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- JCI Maritime & Offshore (M&O) Solutions Introduction
- Product & System Portfolio
- Why JCI M&O ...
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About Johnson Controls International…
Johnson Controls and Tyco Merge

A global industrial leader for safety, security and sustainability

ABOUT THE MERGER

Johnson Controls, a global multi-industrial company, and Tyco, a global fire and security provider, have combined to create Johnson Controls International plc, a global leader in building products and technology, integrated solutions and energy storage.

This merger brings together best-in-class product, technology and service capabilities across controls, fire, security, HVAC, power solutions and energy storage, to serve various end markets including large institutions, commercial buildings, retail, industrial, small business and residential in land and marine & off-shore market.
Creating a Global Industrial Leader
Through a Merger of Complementary Businesses

Uniting global leaders uniquely positioned in buildings and energy markets

$30 Billion in Revenue with Strong Growth Potential

117,000 Global Employees

Distinct Industry Expertise
- Leader in building technology and energy storage
- World-class buildings and automation control technology
- Integrated solutions for smart buildings, campuses and cities
- Value-added services driven by advanced data, analytics and connectivity

Expands Buildings Portfolio & Unites Innovation Pipelines
- Strong presence in North America and Asia
- Unique application knowledge and expertise
- World-class engineering, installation and service capabilities

Links Complementary Geographic Footprints & Operational Capabilities
- Johnson Controls shareholders will own 56% of combined company
- Alex Molinaroli will serve as Chairman and CEO
- 6 current directors from Johnson Controls

Strong Leadership & Balanced Ownership
- Tyco shareholders will own 44% of combined company
- George R. Oliver will serve as President and COO and become the next CEO
- 5 current directors from Tyco

The combined company will pair leading businesses with best-in-class product, technology and service capabilities to deliver greater value to customers, shareholders and employees. The company will continue its commitment to innovation and growth in the United States and globally.
Who We Are Together

130+ YEARS OF INNOVATION
117,000 EMPLOYEES
316,000+ VOLUNTEER HOURS Recorded in 2015
4+ MILLION CUSTOMERS GLOBALLY

$30 BILLION ANNUAL REVENUE
$78 MILLION IN CHARITABLE CONTRIBUTIONS in the Past 5 Years
MORE THAN 8,700 ACTIVE PATENTS

LEADER
• Building Products, Technologies & Integrated Solutions
• Energy Storage

HEADQUARTERS:
Cork, Ireland
Milwaukee, WI, USA
Shanghai, China

NEARLY 2,000 LOCATIONS WORLDWIDE
SERVING CUSTOMERS IN 150+ COUNTRIES

Johnson Controls
Leading Brands Portfolio of Products and Services

$30 Billion Global Leader

#1 in HVAC, Controls, Fire, Security and Power Solutions
JCI Maritime & Offshore Solutions Introduction
JCI M&O Solutions Asia Introduction

Main Office
- Beijing
- Shanghai
- Singapore
- Kuala Lumpur
- Johor Bahru
- Seoul

Branches
- Shenzhen
- Chengdu
- Wuhan
- Hangzhou
- Fuzhou
- Xi'an
- Tianjin
- Jinan
- Jinan
- Shenyang
- Changsha
- Guangzhou
- Macau
- Taiwan
- Shenzhen
- Hong Kong
- Pulau Pinang

COE: Center of Excellence
Introduction – JCI M&O Solutions Korea

Maritime & Offshore Korea

- Marine & Offshore total fire protection system provider for design, manufacturing, installation and service.
- COE (Center of Excellence) in NEA (North East Asia) Business in Korea, Japan and China

Company information

- Address: Johnson Controls, 21, Noksansandan 261-ro 13 beong-gil, Gangseo-gu, Busan, Korea
- Contact: +82 0)51 (Marine) 970 3932 / (Offshore) 899 5304
- Last 3 years revenue

<table>
<thead>
<tr>
<th>Description</th>
<th>‘2015</th>
<th>‘2016</th>
<th>‘2017</th>
</tr>
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<tr>
<td>Revenue</td>
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<td>60.6</td>
<td>32.2</td>
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Key References for last 3 years

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<tr>
<th>Delivery time</th>
<th>Shipowner</th>
<th>Shipyard</th>
<th>Type</th>
<th>Class</th>
<th>Supply Item</th>
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<tbody>
<tr>
<td>2014-2016</td>
<td>ENI Goliat</td>
<td>HHI</td>
<td>FPSO</td>
<td>DNV</td>
<td>Deluge, Loose</td>
</tr>
<tr>
<td>2015-2017</td>
<td>Inpex Ichthys project</td>
<td>DSME, SHI</td>
<td>CPF, FPSO</td>
<td>DNV</td>
<td>Deluge, Inergen, Foam package, Loose &amp; Life saving equipment</td>
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<tr>
<td>2015-2017</td>
<td>Total EGINA</td>
<td>SHI</td>
<td>FPSO</td>
<td>BV</td>
<td>Deluge, Inergen, Foam package, Loose equipment</td>
</tr>
<tr>
<td>2015-2019</td>
<td>Petronas</td>
<td>SHI</td>
<td>LNG FPSO</td>
<td>ABS</td>
<td>Deluge, Inergen, Low&amp;High Foam, Local Water mist, Dry Powder, Loose FF.</td>
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<tr>
<td>2017-2019</td>
<td>ENI Mozambique</td>
<td>SHI</td>
<td>LNG FPSO</td>
<td>LLOYD</td>
<td>Inergen, High Foam, DP, LWM</td>
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<tr>
<td>2018</td>
<td>Odfjell</td>
<td>Hudong Zhonghua</td>
<td>49K Tanker</td>
<td>DNV</td>
<td>CO2, Deck Foam</td>
</tr>
<tr>
<td>2018-2019</td>
<td>Maersk Tanker</td>
<td>DSIC</td>
<td>113K Tanker</td>
<td>LR</td>
<td>CO2, Water mist Deck foam</td>
</tr>
<tr>
<td>2017-2018</td>
<td>MOL</td>
<td>Imabari</td>
<td>20000TEU Cotainer</td>
<td>ABS &amp; LR</td>
<td>HP CO2</td>
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<tr>
<td>2017-2018</td>
<td>Maersk</td>
<td>DSME</td>
<td>20120TEU Cotainer</td>
<td>ABS</td>
<td>LP CO2</td>
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</table>
Introduction – JCI M&O Solutions China

Maritime & Offshore China

- Johnson Control Asia HQ in Shanghai, China
- Around 12 branch / agent / distributors national wide in China

Company information

- Address: Johnson Controls, Floor 4B, No. 518-11, North Fuquan Road Changning District, Shanghai, China, 200335
- Contact: (Email) david.yao@jci.com  (Call)

Last 3 years revenue

<table>
<thead>
<tr>
<th>Description</th>
<th>‘2015</th>
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<th>‘2017</th>
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<td>Revenue</td>
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Key References for last 3 years

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<th>Type</th>
<th>Class</th>
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</thead>
<tbody>
<tr>
<td>2015</td>
<td>HODI</td>
<td>ZPMC</td>
<td>400ft Jack Up</td>
<td>ABS</td>
<td>Deluge, Helideck Foam, Mud Tank Foam, Sprinkler, Wet Chemical</td>
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<tr>
<td>2015</td>
<td>COSL</td>
<td>CIMC</td>
<td>Deep sea Semi-Submersible drilling unit</td>
<td>DNV</td>
<td>Novec1230, Deluge</td>
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<tr>
<td>2015-2017</td>
<td>Beacon Atlantic</td>
<td>CIMC</td>
<td>GM4D</td>
<td>DNV</td>
<td>Fire Detection, Sprinkler, Deluge, Foam, Foam, Dual Agent</td>
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<tr>
<td>2016</td>
<td>KS Drilling</td>
<td>ZPMC</td>
<td>400ft Jack Up</td>
<td>ABS</td>
<td>Fire Detection Deluge, Helideck Foam, Mud Tank Foam, Sprinkler, Wet Chemical</td>
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<tr>
<td>2016</td>
<td>Royal IHC</td>
<td>Nantong Rainbow Offshore &amp; Engineering Equipment</td>
<td>4000T Heavy Lift vessel</td>
<td>BV</td>
<td>Fire Detection, Novec1230</td>
</tr>
<tr>
<td>2016-2018</td>
<td>Maersk</td>
<td>COSCO</td>
<td>3600TEU</td>
<td>LR</td>
<td>CO2</td>
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</tbody>
</table>
Introduction – JCI M&O Solutions SEA

