Tillquist

Peco Facet
a CLARCOR company

PECOFACET MARINE SOLUTIONS

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CLARCOR is a global provider of filtration products and services for the Marine Industry. We offer the industry's broadest product range with more than 80,000 filter types, superb product quality, leading brands, extensive distribution network and technical expertise to serve customers worldwide.

CLARCOR provides Total Filtration from a single source by bringing together the products, experience and expertise of our companies to meet all your marine filtration needs. This collaboration insures that customers receive the best filtration and on-time delivery directly to each business location–to protect people, equipment and the environment.

CLARCOR offers the broadest array of filtration products, technologies and services to meet current and future Marine Industry requirements. Our customers, worldwide, depend on CLARCOR filtration products to fuel their future.

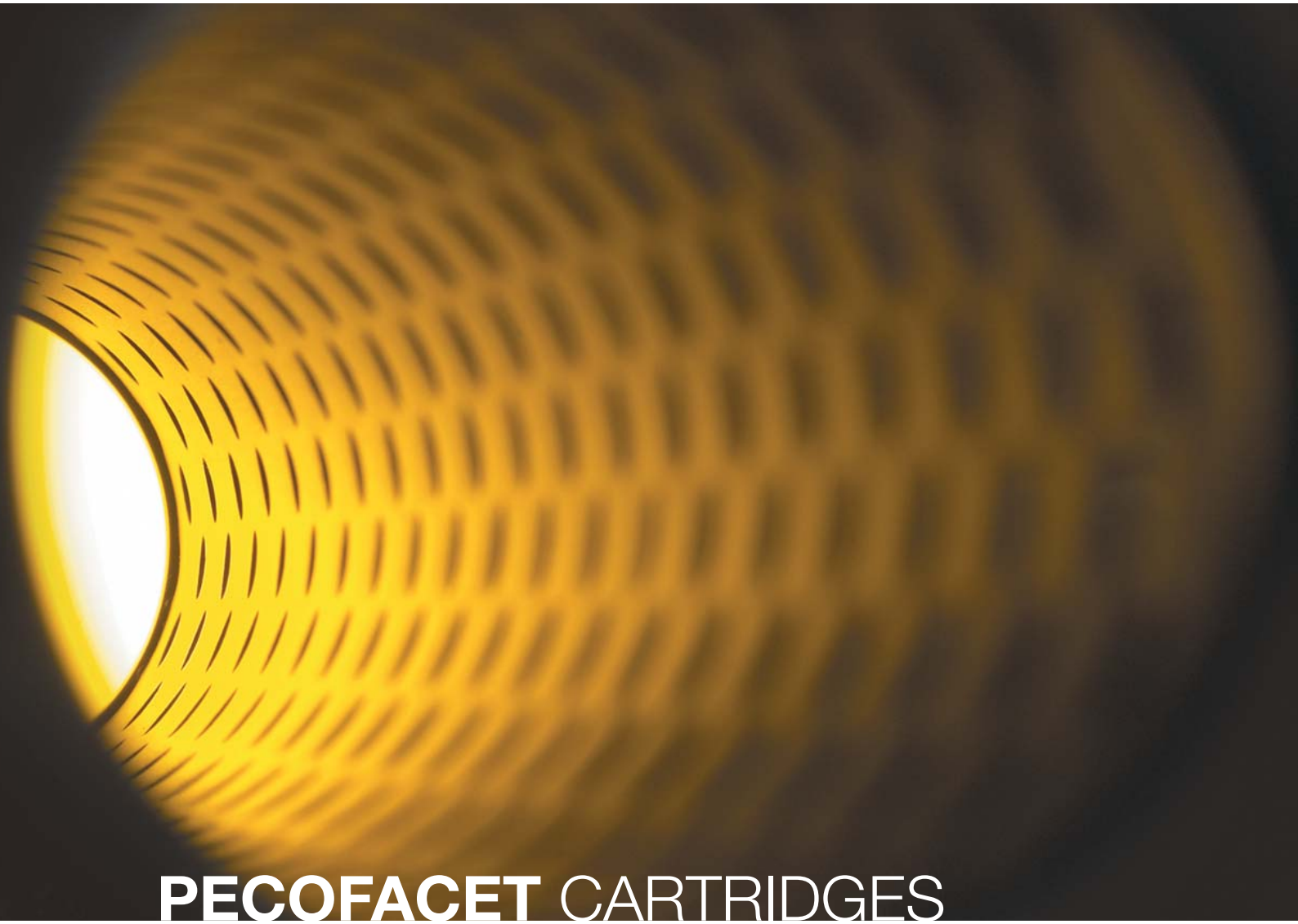
CLARCOR provides unparalleled customer value with filtration solutions for water, fuel, oil, air and gas in every stage and aspect related to the Marine field. We optimize equipment reliability and power output to reduce equipment downtime and unplanned power outages.

