supplemented. So ship crews will not be able to measure the tank level easily. “Honesty” can solve this problem. Ship crews can measure the tank level about 4 times faster than existing sounding scale. It can also measure accurately under the cappuccino effects.


SEMCO

**SEMCO LTD. / Sales Department**
5-4-23 Takatsuka-dai Nishi-ku Kobe 651-2271 Japan
Tel.: +81-78-992-8361
E-mail : sales@semco-ltd.com

TAKENAKA SEISAKUSHO Co., Ltd.

# TAKECOAT Series
# -Great Wall for Corrosion-

TAKENAKA's original coatings, TAKECOAT-1000, and TAKECOAT-CERAMIC1 have excellent and unique property which provides a lot of advantages for being used in harsh environment of various fields/industries in the world.

## TAKECOAT-1000

**Fluorocarbonpolymer Coating**

**TAKECOAT-1000**
- Resistance to rust and corrosion
- Long term durability
- Lubricity
- Sustainable for even seawater and desert area

TAKECOAT-1000 is a fluorocarbon polymer surface treatment with powerful anti-rusting, anti-corrosion properties. It was created by combining precoating under treatment and fluorocarbon polymer coating technologies to enhance the adhesion of the metal/film interface, and impart anti-rust and anti-corrosion properties despite being thin. Because TAKECOAT-1000 has a low fastening torque coefficient value, it prevents contact corrosion between different types of metals.

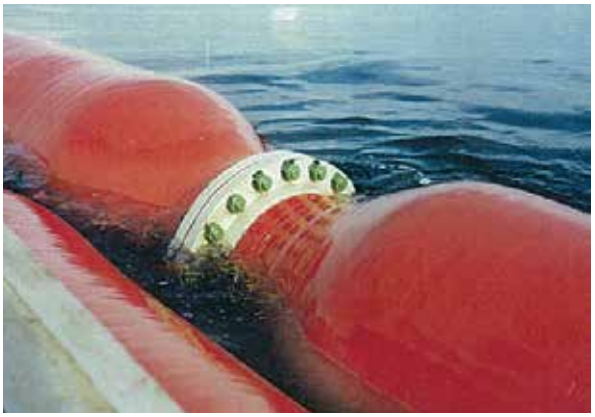
## TAKECOAT-CERAMIC1

**Ceramic Coating**

**TAKECOAT-CERAMIC1**
- Heat resistance up to 450℃
- Thermal shock resistance
- Stable fastening

Created by combining base treatment technology with a uniquely developed ceramic process for inorganic polymer, TAKECOAT-CERAMIC1 provides powerful heat resistance and long-term durability. The inorganic, heat-resistant resin film is extremely thin, between 20 and 30μm, and because TAKECOAT-CERAMIC1 has lubricant properties, it does not catch on screws and so provides favorable performance during fastening.

### Application of TAKECOAT-1000 for Marine Hose



### TAKENAKA's original two layer coating system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**TAKENAKA SEISAKUSHO CO., LTD.**
6-4-35 Hishie, Higashi Osaka 578-0984
Tel.: +81-6-6789-1555 Fax: +81-6-6782-2053
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# Tokyo Keiki Global Marine systems, Leading Edge Technology supporting the most magnificent voyage.

With regards to ship safety and efficient navigation, We TOKYO KEIKI have developed a total navigation equipment package which includes Gyrocompass, Autopilot, ECDIS and Marine Radar. We can offer a seamless connection to and beyond each equipment.

Tokyo Keiki is proud of our one-stop service which supports equipment from consultation, selection and all throughout its after servicing life.

## ACE

The latest Automatic Steering Function, ACE (Advanced Control for Ecology), is now available for integration to existing PR-6000 Autopilots, as well as, optional installation for PR-9000 series Autopilot.

ACE is a straight leg course control, that automatically creates a route on the heading between the ship's current position and destination, calculates outside disturbances, and implements the best rudder control making it possible for the vessel to sail the most efficient route.

## FOG

The latest addition to TOKYO KEIKI's line up of highly reliable products, the new Fiber Optic Gyrocompass TF-900. "STRAP DOWN type Gyrocompass" having no gimbals and comprising of 3 fiber gyro axis's and 3 accelerometer axis's. TF-900 is conformance to IMO standards including High Speed Craft, Meeting international standards(ISO/IEC), High performance and environmental adaptive and compatible with conventional type Gyrocompass.

TF-900


ACE (COURSE CONTROL)

Bridge Configuration

**TOKYO KEIKI INC.**
2-16-46, Minami-Kamata, Ohta-Ku, Tokyo 144-8551 JAPAN
Tel: +81-3-3732-2111 Fax: +81-3-3736-0261
URL: https://www.tokyokeiki.jp/e/

WÄRTSILÄ

# Wärtsilä 31

## *Wärtsilä 31 is recognised by Guinness World Records as the world's most efficient 4-stroke diesel engine*

The Wärtsilä 31 is the first in a new generation of medium speed engines, designed to set a benchmark in efficiency and overall emissions performance.

The Wärtsilä 31 is available in 8 to 16 cylinder configurations and has a power output ranging from 4.2 to 9.8 MW, at 720 and 750 rpm. The launch of the Wärtsilä 31 introduces a 4-stroke engine having the best fuel economy of any engine in its class. At the same time, it maintains outstanding performance across the complete operating range. Its modular design enables significant reductions in maintenance time and costs, thereby improving power availability and reducing the need for spare parts.

The Wärtsilä 31 retains its high efficiency and environmental values throughout the entire lifecycle of the vessel.

- Lowest fuel consumption over a wide operating range.
- Highest cylinder power in its segment, 610 kW/cylinder.
- Available in Diesel, Dual Fuel (DF) and Pure Gas (SG) versions.
- Meets the coming IMO Tier 3 regulations when operating on gas, and with an SCR when using diesel fuel.
- Reliability guaranteed through extensive validation and Wärtsilä's vast manufacturing experience.
- Supported by Wärtsilä's extensive global service network.

WÄRTSILÄ

**Wärtsilä Japan Ltd.** wjp.marine@wartsila.com
**Tokyo Office** Shin-Kasumigaseki Building 3F, 3-3-2 Kasumigaseki, Chiyoda-ku, Tokyo, 100-0013, Japan Tel. +81 3 6631 7670
**Kobe Office** 6-7-2, Minatojima, Chuo-ku, Kobe, 650-0045, Japan Tel. +81 78 304 7501

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**Head Office:**
Toranomon Toyo Kyodo Building, 13-3, Toranomon 1-chome, Minato-ku, Tokyo 105-0001, Japan
Tel: +81-3-3502-2041 Fax: +81-3-3591-2206 E-mail: info@jsmea.or.jp URL: http://www.jsmea.or.jp

**Overseas Offices:**

**JETRO Hongkong, Ship Machinery Department**
Room 4001, 40/F., Hopewell Centre, 183 Queen's Road East, Wan Chai, Hong Kong, China
Tel: +852-2501-7291 Fax: +852-2868-1455

**JETRO Houston, Offshore and Maritime Department**
1221 Mckinney, LyondellBasell Tower, Suite 4141, Houston, Texas 77010, U.S.A.
Tel: +1-713-759-9595 Fax: 1-713-759-9210

**JETRO Singapore, Ship Machinery Division**
Hong Leong Building, #38-01 to 05 #37-02A 16 Eaffles Quay, Singapore 048581
Tel: +65-6429-9522 Fax: +65-6224-1169


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