Maritime & Offshore SEA

- Diverse Team, well trained engineers for Fire Detection, Fire Protection, Gas Suppression, Security & Production Systems
- COE (Center of Excellence) of SEA, business in Singapore, Malaysia, Indonesia, Philippine, Vietnam and India

Company information

- Address: 31, International Business Park, #03-02, Singapore, 609921
- Contact: (Email) (Call) +65 6389 8888
- Last 3 years revenue

<table>
<thead>
<tr>
<th>Description</th>
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Key References for last 3 years

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<th>Shipyard</th>
<th>Type</th>
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<th>Supply Item</th>
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</thead>
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<tr>
<td>2015</td>
<td>Bumi Amada</td>
<td>MMHE Shipyard, Malaysia</td>
<td>E-House</td>
<td>BV</td>
<td>Inergen 300 Bar, Deluge System</td>
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<td></td>
<td></td>
<td></td>
<td>ABS / USCG</td>
<td>Novec 1230</td>
</tr>
<tr>
<td>2015</td>
<td>AET Ship management</td>
<td>Dry Dock World, Dubai</td>
<td>Modular Capture Vessel</td>
<td>UL / BOMBA</td>
<td>F&amp;G, Alarm Devices, HSSD, Inergen 300Bar, Fire Fighting Equipment</td>
</tr>
<tr>
<td>2016</td>
<td>Royal Malaysia Navy</td>
<td>Boustead Naval Shipyard, Malaysia</td>
<td>Littoral Combat Vessel</td>
<td>BV</td>
<td>Novec 1230, CO2, Foam, Twin Agent, Fire Detection</td>
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<tr>
<td>2016</td>
<td>EnQuest / Bumi Armada Berhad</td>
<td>Keppel Shipyard, Singapore</td>
<td>FPSO</td>
<td>DNV</td>
<td>Inergen 300Bar, AFDS, Manual Alarm Call points &amp; Field Devices</td>
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<tr>
<td>2017</td>
<td>Maersk Oil UK</td>
<td>Sembcorp, Singapore</td>
<td>Platform</td>
<td>DNV</td>
<td>Inergen 300Bar, Wet Chemical, Chemical Injection Unit</td>
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<tr>
<td>2017</td>
<td>Republic of Singapore Coast Guard</td>
<td>Brani Yard, Singapore</td>
<td>Patrol Boat</td>
<td>ABS</td>
<td>AFDS</td>
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</tbody>
</table>
JCI M&O Solutions Market Leading Brand

Specialists in Fire, Security & Life Safety from ship to shore

We have one of the most extensive fire, life safety and security solutions portfolio in the world with the most recognized brands in the marketplace.
JCI M&O Integrated Services for Oil & Gas Assets

Total capability from One source
Servicing mature assets
JCI M&O Integrated Services for Navy

- Shipwide Fire Detection
- Accommodation Fire Detection
- Hangar Foam System
- Small Magazines Spray System
- Control Spaces Water Spray
- Large Magazines Rapid Reaction Spray System
- Main Machinery Spaces Inergen LAFF System Foam Central Storage
- Weapons Lift Rapid Reaction Spray System
- Incinerator Space Watermist
- Galley Duct Carbon Dioxide
- Tank Deck Foam
- Misc Machinery Spaces Water Spray/Foam
- Deep Fat Fryers Liquid Chemical
- Flight Deck Foam Central Storage
- Stores Water Spray
- NBCD (Prewet)
- Small Magazines Spray System
- Aux Machinery Spaces Foam/Spray

Reference only for above image
JCI M&O Integrated Services for Commercial Vessels

- Fire Detection System
  - Fire Alarm System
  - Accommodation Areas

- Deck Foam System
  - Tank Deck Areas

- Dry Chemical Powder system
  - Cargo Deck Areas

- HIEX Foam System
  - Engine room
  - Pump room

- Water-mist System
  - Main Engine
  - Generator
  - Boiler

- High/Low Pressure CO2 system
  - Engine room
  - Pump room
  - Cargo hold
  - Car Deck
Product & System Portfolio

- Water Based Extinguishing System
  - Water-mist
  - Deluge
  - Foam Package
  - Hi-Foam
  - Deck Foam
  - Dry Powder
  - External FIFI

- Gaseous Extinguishing System
  - LP CO2
  - HP CO2
  - Inergen
  - Novec 1230
  - FM200

- Safety Equipment
  - Loose & Life saving equipment
  - Hydrant equipment
  - Portables extinguisher
  - Breathing Apparatus

- Production
  - Chemical Injection
  - Wellhead Control
  - HPU

- Detection System
  - Fire Detection system
  - Fire & Gas system
  - Air sampling system

- Audio Comm.
  - Public address & Voice alarm
  - General alarm
  - Talkback & Intercom system

- Security
  - Access control & Monitoring system
  - CCTV surveillance
  - Integrated solution

Design, Fabricate, Commission & Test, After Sales Service
JCI M&O Solutions that comply with

- British Royal Navy Ministry of Defense
- The Royal Australian Navy
- Royal Netherlands Navy
- Indian Navy
- NATO (North Atlantic Treaty Organization)
Water based Extinguishing System
## Water Based Extinguishing System

### Key Word

- Operating Pressure
- Local / total flooding
- Fog Nozzle

- Various material
- Fast opening

- Regulating
- Foam tank
- Foam Package, Hi / Low and Heli deck Foam

- LNG / LPG
- Chemical Agent

- Pump & Gear Box
- Water Monitor
- Remote Control

### Water-mist System
- High & low Pressure
- Machinery Space
- Main Engine, Boiler, Generator

### Deluge System
- Process Area

### Foam System
- Machinery Space
- Engine Room
- Cargo Pump Room
- Deck, Heli Deck Area

### Dry-Powder System
- Process Area
- Cargo Deck Area

### External Fire Fighting
- Deck Area
Local Water-Mist System

General
Water mist system is to suppress and fight all fires in protected areas. In this fire extinguishing system, water is sprayed in high or low pressure to make small water droplets. Water mist is sprayed into flame so that to promote vaporization and decrease in oxygen concentration as suffocation.

Application area
Main Engine, Generator, Purifier, Incinerator, Boiler

Regulation
1. SOLAS regulation II 2/10 - Fire Fighting
2. FSS code (International Code for Fire Safety Systems) - Chapter 5.2.5 Equivalent fixed gas fire-extinguishing systems for machinery spaces and cargo pump-rooms
3. IMO MSC/Circ. 1165 (Revised guidelines for the approval of equipment water-based fire-extinguishing systems for machinery spaces and cargo pump-rooms)
4. IEC 60945 (Maritime navigation and radio communication equipment and systems)

Class Approval Certificates
MED, LR, ABS, DNV-GL, BV, CCS, NK, KR, KG, RINA, CE
Local Water-Mist System

Application area
Main engine, Generator, Purifier, Incinerator, Boiler etc.
Deluge Valve Skid

**General**

*Deluge Valve* is known as a system control valve in a deluge system, used for fast application of water in a spray system. *Deluge valve* protects areas such as power transformer installation, storage tank, conveyor protection and other industrial application etc. With the addition of foaming agent they do protect aircraft hanger. Fast Opening time

**Application area**

Top & Hull Process Facility Area

**Class Approval Certificates**

UL, VdS, Ghost, ABS, Lloyds, DNV-GL, BV, MED
Deluge Valve Skid

Application area
Top & Hull Process Facility Area
Foam Package System

General
Fire suppression foam is comprised of three parts: foam concentrate, water, and air. When mixed correctly, these parts form a homogeneous foam blanket that extinguishes flames by the combined mechanisms of cooling, separating the flame source from the product surface, suppressing vapors, and smothering. This makes foam suppression systems an effective option for protecting flammable and combustible liquids.