CLARCOR is positioned to meet your Total Filtration and service needs.

PECOFACET MARINE SOLUTIONS

PECOFACET is the leading filtration and separation company serving the world's petrochemical, refining, marine, offshore and aviation industries. PecoFacet has earned worldwide recognition with more than 70 years of experience in the separation of solid-liquid, liquid-liquid, liquid-gas and solid-gas.

Facet International a CLARCOR company
Peco a CLARCOR company
Baldwin Filters a CLARCOR company
MKI a CLARCOR company
AirGuard a CLARCOR company
Purolator a CLARCOR company
UAS a CLARCOR company KLEENTEK
ATi a CLARCOR company
CLARCOR UK a CLARCOR company
CF Clark Filter a CLARCOR company
Hastings Premium Filters a CLARCOR company
TFS Total Filtration Services a CLARCOR company



PECOFACET CARTRIDGES

PecoFacet cartridges provide efficient filtration of fluids in a wide variety of applications.

PecoFacet cartridges are manufactured using proprietary combinations of high performance filter media. Years of research and development have enabled PecoFacet to develop an expansive range of filter grades to meet the stringent requirements of marine applications.

Selection of media and vessel design determine the filter flow rate, dirt holding capacity, particle-size removal in one pass, overall cost of operation and initial investment.

MICROFILTERS AND BASKET STRAINERS

PecoFacet Microfilters and Basket Strainers have the following marine applications:

· Removal of solids and organisms at the water captation system.

· Protection of the pumping equipments of the ship cooling systems.

· Protection of meters, valves, control equipments and refueling systems pumps.

Designed as a first stage filtration process to remove solids such as rust, dirt, scale, granules and other particles commonly found in liquid process streams.

Vessels are available in carbon steel or stainless steel with several standard sizes designed to meet specific flow requirements.

ASME Code, Section VIII construction, stamped and certified or “CE” marked.

Designed for 10.3 bar (150 PSI) at 121ºC (250ºF); higher pressure and temperature ratings available on request.

Flow rates up to 24,200 usgpm (92,000 l/min) and 5,300 usgpm (20,000 l/min) for Basket Strainers and Microfilters respectively.

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PECOFACET FILTER WATER SEPARATORS

PecoFacet Filter Water separators are highly efficent and complete units designed to remove solids down to 0.5 microns and dispersed liquids from process streams.

Small size and weight, and small investment and installation costs. Low operating costs, with minimum and easy maintenance.

Installed in fuel treatment plants or gas-landing stations.

Designed to filter solids and separate two immiscible liquids. Using PecoFacet high quality coalescer and separator cartridges, the best liquids and solids removal is provided. These quality PecoFacet products are designed for installations in petrochemical plants, refineries, power plants, bulk storage terminals, offshore production platforms, and many other industrial and marine applications.
Carbon stainless steel, CuNi construction.
ASME Code, Section VIII construction, stamped and certified or “CE” marked.
Designed for pressure and temperature ratings on request.

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PecoFacet Automatic Filters allow a continuous filtration of diesel, oil and sea water with high contents of solids by granting an automatic sequential back-washing of the filtering elements.

AUTOMATIC FILTERS

Automatic cleaning occurs when set differential pressure is achieved, then a gear motor reducer rotates the cleaning arms, inverting the flow through filtration columns and discharging sludge outside by drain nozzle.
Flow rates from 220 to 53,000 usgpm (830 to 200,000 l/min.) retaining solid particles from 10 to 1,000 microns.
Built in stainless steel or carbon steel.