Application area
Upper Deck Area, Cargo Deck Area, Helideck Area

Class Approval Certificates
UL, VdS, Ghost, Lloyds, ABS, DNV-GL, BV, MED

Foam Package Skid
Foam Package System

Application area
Upper Deck Area, Cargo Deck Area, Helideck Area

Foam Liquid 3%
Ball Valve (SRI)
Pump & Motor
Instrument Board
Foam Tank (110m³) for Egina FPSO
High Expansion Foam System

**General**
High expansion foam system is applied for total flooding system of engine and pump room as alternative system for Halon & CO2 extinguishing system. As halon & CO2 system will be phased out due to global warming restriction, this system could be one of ideal substitution.

**Application area**
Engine Room & Pump Room & etc.

**Regulation**
1. SOLAS regulation II-2/10 - Fire Fighting
2. FSS code (International Code for Fire Safety Systems) - Chapter 6: Fixed high expansion foam systems
3. IMO MSC.1/Circ. 1384 (Dec. 2010) – Fire Test Standard
4. IMO MSC/Circ. 1165 (June, 2005) – Environment Test for foam generator
5. EN 1365-1 (2003) – Environment Test for foam generator
6. IMO MSC/Circ.670 (1994) – Foam concentrate test

**Class Approval Certificates**
MED, ABS, LR, DNV-GL, KR, BV, NK, CCS, RINA
High Expansion Foam System

Foam Generator
SPF-25 / 50 / 100

Foam Pump Skid
Foam Pump Skid 3D Modeling

Fire extinguishing test

Application area
Engine Room, Pump Room & etc.
Deck Foam System

**General**
Foam system is used for the protection of chemical and oil tank decks or heli-decks in accordance with class requirements and IBC code. The foam monitors may be delivered as manually operated. (electric or hydraulic type)

**Application area**
Chemical and Oil Tank Deck, Heli-deck areas

**Regulation**
1. SOLAS regulation II-2/10 - Fire Fighting
2. FSS code (International Code for Fire Safety Systems) - Chapter 14: Fixed deck foam systems
3. IMO MSC.1/Circ. 1312
   (Revised guidelines for the performance and testing criteria, and surveys of foam concentrates for fixed fire-extinguishing systems)

**Class Approval Certificates**
RINA, NK, KR
Deck Foam System

Application area
Tank Deck areas

Helidack Foam Skid : Helicopter Deck

Foam Monitor

Proportioner

Deck Foam Unit
Dry-Chemical Powder System

**General**
Dry powder system is designed specifically for marine application so that can be met with SOLAS requirements for LPG and LNG tankers.

**Application area**
Cargo Deck for gas tankers

**Regulation**
1. **SOLAS regulation II-2/1.6.2 - Application of Requirements for Tankers**
2. **IGC Code** (International Code for Construction and Equipment of Ships Carrying Liquefied Gases in Bulk)
3. **IMO MSC.1/Circ. 1315**
   (Guidelines for the approval of fixed dry chemical powder fire-extinguishing systems for the protection of ships carrying liquefied gases in bulk)
4. **DNV F-AMC** Duration time 60 sec.
5. **EN 615** (Fire extinguishing media – Specifications for powders)

**Class Approval Certificates**
- New product world #1 largest size MED, LR, DNV-GL, BV, NK
## Dry-Chemical Powder System

![Dry-Powder Monitor](image1)

![Hand Hose Cabinet](image2)

![Tank Unit](image3)

![N2 Cylinder](image4)

<table>
<thead>
<tr>
<th>Description</th>
<th>NEW</th>
<th>Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK size</td>
<td>Max. 3,250 liter</td>
<td>Largest tank size over the world until now (Mar. 2018)</td>
</tr>
<tr>
<td>Capacity scope</td>
<td>200L/260L/400L/750L/960L/1290L/1530L/1830L/1970L/2170L/2490L/2540L/2750L/3000L/3250L</td>
<td>Available various tank capacity requirements from ship owners (small to large)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Up to -20 °C</td>
<td>Able to apply ships navigating cold area</td>
</tr>
<tr>
<td>Monitor</td>
<td>10Kg/s, 12.5Kg/s, 16Kg/s, 20Kg/s, 25Kg/s</td>
<td>• Generally 45 sec discharge (DNV F_AMC only for 60 sec.)</td>
</tr>
<tr>
<td>Hose Gun</td>
<td>3.5Kg/s</td>
<td>• Provide extra allowance +5%</td>
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</table>
External Fire Fighting System

- Portable Controller with 20m Cable (1 Set)
- Fire Monitor (2 Sets)
- Control Board (1 Set)
- Deck Head (4-Way Delivery Head) (2 Sets)
- STORZ C52 Coupling
- BS336 2” Coupling
- JIS 50A Coupling
- Foam Pump (1 Set)
- Foam & ODL System (Option)
- Foam Pump Starter Pane (1 Set)
- Foam Proportioner (1 Set)
- Integrated Gear Box & Fire Pump
- Clutch Controller (2 Sets)
- Gear Box (2 Sets)
- Fire Pump (2 Sets)
- Wheel House Top
- Wheel House
- Main Engine Room
- Water Spray System
- Weather Deck
- Portable Controller with 20m Cable (1 Set)
- Fire Monitor (2 Sets)
- Control Board (1 Set)
- Deck Head (4-Way Delivery Head) (2 Sets)
- STORZ C52 Coupling
- BS336 2” Coupling
- JIS 50A Coupling
- Foam Pump (1 Set)
- Foam & ODL System (Option)
- Foam Pump Starter Pane (1 Set)
- Foam Proportioner (1 Set)
- Integrated Gear Box & Fire Pump
- Clutch Controller (2 Sets)
- Gear Box (2 Sets)
- Fire Pump (2 Sets)
A new compact INTEGRATED gearbox-pump
co-produced by L-Tyco & KUMERA
with its renowned quality in marine transmission systems

External Fire Fighting System
Gaseous Extinguishing System

Gaseous Extinguishing System

LP CO2
HP CO2
Inergen
Novec 1230
FM200

Water Based Extinguishing System

Watermist
Deluge
Foam Package
High Foam
Deck Foam
Dry Powder
External FIFI

Safety Equipment

Loose & Life saving equipment
Hydrant equipment
Portable extinguisher
Breathing Apparatus

Detection System

Fire Detection system
Fire & Gas system
Gas sampling system

Production

Chemical Injection
Wellhead Control
HPU

Security

Access control & Monitoring system
CCTV surveillance
Integrated solution

Audio Comm.

Public address & Voice alarm
General alarm
Talkback & Intercom system
# Gaseous Extinguishing System

## Key Word

- **PCTC (Ro-Ro)**
- **Super-Ultra Container**
- **Release by 1/3**
  - Cost efficiency
  - Rapid effect

- **Clean**
- **Safe**
- **Inert-gas**
- **300 bar**
- **Excellent**

## LP CO2 System
- Main Engine, Pump Room
- Cargo Hold, Car Deck

## HP CO2 System
- Main Engine, Pump Room
- Cargo Hold, Car Deck

## INERGEN System
- Control Room
- Cargo Pump Room

## NOVEC System
- Control Room
- Cargo Pump Room

## FM-200 System
- Control Room
- Cargo Pump Room

<table>
<thead>
<tr>
<th>Properties</th>
<th>INERGEN</th>
<th>NOVEC</th>
<th>FM200</th>
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<tbody>
<tr>
<td>ODP (Ozone Depletion Potential)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>GWP (Global Warming Potential–IPCC2)</td>
<td>0.0</td>
<td>1</td>
<td>3220</td>
</tr>
<tr>
<td>ALT (Atmospheric Lifetime (Years))</td>
<td>0.0</td>
<td>0.014  (5days)</td>
<td>34.2 (33.5 Y)</td>
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</table>
LP CO2 System

**General**
Low pressure CO2 tank unit is furnished with its own refrigeration machinery to keep the temperature and also to adjust the pressure at the correct level. The system is designed and installed so that CO2 gas can be discharged into relevant protected area using control cabinet.

**Application area**
Engine Room, Pump Room, Cargo Hold, etc.

**Regulation**
1. SOLAS regulation II-2/10 - Fire Fighting
2. FSS code (International Code for Fire Safety Systems) - Chapter 5: Fixed gas fire-extinguishing systems

**Class Approval Certificates**
BV, CCS, KR, CE
LP CO2 System

Application area
Engine Room, Emergency Room, Cargo Hold, etc.

Newly developed in compliance with...

- SOLAS II-2/10: Fire Fighting- IMO Res. MSC. 339(91)
- FSS Code chapter 5: Fixed gas Fire extinguishing system
**General**
Carbon Dioxide (CO2) Gas, the fastest and most efficient extinguishing agent against fires in protected spaces, suffocates the fire within designated time and minimize the damage in protected spaces.

**Application area**
Engine Room, Pump Room, Cargo Hold, etc.

**Regulation**
1. SOLAS regulation II-2/10 - Fire Fighting
2. FSS code (International Code for Fire Safety Systems) - Chapter 5: Fixed gas fire-extinguishing systems

**Class Approval Certificates**
DNV-GL, CCS and LR, BV, ABS, NK, RINA, KG, KR, CE
HP CO2 System

Application area
Engine Room, Pump Room, Cargo Hold, etc.

MCC
Cylinder V/V
BCC
POD V/V
Cylinder Rack Unit
Inergen System

**General**
INERGEN® is a mixture of 52% Nitrogen, 40% Argon and 8% CO2. This discharge mixture makes INERGEN® singularly unique. No other inert gas has the unique ability to rapidly extinguish a fire yet at the same time provide a safe environment for any person within the occupied area by actually decreasing cardiac distress and maintaining arterial blood oxygenation and mental performance in low oxygen levels.

**Application area**
Electric & Instrument room, Machinery space, Control room

**Class Approval Certificates**
UL, VdS, Ghost, Lloyds, ABS, DNV-GL, BV
Inergen System

Application area
Electric & Instrument room, Machinery space, Control room
Novec1230 System

**General**
Novec 1230, C6F12O, (3M Novec 1230) fluid is a low global warming potential Halon replacement for use as a gaseous fire suppression agent. Novec 1230 is manufactured by 3M. It is generally used in situations where water from a fire sprinkler would damage expensive equipment or where water-based fire protection is impractical, such as Electric & Instrument room, Machinery space, Control room.

**Application area**
Electric & Instrument room, Machinery space, Control room

**Class Approval Certificates**
UL, VdS, Ghost, Lloyds, ABS, DNV-GL, BV
Novec1230 System

Application area
Electric & Instrument room, Machinery space, Control room
Loose Equipment & Production System

Safety Equipment
- Loose & Life saving equipment
- Hydrant equipment
- Portables extinguisher
- Breathing Apparatus

Production
- Chemical Injection
- Wellhead Control
- HPU

Detection System
- Fire Detection system
- Fire & Gas system
- Gas sampling system

Production
- Chemical Injection
- Wellhead Control
- HPU

Security
- Access control & Monitoring system
- CCTV surveillance
- Integrated solution
- Audio Comm.
- Public address & Voice alarm
- General alarm
- Talkback & Intercom system
Safety Equipment and Production

<table>
<thead>
<tr>
<th>Safety Equipment</th>
<th>Well Head Control Panels (WHCP)</th>
<th>Hydraulic Power Units (HPU)</th>
<th>Chemical Injection Packages (CIP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fire Fighting Equipment</td>
<td>• Provides hydraulic, pneumatic and/or electrical operator interface and ESD to wellhead valves and chokes (SCSSV, SSV, WSV, etc.). Responses to monitored wellhead pressures and other process conditions.</td>
<td>• Create hydraulic pressure head used to control valves, and drilling equipment.</td>
<td>• Perform from topside or surface mounted skids - injection and storage of chemical agents and/or hydrate inhibitors into the well stream to enhance production.</td>
</tr>
<tr>
<td>- Fire fighters equipment</td>
<td></td>
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<tr>
<td>(Hydrant, Fire hose, Hose reel, Fire Monitor, Water Nozzle, Fire man outfit, etc.)</td>
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<tr>
<td>- Fire Extinguishers</td>
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<tr>
<td>• Life Saving equipment</td>
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</tr>
<tr>
<td>- EEBD, CABA, SCBA</td>
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<tr>
<td>- First Aid Kit</td>
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<td></td>
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<tr>
<td>- LV, JV Rescue Kit</td>
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<tr>
<td>- Chemical Spillage Kit</td>
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</tr>
</tbody>
</table>

Fire Fighting Equipment:
- Fire fighters equipment (Hydrant, Fire hose, Hose reel, Fire Monitor, Water Nozzle, Fire man outfit, etc.)
- Fire Extinguishers

Life Saving equipment:
- EEBD, CABA, SCBA
- First Aid Kit
- LV, JV Rescue Kit
- Chemical Spillage Kit
Electrical Fire & Safety System

- Gaseous Extinguishing System
  - LP CO2
  - HP CO2
  - Inergen
  - Novec 1230
  - FM200
- Water Based Extinguishing System
  - Watergmist Deluge
  - Foam Package
  - High Foam Deck Foam
  - Dry Powder
  - External FIFI
- Safety Equipment
  - Loose & Life saving equipment
  - Hydrant equipment
  - Portables extinguisher
  - Breathing Apparatus
- Detection System
  - Fire Detection system
  - Fire & Gas system
  - Gas sampling system
- Audio Comm.
  - Public address & Voice alarm
  - General alarm
  - Talkback & Intercom system
- Security
  - Access control & Monitoring system
  - CCTV surveillance
  - Integrated solution
## Electrical System and Devices

### Key Word

- **F&G System**
- **System Integration**
- **Smoke Sampling System**

- **PAGA (Public Address General Alarm)**
- **Intercom**

### System Features

- **Fire Detection System**
- **Audio Communication System**
- **Security System**

- **Access Control**
- **CCTV**
- **System Integration**
Fire Detection System

**General**
Fire detection system is used for automatic monitoring of temperature and smoke concentration in the protected area and provide early warning of the fire alarm in accordance with class requirements and FFS code.

**Application area**
Vessel & offshore accommodation area & engine room

**Regulation**
1. SOLAS Chapter II-2 PART C 7 Detection and alarm
2. FFS CODE Chapter 9 - Fixed Fire Detection and Fire Alarm Systems
3. IMO MSC+311(88) MSC.339(91)

**Class Approval Certificates**
MED, NK, RINA classes
Fire Detection System

Application area
Accommodation & Engine room

T1200 conventional system
T2000 addressable system

Point Type Detectors
Sounders, Beacons, Bells
Call points
Flame Detectors
Why JCI M&O.....
Maximize Customer Satisfaction

Total Solution Provider

Integrated Solutions & Services

Fire Detection

F&G System

Fire Protection

Life safety

Security

Lead Product Innovation

Package System Single Source Provider
Worldwide Service Network

True 24/7 and experienced technical support

With more than 18,000 equipment installations world-wide, our customer base includes more than 20% of all ocean going vessels
Oil and gas offshore facilities including drilling, refinery/gas process, storage and transfer from FPSO mooring represent significant fire risk. A Fire event in the offshore areas can be difficult to manage and can become rapidly uncontrollable. Robust automated systems are ideal given the limited accessibility and frequently high volume of flammable liquids/gas.

**Recommended Equipment**
- Fire detection & alarm system
- Deluge valve skids
- Foam package system
- High expansion foam system
- Deck foam system
- Inergen system
- Helideck fire fighting system
- Loose & Life saving equipment
- F&G system
Fire hazards include hydrocarbon fire of machinery spaces such as engine room, pump room, cargo hold as well as gas fire on deck of gas carriers.