PECOFACET SERIES 21 & 22

The PecoFacet 21 and 22 Series filter housings are economical, compact housings for superior in-line filtration protection when used with PecoFacet's standard 21 or 22 Series filter cartridges to remove water from marine fuels.

Both the exteriors and interiors of the PecoFacet 21 and 22 Series filter housings carbon steel bodies are epoxy coated to protect against corrosion.

Depending on the 21 Series or 22 Series cartridge selected, the housings may be used as particulate filters, absorptive filters, filter separators or air/gas entrainment separators to remove solids, water, mist or of the carbon steel. These sturdy, single cartridge housings are easy to maintain and require only 2" (51 mm) base clearance for cartridge changeout.

The body of the PecoFacet filter water separator model VFCS- 21/22-C is constructed from carbon steel and protected with an epoxy coating. The cap is made from anodized die cast aluminium. It is suitable for removing water from Diesel down to 25 p.p.m., as well as solids bigger than 25 microns in a flow rate up to 17.6 usgpm (66 l/min.) of diesel oil. Supplied with high vacuum alarm feature for pump/engine protection.

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Eliminate the need for other water defense devices and receive maximum water removal, solids holding capacity and shutdown protection to assure clean, dry fuel delivery.

The new PecoFacet HFG Series horizontal Fuel-Gard® monitor housings continually check the entire flow of fuel, not just mere samples, for water or solids contamination. By performing three jobs, the FG Series monitors assure clean, dry fuel.

PECOFACET FUEL GARD® MONITORS

They absorb free and emulsified water, remove ultra-fine solids, and shut down system flow when hit with a localized slug of water. In addition, the PS Series monitors positively shut down system flow when pressure drop across the cartridge exceeds 40 psi eliminating any possibility of media or water transmission while also preventing the system being reused. They are designed to flow from the outside to inside at a rate of 1 gallon (3.79 liters) per inch of length.

PecoFacet's Fuel-Gard monitor housings are built to ASME Code, constructed of carbon steel and designated for maximum working pressure of 150 psi. They are furnished with FG Series monitor cartridges that meet and exceed the latest edition of E.I. specification #1583 Aviation Fuel Filter Monitors With Absorbent Type Elements.

PecoFacet's GNG Series monitor cartridges are interchangeable with the FG Series when MIL-M-81380C(AS) requirements are desired.

PECOFACET LUBE OIL CONDITIONERS

PecoFacet Lube Oil Conditioner was designed to maintain the lube oil within the specifications of the engines and turbines manufacturers regarding the content in water and solids, extending the properties/life of such lube oil.

Turn-key solutions, supplied with all the components and accessories, ready to put into operation after an easy installation.

Built to ASME Code. Carbon steel or stainless steel construction.
Explosion proof design (ATEX).
Removes free water up to concentrations lower than 20 ppm and solids larger than 5 micron.
Automatic operation, regulated through a PLC.
Flow rates from 10 to 18.5 usgpm (37.8 to 70 l/min.).

Its features make this equipment easy to use and maintain.

Every unit is tested before shipment to ensure the optimal levels of service/performance.

Bilge water produced by new-generation ships often contains "advanced" water-oil emulsions originating from the maintenance of turbines, engines and other shipboard mechanical systems. When this is the case, more sophisticated separation is required.

CPS 3.2E + EMB equipment removes hydrocarbons in two stages. In the first stage, free hydrocarbon is separated from water. In the second stage, emulsions are broken by a membrane which removes emulsified hydrocarbon resulting in effluent with total hydrocarbon content of less than 5 ppm.