**Recommended Equipment**
- Fire detection & alarm system
- HP/LP CO2 fire fighting system
- Local water mist system
- Deck foam system
- High expansion foam System
- Dry chemical powder system
- Clean agent system (Inergen, Novec, FM200)
- Automatic sprinkler system
- EEBD, SCBA, CABA
- Portable fire extinguishers
This prestigious qualification assures the quality of services and systems for oil companies operating in Europe.
TOTAL: 44 PROJECTS
FPSO: 13 Projects
Platform: 18 Projects
ETC: 50 Drillships and Drill-rig

North Sea: 8 PJT & 17Series (Drill ships & Rig)
- NEXUS FPSO
- Goliat FPSO
- BP Skarv FPSO
- TEEKAY FPSO
- BP QUAD204 FPSO
- Odfjell Drill-rig
- Petreserv Drill-rig
- Songa Drill-rig
- Etc. 17 Drillship & Rig

Africa: 12 PJT
- ENI MOZAMBIQUE FLNG
- EGINA FPSO
- PAZFLOR FPSO
- CLOV FPSO
- MOHO BILONDO FPU
- AKPO FPSO
- USAN FPSO
- DALIA FPSO
- SABRATHA Platform
- EGP-3 Platform
- OFON Platform
- MOHO NORD Platform

America: 2 PJT
- White Rose FPSO
- Kearl Oil Sand (Onshore)

Middle East: 5 PJT
- Umm Shaif Platform
- Blok5 Platform
- VASAI Platform
- INPEX ICHTHYS Platform
- Qatar LNG

Asia: 7 PJT
- Sakhalin Platform
- BARZAN Platform
- YADANA Platform
- SHWE Platform
- Huizhou Platform
- BONGKOT Platform
- Carigali Platform

Oceania: 3 PJT
- INPEX ICHTHYS FPSO
- INPEX ICHTHYS CPF
- Woodside FPSO

Updated 2016Y sail away from 2006Y
JCI M&O References

**Project: TOTAL EGINA FPSO**
Ship Owner: TOTAL
Ship yard: Samsung Heavy Industries, Co., Ltd. (SHI)
Ship type: FPSO [Floating Production Storage Offloading]
Location: Nigeria Lagos
Contract date: October, ‘2014
Estimated hand over date: ‘2017 ~

<table>
<thead>
<tr>
<th>JCI M&amp;O KR</th>
<th>Supplied Item</th>
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<tbody>
<tr>
<td></td>
<td>1. INERGEN System</td>
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<td>2. Deluge System</td>
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<td>3. Foam Package System</td>
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<tr>
<td></td>
<td>4. Fixed Fire Fighting System</td>
</tr>
</tbody>
</table>

**Project: ENI GOLIAT FPSO**
Ship Owner: ENI
Ship yard: Hyundai Heavy Industries Co., Ltd. (HHI)
Ship type: FPSO [Floating Production Storage Offloading]
Location: North Sea
Contract date: March, ‘2011
Estimated hand over date: ‘2017 ~

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<thead>
<tr>
<th>JCI M&amp;O KR</th>
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<tr>
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<td>3. Portable Fire Fighting System</td>
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<td></td>
<td>4. Life Saving Equipment</td>
</tr>
</tbody>
</table>
### JCI M&O References

#### Project: INPEX ICHTHYS FPSO
- **Ship Owner:** INPEX
- **Ship yard:** Daewoo Shipbuilding & Marine Engineering, Co., Ltd. (DSME)
- **Ship type:** FPSO [Floating Production Storage Offloading]
- **Location:** Browse Basin, offshore Western Australia
- **Contract date:** March. '2013
- **Estimated hand over date:** Middle of ‘2017

<table>
<thead>
<tr>
<th>JCI M&amp;O KR Supplied Item</th>
<th>1. INERGEN System</th>
<th>2. Deluge System</th>
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<tr>
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<td>3. Foam Package System</td>
<td>4. Helideck Foam System</td>
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<td>5. Life Saving Equipment</td>
<td>6. Fixed Fire Fighting System</td>
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<tr>
<td></td>
<td>7. Portable Fire Fighting System</td>
<td>8. Portable Fire Fighting System</td>
</tr>
</tbody>
</table>

#### Project: INPEX ICHTHYS CPF
- **Ship Owner:** INPEX
- **Ship yard:** Samsung Heavy Industries, Co., Ltd. (SHI)
- **Ship type:** CPF [Floating Central Processing Facility]
- **Location:** Browse Basin, offshore Western Australia
- **Contract date:** March. ‘2013
- **Estimated hand over date:** Middle of ‘2017

<table>
<thead>
<tr>
<th>JCI M&amp;O KR Supplied Item</th>
<th>1. INERGEN System</th>
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<td></td>
<td>7. Fixed Fire Fighting System</td>
<td>8. Portable Fire Fighting System</td>
</tr>
</tbody>
</table>
JCI M&O References

**Project: PETRONAS FLOATING LNG 1**
- **Ship Owner:** PETRONAS
- **Ship yard:** Daewoo Shipbuilding & Marine Engineering, Co., Ltd. (DSME)
- **Ship type:** FLNG [Floating Liquefied Natural Gas]
- **Location:** Malaysia
- **Contract date:** March. ‘2013
- **Estimated hand over date:** March. ‘2016

**Supplied Item**
1. INERGEN System  
2. Water-Mist System  
3. Foam Package System  
4. Helideck Foam System  
5. Fixed Fire Fighting System  
6. Portable Fire Fighting System

---

**Project: PETRONAS FLOATING LNG 2**
- **Ship Owner:** PETRONAS
- **Ship yard:** Samsung Heavy Industries, Co., Ltd. (SHI)
- **Ship type:** FLNG [Floating Liquefied Natural Gas]
- **Location:** Malaysia
- **Contract date:** July. ‘2014
- **Estimated hand over date:** ‘2017 ~

**Supplied Item**
1. INERGEN System  
2. Deluge System  
3. Foam Package System  
4. Helideck Foam System  
5. Fire Detection System  
6. Life Saving Equipment  
7. Fixed Fire Fighting System  
8. Portable Fire Fighting System
### Project: MOHO NORD FPU, TLP
- **Ship Owner:** TOTAL
- **Ship yard:** Hyundai Heavy Industries Co., Ltd. (HHI)
- **Ship type:** TLP [Tension Leg Platform] / FPU [Floating Product Unit]
- **Location:** Congo Offshore
- **Contract date:** March. ‘2013 / October. ‘2014
- **Estimated hand over date:** Middle of ‘2017

<table>
<thead>
<tr>
<th>JCI M&amp;O KR Supplied Item</th>
<th>1. Inergen System</th>
<th>2. Fixed Fire Fighting Equipment</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>3. Portable Fire Fighting System</td>
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<thead>
<tr>
<th>1. CO2 System</th>
<th>2. Water-Mist System</th>
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<tbody>
<tr>
<td>3. Deluge System</td>
<td>4. Fixed Fire Fighting System</td>
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<tr>
<td>6. Portable Fire Fighting System</td>
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</tbody>
</table>

### Project: DOMESTIC SUPPLY OBLIGATION PLATFORM
- **Ship Owner:** CHEVRON
- **Ship yard:** Hyundai Heavy Industries Co., Ltd. (HHI)
- **Ship type:** Platform
- **Location:** Nige
- **Contract date:** March. ‘2013
- **Estimated hand over date:** ‘2016 ~

<table>
<thead>
<tr>
<th>JCI M&amp;O KR Supplied Item</th>
<th>1. CO2 Snuffing</th>
<th>2. Deluge System</th>
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<tbody>
<tr>
<td></td>
<td>3. Fixed Fire Fighting System</td>
<td>4. Portable Fire Fighting System</td>
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</tbody>
</table>
JCI M&O References

Project: BP QUAD 204 FPSO
Ship Owner: BP
Ship yard: Hyundai Heavy Industries Co., Ltd. (HHI)
Ship type: FPSO [Floating Production Storage Offloading]
Location: North sea
Contract date: March. ‘2012
Estimated hand over date: ‘2016 ~

JCI M&O KR
Supplied Item
1. Deluge System
2. Fixed Fire Fighting System

Project: TOTAL USAN FPSO
Ship Owner: TOTAL
Ship yard: Hyundai Heavy Industries Co., Ltd. (HHI)
Ship type: FPSO [Floating Production Storage Offloading]
Location: Nigeria Offshore
Contract date: 2010Y October.
Estimated hand over date: ‘2014 ~

JCI M&O KR
Supplied Item
1. INERGEN System
2. Deluge System
3. Water-Mist System
4. Foam Package System
5. Fixed Fire Fighting System
JCI M&O References

**Project: TOTAL CLOV FPSO**
- **Ship Owner:** TOTAL E&P
- **Ship yard:** Daewoo Shipbuilding & Marine Engineering, Co., Ltd. (DSME)
- **Ship type:** FPSO [Floating Production Storage Offloading]
- **Location:** Offshore Angola CLOV Field
- **Contract date:** April. ‘2011
- **Estimated hand over date:** ‘2014

<table>
<thead>
<tr>
<th>JCI M&amp;O KR</th>
<th>Supplied Item</th>
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<tbody>
<tr>
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<td>1. INERGEN System</td>
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<td>2. Deluge System</td>
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<td>3. Water-Mist System</td>
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<td>4. Hi-Ex Foam System</td>
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<td>5. Fixed Fire Fighting System</td>
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<td>6. Life Saving Equipment</td>
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<td>7. Portable Fire Fighting Equipment</td>
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</tbody>
</table>

**Project: KEARL OIL SAND PROJECT PHASE 1&2**
- **Ship Owner:** EXXON MOBIL
- **Ship yard:** AMEC Natural Resources Americas
- **Ship type:** Onshore
- **Location:** Browse Basin, offshore Western Australia
- **Contract date:** May. ‘2011
- **Estimated hand over date:** ‘2017

<table>
<thead>
<tr>
<th>JCI M&amp;O KR</th>
<th>Supplied Item</th>
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<tbody>
<tr>
<td></td>
<td>1. Deluge System</td>
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</tbody>
</table>

**JCI M&O References**
JCI M&O References

Project: BP Mad dog2 FPU
Ship Owner: BP
Ship yard: SHI (Samsung Heavy Industry)
Ship type: FPU [Floating Production Unit]
Location: Offshore Field
Contract date : Sep. ‘2017
Estimated hand over date: ‘2020

JCI M&O KR
Supplied Item
1. Top side HPU
2. Valve Control HPU
3. Sub-Sea HPU

Project: ENI Coral Mozambique FLNG
Ship Owner: ENI
Ship yard: SHI (Samsung Heavy Industry)
Ship type: FLNG (Floating Liquide Natural Gas Plant)
Location: Mozambique
Contract date : Nov. ‘2017
Estimated hand over date: ‘2020

JCI M&O KR
Supplied Item
1. INERGEN System
2. Local Water-mist System
3. Dry-Powder System
4. Hi-Ex Foam System

# JCI M&O References

<table>
<thead>
<tr>
<th>Project: KRAKEN FPSO</th>
<th>Ship Owner: EnQuest / Bumi Armada Berhad</th>
</tr>
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<tbody>
<tr>
<td>Ship yard: Keppel Shipyard</td>
<td></td>
</tr>
<tr>
<td>Ship type: FPSO (DNV Approved)</td>
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<tr>
<td>JCI M&amp;O SG Supplied Item</td>
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<td>1. INERGEN System</td>
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<td>3. Fire Detection System</td>
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<td>4. AFDS</td>
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<table>
<thead>
<tr>
<th>Project: Madura FPSO</th>
<th>Ship Owner: Husky-CNOOC Madura Limited (HCML) / Bumi Armada Berhad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship yard: Keppel Shipyard</td>
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<tr>
<td>Ship type: FPSO (ABS Approved)</td>
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<tr>
<td>JCI M&amp;O SG Supplied Item</td>
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<tr>
<td>1. Deluge System</td>
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<tr>
<td>2. Fire Detection System</td>
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<tr>
<td>3. F&amp;G System</td>
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<table>
<thead>
<tr>
<th>Project: ENI Angola FPSO</th>
<th>Ship Owner: ENI Angola S.P.A / Bumi Armada Berhad</th>
</tr>
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<tbody>
<tr>
<td>Ship yard: Keppel Shipyard</td>
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<tr>
<td>Ship type: FPSO (ABS Approved)</td>
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<tr>
<td>JCI M&amp;O SG Supplied Item</td>
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<tr>
<td>1. Deluge System</td>
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<tr>
<td>2. Foam System</td>
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<table>
<thead>
<tr>
<th>Project: ABO FPSO</th>
<th>Ship Owner: BW Offshore / AGIP</th>
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<tbody>
<tr>
<td>Ship yard: Keppel Shipyard</td>
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<tr>
<td>Ship type: FPSO (DNV Approved)</td>
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<tr>
<td>JCI M&amp;O SG Supplied Item</td>
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<td>1. Fire Detection System</td>
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</table>
## JCI M&O References

<table>
<thead>
<tr>
<th>Project: Xikomba FPSO</th>
<th>Ship Owner: SBM Offshore / Sonangol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship yard: Keppel Shipyard</td>
<td>Ship type: FPSO in Angola</td>
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<tr>
<td>JCI M&amp;O SG</td>
<td>1. Upgrading of Fire Detection System</td>
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<table>
<thead>
<tr>
<th>Project: Ichthys FPSO</th>
<th>Ship Owner: INPEX &amp; Total</th>
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</thead>
<tbody>
<tr>
<td>Ship yard: Keppel Shipyard, EPC: SBM Offshore</td>
<td>Ship type: FPSO (DNV Approved)</td>
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<tr>
<td>JCI M&amp;O SG</td>
<td>1. Fire Fighting Equipment 2. F&amp;G System</td>
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<thead>
<tr>
<th>Project: BC-10 FPSO</th>
<th>Ship Owner: Shell</th>
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<tbody>
<tr>
<td>Ship yard: Keppel Shipyard, EPC: SBM Offshore</td>
<td>Ship type: FPSO (ABS Approved)</td>
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<tr>
<td>JCI M&amp;O SG</td>
<td>1. Fire Fighting Equipment 2. F&amp;G System</td>
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<thead>
<tr>
<th>Project: P-61 TLWP</th>
<th>Ship Owner: Petrobras &amp; Chevron</th>
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</thead>
<tbody>
<tr>
<td>Ship yard: Keppel Fels, Engineering/Operator: Floatec / J. Ray McDermott</td>
<td>Ship type: FPSO (ABS Approved) in Brazil</td>
</tr>
<tr>
<td>JCI M&amp;O SG</td>
<td>1. CO2 System</td>
</tr>
</tbody>
</table>
## JCI M&O References

### Project: FPSO Cendor
- **Ship Owner:** Petronas Carigali, KUFPEC (Kuwait Foreign Petroleum Exploration Company) and PetroVietnam
- **Ship yard:** MISC Berhad
- **Ship type:** FPSO in Malaysia

| JCI M&O SG Supplied Item | 1. INERGEN (300 Bar) System | 2. Addressable F.D.S |

### Project: Kaombo FPSO, E-House (by Schneider Electric)
- **Ship Owner:** Sonangol P&P, Sonangol Sinopec International, Esso, Galp
- **Ship yard:** Sembawang Shipyard
- **Ship type:** FPSO (BV Approved)

| JCI M&O SG Supplied Item | 1. INERGEN System |

### Project: Jangkrik Complex
- **Ship Owner:** ENI Muara Bakau
- **Ship yard:** Balik Papan Indonesia
- **Ship type:** FPU (DNV-GL Approved)

| JCI M&O SG Supplied Item | 1. INERGEN (300 Bar) System | 2. Fire Fighting Equipment | 3. Fire Hose reel / Fire Extinguishers |