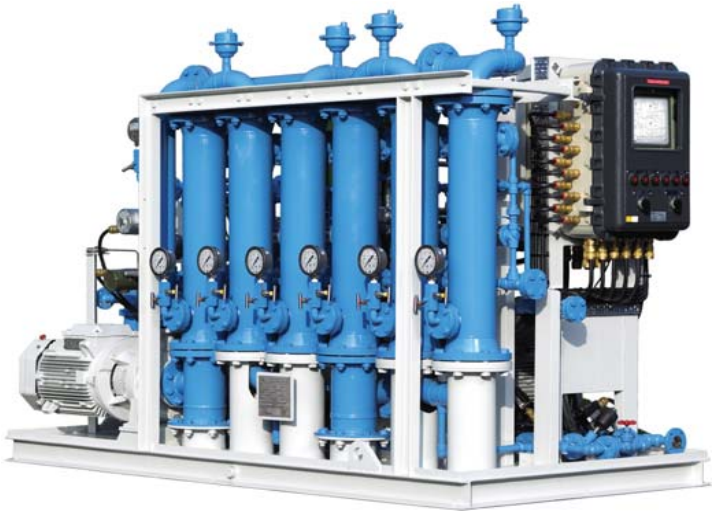
PecoFacet CPS 3.2E + EMB has been tested, approved and certified according to the requirements of IMO MEPC.107(49). PecoFacet's experience assures cost efficiency and reliability.

PECOFACET BILGE WATER SEPARATOR

Solid particles settle onto the plates and slide down to the removal holes, particles that enter the solids removal holes fall to the bottom of the separator, where they accumulate until removed.
The supports for the MPak® elevate the plates several inches above the bottom of the separator to provide solids storage capacity. The systems are designed to handle either gravity or pumped flow on a single-pass or recirculatory basis. They are also largely self-cleaning, so as to avoid the problems caused by the accumulation of solid particles in the system.

PecoFacet Oil Water Separators with Membranes are designed to treat hydrocarbon water and gas condensate containing benzene (aromatics) coming from deckdrain water and produced water.

Tested, approved and certified according to the requirements of IMO MEPC.107(49), reaching down an effluent with total hydrocarbon content of less than 5 ppm.
Explosion proof design (ATEX).
Flow rates from 2.2 to 44 usgpm (8.3 to 166.5 l/min.).



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PECOFACET BILGE WATER SEPARATOR

Through continuous research and development programs and designs based on easy maintenance and maximum efficiency, PecoFacet has developed the new series of CPS BMKIII + EBM 14x bilge water separation units.
This series combines the classic Coalescing Plates PecoFacet MPak® technology with innovative membranes that accomplish high efficiency in chemical and mechanical emulsion breaking.

PecoFacet's units are compact and highly adaptable to the available space onboard. In addition they are lightweight and require little maintenance. Operation is easy because it is fully automatic; all functions are controlled through a PLC.

CPS BMKIII + EBM 14x equipment removes hydrocarbons in two stages. In the first stage, free hydrocarbon is separated from water through PecoFacet's patented coalescent plate packs. In the second stage, emulsions are broken by a membrane which removes emulsified hydrocarbon, reaching down an effluent with total hydrocarbon content of less than 15 ppm.

PecoFacet's CPS BMKIII + EBM14x has been tested, approved and certified according to the requirements of IMO MEPC.107(49).

PecoFacet Sewage Systems with integrated vacuum have been designed for the treatment of black waters (coming from W.C., urinals and hospitals) and grey waters (sinks, showers, laundry and galley) generated onboard ships. This treatment consists in the purification and later disinfection of waters in order to achieve a quality effluent meeting all legislative requirements.

PECOFACET SEWAGE TREATMENT PLANTS

These plants treat sewage biologically, meaning they are of the active sludge, prolonged aeration, aerobic type.
PecoFacet STP plants are built in a single steel module to ease transportation and onboard installation.

Meet Marpol Annex IV Requirements, 8(1)(b) and 9.1.1 Regulations, as well as IMO Resolution MEPC-2(VI), MEPC-159(55), CE Standards 96/98/EC and 98/85/EC; they do not generate sludge that should be later discharged.

Fully automatic operation driven by PLC.
Explosion proof design (ATEX).

PECOFACET BUILT-IN VACUUM SYSTEMS

What makes the VTP system unique is its built-in vacuum system that transports black waters along the piping system to the treatment plant. The vacuum in the circuit is achieved automatically with the ejector and circulating pump.