### Project: Su Tu Trang Gas Field
- **Ship Owner:** Su Tu Trang Gas Field, Cuu Long Basin, Vietnam
- **Ship yard:** Vietsovpetro Vietnam
- **EPC:** Latech Co., Ltd
- **Ship type:** FPSO (DNV Approved)

| JCI M&O SG Supplied Item | 1. FM200 System |
JCI M&O References

**Project: OSX-1 FPSO**
Ship Owner: OSX Brazil S.A
Ship yard: Keppel Fels, Singapore  
Engineering / P.M: B/W Offshore Ltd
Ship type: FPSO in Brazil

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Deluge System</th>
<th>2. INERGEN System</th>
<th>3. Hose reel Cabinet</th>
</tr>
</thead>
</table>

**Project: OSX-2 FPSO**
Ship Owner: OGX Perroleo e Gas
Ship yard: Keppel Shipyard,  
FPSO Conversion: SBM Offshore
Ship type: FPSO in Brazil (ABS Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. CO2 System</th>
</tr>
</thead>
</table>

**Project: FPSO OKHA**
Ship Owner: Swoodside, BHP, BP, Chevron, Australia LNG
Ship yard: Keppel Shipyard,  
FPSO Conversion: SBM Offshore
Ship type: FPSO in Australia (DNV Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. INERGEN (300 Bar) System</th>
</tr>
</thead>
</table>

**Project: PFLNG 1**
Ship Owner: Petronas Carigali Sdn Bhd
Ship yard: DSME / Technip
Ship type: FLNG (ABS Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. INERGEN System</th>
<th>2. Fire Fighting Equipment</th>
</tr>
</thead>
</table>
## JCI M&O References

### Project: Triyards Sofel H1025
- **Ship Owner:** Sofel
- **Ship yard:** Saigon Shipyard Co. Ltd
- **Ship type:** Self Elevating Unit (ABS Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Helideck Foam System</th>
<th>2. Wet Chemical System</th>
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<tbody>
<tr>
<td></td>
<td>3. CO2 System</td>
<td>4. Gas Detection</td>
</tr>
<tr>
<td></td>
<td>5. AFDS</td>
<td></td>
</tr>
</tbody>
</table>

### Project: Culzean Field Development
- **Ship Owner:** Mearsk Oil UK
- **Ship yard:** SMOP Pte Ltd (Sembcorp Marine Platforms Pte. Ltd.)
- **Ship type:** Platform (DNV Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Chemical Injection Unit</th>
<th>2. INERGEN System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3. Wet Chemical System</td>
<td></td>
</tr>
</tbody>
</table>

### Project: Sagar Uday Drilling Rig
- **Ship Owner:** ONGC
- **Ship yard:** L&T Shipyard in India
- **Ship type:** Drilling Rig (ABS Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Addressable Fire Detection System</th>
</tr>
</thead>
</table>

### Project: Bekok C Platform
- **Ship Owner:** Petronas Carigali Sdn Bhd
- **Ship yard:** Kemaman in Malaysia
- **Ship type:** Platform (ABS Approved)

| JCI M&O SG Supplied Item | 1. Upgrading of Addressable Fire Detection System |
JCI M&O References

Project: A3001 Lift-boat Project (Blue Titanium)
Ship Owner: Baker Engineering Pte. Ltd.
Ship yard: Sea Deep Shipyard Pte. Ltd. in Singapore
Ship type: Lift-boat (ABS Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Fire &amp; Gas System</th>
<th>2. CCTV System</th>
</tr>
</thead>
</table>

Project: Hull-B320 and Rig Hull-B321
Ship Owner: Mermaid Maritime Public Company Limited
Ship yard: Keppel Fels in Singapore
Ship type: Class B Jack-up Rig (ABS Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Addressable Fire Detection System</th>
</tr>
</thead>
</table>

Project: Hull-B319
Ship Owner: S.D. Standard Drilling
Ship yard: Keppel Fels in Singapore
Ship type: Class B Jack-Up Rig (ABS Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Addressable Fire Detection System</th>
</tr>
</thead>
</table>

Project: WHP-BK10 & BK3
Ship Owner: Vietcovpetro
Ship yard: Vietsovpetro in Malaysia
Ship type: Well Head Platform (ABS Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Addressable Fire Detection System</th>
</tr>
</thead>
</table>
### JCI M&O References

#### Project: Conversion FSO Bergading
- **Ship Owner:** Hess
- **Ship yard:** MMHE Shipyard
- **Ship type:** FSO (BV Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Deluge System</th>
<th>2. Foam System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3. NOVEC System</td>
<td>4. Fire Fighting Equipment</td>
</tr>
</tbody>
</table>

#### Project: Petrobras Pre-Salt FPSO x 8 (P66 to P73)
- **Ship Owner:** Petrobras
- **Ship yard:** Ecovix
- **Ship type:** FPSO

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Addressable Fire Detection System</th>
</tr>
</thead>
</table>

#### Project: APLNG
- **Ship Owner:** ConocoPhillips, Origin, Sinopec
- **Ship yard:** Siemens Batam Yard
- **Ship type:** APLNG

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. NOVEC System</th>
<th>2. F&amp;G System</th>
</tr>
</thead>
</table>

#### Project: Maintenance Service for FSO Puteri Cakerawala
- **Ship Owner:** CHOC (Carigali Hess Operating Company)
- **Ship yard:** CHOC
- **Ship type:** FSO (BV Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O SG Supplied Item</th>
<th>1. Addressable Fire Detection System and Field Devices</th>
</tr>
</thead>
</table>
# JCI M&O References

<table>
<thead>
<tr>
<th>Project: Cendor FPSO</th>
<th>Ship Owner: Petronas Carigali, KUFPEC (Kuwait Foreign Petroleum Exploration Company) and PetroVietnam</th>
<th>Ship yard: MISC Berhad (BV Approved)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JCI M&amp;O SG Supplied Item</td>
<td>1. INERGEN 300 Bar System</td>
<td>2. Addressable Fire Detection System</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project: TGT E-House</th>
<th>Ship Owner: Bumi Amada</th>
<th>Ship yard: MMHE Malaysia</th>
<th>Ship type: FPSO (BV Approved)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JCI M&amp;O SG Supplied Item</td>
<td>1. INERGEN 300 Bar System</td>
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<tbody>
<tr>
<td>JCI M&amp;O SG Supplied Item</td>
<td>1. Gas Detection System</td>
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<tbody>
<tr>
<td>JCI M&amp;O SG Supplied Item</td>
<td>1. Fire Fighting Equipment</td>
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</table>
### JCI M&O References

<table>
<thead>
<tr>
<th>Project: 20,120 TEU Container 11 shipset (Jul. 2015)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship Owner: A.P. Moller Maersk</td>
<td></td>
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<tr>
<td>Ship yard: DSME Shipyard</td>
<td></td>
</tr>
<tr>
<td>Ship type: ULCS (Ultra Large Container Ship) (ABS Approved)</td>
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</tr>
<tr>
<td>JCI M&amp;O KR Supplied Item</td>
<td></td>
</tr>
<tr>
<td>1. Low Pressure CO2 System</td>
<td>2. Local Water-mist System</td>
</tr>
<tr>
<td>3. Loose equipment</td>
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<table>
<thead>
<tr>
<th>Project: 20,000 TEU Container 11 Shipset (Apr. 2016)</th>
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</thead>
<tbody>
<tr>
<td>Ship Owner: MOL (Mitsui OSK Lines)</td>
<td></td>
</tr>
<tr>
<td>Ship yard: Imabari Shipyard</td>
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</tr>
<tr>
<td>Ship type: Container Ship (ABS &amp; LR Approved)</td>
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<tr>
<td>JCI M&amp;O KR Supplied Item</td>
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</tr>
<tr>
<td>1. High Pressure CO2 System</td>
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</tbody>
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<thead>
<tr>
<th>Project: 180,000 cbm LNG Carrier 1 shipset (Jun. 2016)</th>
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</thead>
<tbody>
<tr>
<td>Ship Owner: MOL (Mitsui OSK Lines)</td>
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</tr>
<tr>
<td>Ship yard: MHI (Mitsubishi) Shipyard</td>
<td></td>
</tr>
<tr>
<td>Ship type: LNG Carrier</td>
<td></td>
</tr>
<tr>
<td>JCI M&amp;O KR Supplied Item</td>
<td></td>
</tr>
<tr>
<td>1. Dry-Powder System</td>
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</tbody>
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<thead>
<tr>
<th>Project: 180,000 cbm LNG Carrier 1 shipset (Aug. 2016)</th>
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<tbody>
<tr>
<td>Ship Owner: NYK</td>
<td></td>
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<tr>
<td>Ship yard: MHI Nagasaki Shipyard</td>
<td></td>
</tr>
<tr>
<td>Ship type: LNG Carrier</td>
<td></td>
</tr>
<tr>
<td>JCI M&amp;O KR Supplied Item</td>
<td></td>
</tr>
<tr>
<td>1. Dry-Powder System</td>
<td>2. HP CO2 System</td>
</tr>
</tbody>
</table>
### JCI M&O References