VTP plants are built in a single steel module to ease transportation and onboard installation. Inside this module there are three specially designed chambers for aeration, settling and disinfection. These chambers are oriented in such a way as to guarantee correct operation and avoid sludge generation. Each chamber has been provided with an access and inspection register. The Plants are supplied completely assembled and tested so that their installation onboard is very quick.

Hot engine cooling water is pumped by the engine circulating pump through the seawater heater and back to the engine circulating system. This water is not affected in any way except that some heat is removed. This is the heat that boils the seawater in the distilling shell. As this takes place under deep vacuum, the seawater is boiled at a very low temperature (46-60ºC / 115-140ºF).

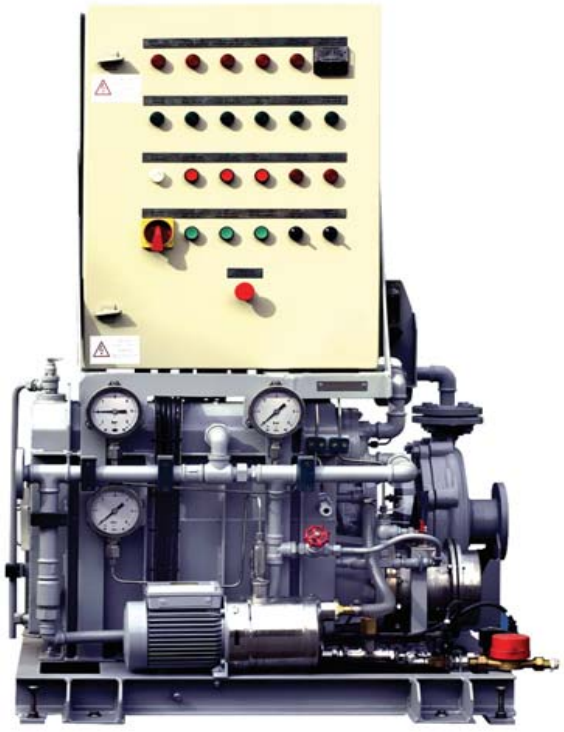
Raw seawater is pumped continuously through the fresh water condenser. Most of the seawater is then discharged to sea. A certain quantity, however, is fed into the distilling shell where it is boiled, the seawater concentrate, or brine, is continuously drawn off from the distilling shell by a venturi ejector and discharged to sea.

PECOFACET DESALINATORS

The vapor or steam, produced by boiling the seawater, passes through a monel mesh separator where any droplets of water or entrained particles are removed. Thus, only pure vapor enters the fresh water condenser section. This vapor passes over the tubes of the fresh water condenser where it is condensed by the cool seawater flowing through the tubes. The resulting fresh water is pumped from there to the storage tank by the fresh water pump.

The distilling shell vacuum is maintained by evacuating the noncondensable gases from the shell with a venturi ejector. All fresh water is monitored by the salinity control system with automatic dumping should the water contain more than 4 ppm. of salt.

Safe design against failure protects valuable freshwater storage from possible salt contamination.



PECOFACET POTABILIZERS

PecoFacet potabilizers are designed to meet the need on board ship to treat the water from evaporators in order to produce suitable drinking water. This is achieved using the processes of re-hardening and sterilization.

This process consists of adding mineral salts to distilled water, in sufficient quantities to achieve a pH of between 7.5 and 8, always below -11ºC (12ºF).

Once the necessary mineral salts have been added, the water must be sterilized to remove the bacteria which have survived the process of evaporation. This sterilization is carried out using ultraviolet radiation. With this method, the water which is to be treated is passed through a chamber where it is subjected to radiation from U.V. generators. These generators are isolated from the water by means of a protective, isothermic casing. This is followed by a slowing down of their reproductive functions until the bacteria are totally eliminated.

The distilled water, is passed through the generator's re-hardening filter, where the water flows uniformly through the bed of mineral salts and takes them up. In this way, the necessary re-hardening, or pH adjustment, is achieved. Next, part or all of the mineralized water passes through the treatment chamber of the sterilizer,where it is treated using ultraviolet radiation.

The Turbo-Generator Fuel-Oil Module embraces the sum of PecoFacet's know-how in microfiltration and separation, together with our experience in handling of fuelling systems, providing fully automated pumping, filtration and conditioning of the fuel that is supplied to the turbo-generator, according to the specifications of the manufacturer. And in both start-up and operational conditions for the different types of fuels with which a turbine can work, each of them with its different characteristics with regard to viscosity and temperature.

TURBO GENERATOR FUEL/OIL MODULE

PORTABLE TANK / COMPACT SYSTEM

Portable tanks are available for the storage of fuel onboard.

These are approved by DNV with certificate no. S-2531. Tanks have a capacity of 3,000 liters (793 USG) and are pressure tested to 3.7 bar (54 PSI). Tanks may be constructed from either carbon steel or stainless steel.

The PecoFacet compact system is skid mounted with a spill tray.

All major components, including piping, are constructed from stainless steel. These are designed for refueling helicopters, and include the following items:

· Basket strainer
· ATEX control panel for different types of current
· Stainless steel pump, drive by ATEX

Supply cabinet includes:

· Fuel monitor — API/IP 1583
· Meter
· Hose reel & hose
· Overwing and underwing nozzles
· Grounding cable reel

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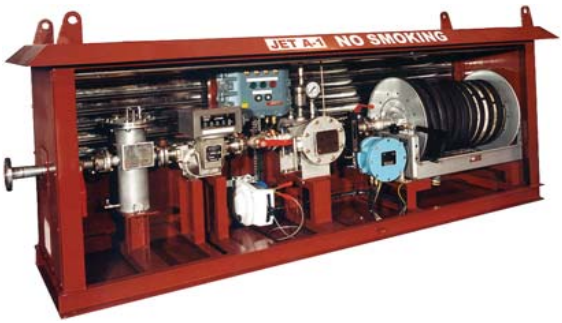
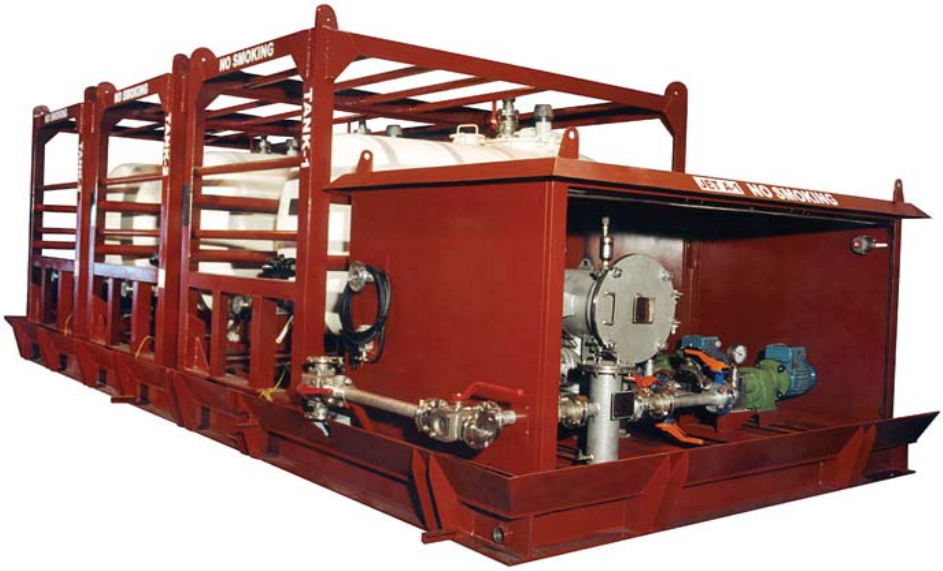
Pumping and Filtration Units – module designed with a spill tray and weather protection cabinet, built in stainless steel, comprising all necessary components to achieve protection, pumping, filtration like basket strainers, pump, ATEX motors, Filter Water Separator as API 1581 5th Edition. ATEX Control Panel, Safety Light, etc.

HELICOPTER REFUELING SYSTEMS

Dispenser Unit – module designed with a spill tray and weather protection cabinet, built in stainless steel, with the required components that could be like as Volumetric Meter, PecoFacet Monitor Absorber Filter as IP 4th Edition, Electrical/Manual Hose Reel, Flexible Aviation Hose with the Nozzles to Overwing and Underwing supplies, Safety Elements, etc.