#### Project: 300,000 dwt VLCC 4 shipset (Sep. 2016)
- **Ship Owner:** GC Tanker  
- **Ship yard:** Jinhai Shipyard  
- **Ship type:** VLCC (Very Large Crude-Oil Carrier)

<table>
<thead>
<tr>
<th>JCI M&amp;O KR</th>
<th>Supplied Item</th>
<th>1. Addressable Fire Detection System</th>
</tr>
</thead>
</table>

#### Project: Navy LPX Dokdo #2 (S139) (Oct. 2016)
- **Ship Owner:** Korean Navy  
- **Ship yard:** Hanjin Heavy Industry  
- **Ship type:** Large Platform Experimental

<table>
<thead>
<tr>
<th>JCI M&amp;O KR</th>
<th>Supplied Item</th>
<th>1. Total Water-mist System</th>
</tr>
</thead>
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#### Project: 81,000 dwt BC 6 shipset (Dec. 2016)
- **Ship Owner:** Golden Union Shipping  
- **Ship yard:** AVIC Weihai Shipyard  
- **Ship type:** Bulk Carrier

<table>
<thead>
<tr>
<th>JCI M&amp;O KR</th>
<th>Supplied Item</th>
<th>1. Addressable Fire Detection System and Field Devices</th>
</tr>
</thead>
</table>

#### Project: 13,000 Crude Oil Tanker 10 shipset (Dec. 2016)
- **Ship Owner:** Shanghai DingHeng  
- **Ship yard:** Tongbao Shipyard  
- **Ship type:** Oil Tanker

<table>
<thead>
<tr>
<th>JCI M&amp;O KR</th>
<th>Supplied Item</th>
<th>1. HP CO2 System</th>
<th>2. Deck Foam System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3. Local Water-mist System</td>
<td></td>
</tr>
</tbody>
</table>
# JCI M&O References

## Project: Fisheries Patrol Vessel (3 Shipset) (Feb. 2017)
- **Ship Owner:** West Sea Fisheries Management
- **Shipyard:** Daesun Shipyard
- **Ship type:** Patrol Vessel

|--------------------------|--------------------------|----------------------|-----------------|---------------------------------|

## Project: Chemical Tanker (49K) (Oct. 2017)
- **Ship Owner:** Odfjel
- **Shipyard:** Hudong Zhonghua Shipyard
- **Ship type:** Chemical Tanker (DNV Approved)

<table>
<thead>
<tr>
<th>JCI M&amp;O KR Supplied Item</th>
<th>1. HP CO2 System</th>
<th>2. Deck Foam System</th>
</tr>
</thead>
</table>
### JCI M&O References

<table>
<thead>
<tr>
<th>Project: Eagle Texas &amp; Eagle Louisiana</th>
<th>Ship Owner: AET Shipmanagement Singapore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship yard: Dry-dock World Dubai</td>
<td>Ship type: Modula Capture Vessel (ABS &amp; USCG Approved)</td>
</tr>
<tr>
<td></td>
<td>JCI M&amp;O SG Supplied Item 1. NOVEC System</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project: RNB Littoral Combat Vessel 6 shipset</th>
<th>Ship Owner: Royal Malaysian Navy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship yard: Boustead Naval Shipyart, Lumut</td>
<td>Ship type: Navy Vessel (BV Approved)</td>
</tr>
<tr>
<td>JCI M&amp;O SG Supplied Item 1. NOVEC System</td>
<td>2. CO2 System</td>
</tr>
<tr>
<td>3. Foam System</td>
<td>4. Fire Detection System</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Project: Ice Class Multipurpose Vessel (H389)</th>
<th>Ship Owner: New Orient Marine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship yard: Keppel Singmarine, Singapore</td>
<td>Ship type: Multipurpose Ice Class Ship</td>
</tr>
<tr>
<td>JCI M&amp;O SG Supplied Item 1. CCTV System</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project: 78m Landing Craft</th>
<th>Ship Owner: Sealink Sdn Bhd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship yard: Sealink Shipyard Miri</td>
<td>Ship type: Landing Craff</td>
</tr>
<tr>
<td>JCI M&amp;O SG Supplied Item 1. Addressable Fire Detection System</td>
<td>2. CO2 System</td>
</tr>
</tbody>
</table>
JCI M&O References

Project: 64.8m AHTS 2 Shipset (SK900, 902)
Ship Owner: Nam Cheong Group
Ship yard: Nam Cheong Dockyard
Ship type: Anchor Handling Tug Supply Vessel (ABS Approved)

JCI M&O SG
Supplied Item
1. Fire Alarm System
2. Gas Detection System
3. CO2 System
4. Local Water-mist System

Project: 50m Tug Boat 2 Shipset (H1462, 1463)
Ship Owner: POET Shipbuilding, Singapore
Ship yard: Jiangsu Suyang Marine
Ship type: Tug ship (ABS Approved)

JCI M&O SG
Supplied Item
1. NOVEC System
2. Fire Detection System
3. Gas Detection System
4. Wet Chemical System

Project: Fast Patrol Ship 20 Shipset
Ship Owner: India Coast Guard
Ship yard: Cochin Shipyard, India
Ship type: Patrol Ship

JCI M&O SG
Supplied Item
1. FM200 System

Project: 52.35m Off-take Support Vessel (Hull 1040)
Ship Owner: Mermaid Marine Australia Limited
Ship yard: ASL Shipyards, Singapore
Ship type: OSV (ABS Approved)

JCI M&O SG
Supplied Item
1. NOVEC System
JCI M&O References

**Project: FDS Upgrading System for Landing Ship Tanks 4 Shipset**  
**Ship Owner:** Ministry of Defence  
**Ship yard:** Sembcorp Marine Integrated Yard, Singapore  
**Ship type:** Navy Vessel (ABS Approved)

**JCI M&O SG**  
**Supplied Item**  
1. Addressable Fire Detection System  
2. FM200 Gas Release Panel

**Project: 5 Years Maintenance Contract For Petrol Boat 10 shipset**  
**Ship Owner:** Ministry of Home Affairs / Singapore Police Coast Guard  
**Ship yard:** Singapore Coast Guard  
**Ship type:** Petrol Ship (ABS Approved)

**JCI M&O SG**  
**Supplied Item**  
1. Addressable Fire Detection System

**Project: P-71 Aircraft Carrier**  
**Ship Owner:** Indian Navy  
**Ship yard:** COCHIN Shipyard Ltd  
**Ship type:** Aircraft Carrier (DNV Approved)

**JCI M&O SG**  
**Supplied Item**  
1. Wet Chemical Fire Fighting System  
2. Galley System

**Project: Royal Thai Navy HTMS Trang**  
**Ship Owner:** Royal Thai Navy  
**Ship yard:** Bangkok Dock  
**Ship type:** Navy Ship

**JCI M&O SG**  
**Supplied Item**  
1. Addressable Fire Detection System  
2. Helideck Foam System  
3. Rapid Response Spray System (RRSS)
THANKS!