PecoFacet's experience assure cost efficiency, working reliability and confidence to protect the equipment installed on Offshore Platforms, Production Transport Storage, Floating Storage Units, Drilling Ships and Gas Explotation Field.



HELICOPTER IN-FLIGHT REFUELING

PecoFacet has development equipments known for their rugged construction, with functionally and safety as key factors.

PecoFacet designs, manufactures and markets Helicopter Refueling Systems for the marine market complying with the most stringent specifications and regulations of the customers and regulatory agencies, comprising basically:

· Portable Aviation Fuel Container Tanks
· Pumping and Filtration Unit
· Dispenser Unit

Transportable Aviation Fuel Container Tank is built in carbon steel or stainless steel up to 3,000 liters (793 USG) of capacity for working pressure of 2.5 bar (36 PSI) as ASME VIII Div.1, designed and certified as DET NORSKE VERITAS CERTIFICATION OF OFFSHORE CONTAINERS and INTERNATIONAL MARITIME DANGEROUS GOODS CODE (IMDG).

PecoFacet has a network of highly professional local representatives in more than 70 countries to guarantee PecoFacet's commitment with a high quality aftersales service by knowledgeable staff combined with the availability of spare parts. This guarantees lifelong product support with spares, upgrade products and services.

PECOFACET AFTERSALES & REFERENCES

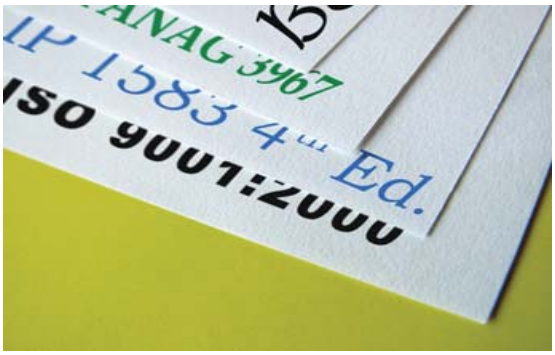
PecoFacet has more than 5,000 units and systems in operation worldwide, fulfilling the most stringent requirements and regulations while maintaining optimum performance in all kind of vessels such as cargo, cruise, yacht, ro-ro, fishing, military and offshore vessels and facilities.

PECOFACET AFTERSALES & REFERENCES

NAVIES
Argentina
Chile
Ecuador
France
Germany
Indonesia
Italy
Kenya
Mexico
Norway
Portugal
Saudi Arabia Coast Guard
Singapore
Spain
The Netherlands
Turkey
United Kingdom
United States
Venezuela

SHIPYARDS
Astilleros Armón
Astilleros Españoles, S.A.
Chantiers de l' Atlantique
Damen Shipyards
DCN
E.N. Bazan
Estaleiros Navais de Viana do Castelo
Estaleiros Sao Jacinto
Factorias Vulcano, S. A.
Fincantieri
Hijos de J. Barreras, S. A.
Kvaerner Masa
Mansal Offshore
Naval Gijon, S.A.U.
Navantia
QGM Group
Singapore Technologies Marine
Tersan Tersanecilik Tasimacilik
Rmk Marine Gemi Yapim
Unión Naval de Valencia

SHIPOWNERS
ABB Lummus Global BV
Albacora
Amoco Transport Company
Boluda Off Shore
CLH
CEPSA
Cia. Trasmediterranea
Chevron U.K. Limited
Commodore Cruise Line
Compagnie Saupiquet
Contenemar
Control Union Netherland
Cunard Line Ltd
Elf Congo
Enterprise Nationale de Transport Maritime
Gaz de France
Health Lead Development Limited
Jan de Nul
Jo Tankers
Knutsen
Laurin Maritime
Limadet Ferry
Naviera F. Tapias
Naviera Pinillos
Naviera Química
PDVSA
Pescanova
Sertosa
Smedvig Production Company
Sonath Offshore Drilling
Statoil
Tay Co Ltd
Transocean
Tri-marine
Total Myanmar
V-ships Limited
Wintershall Noordzee B.V.

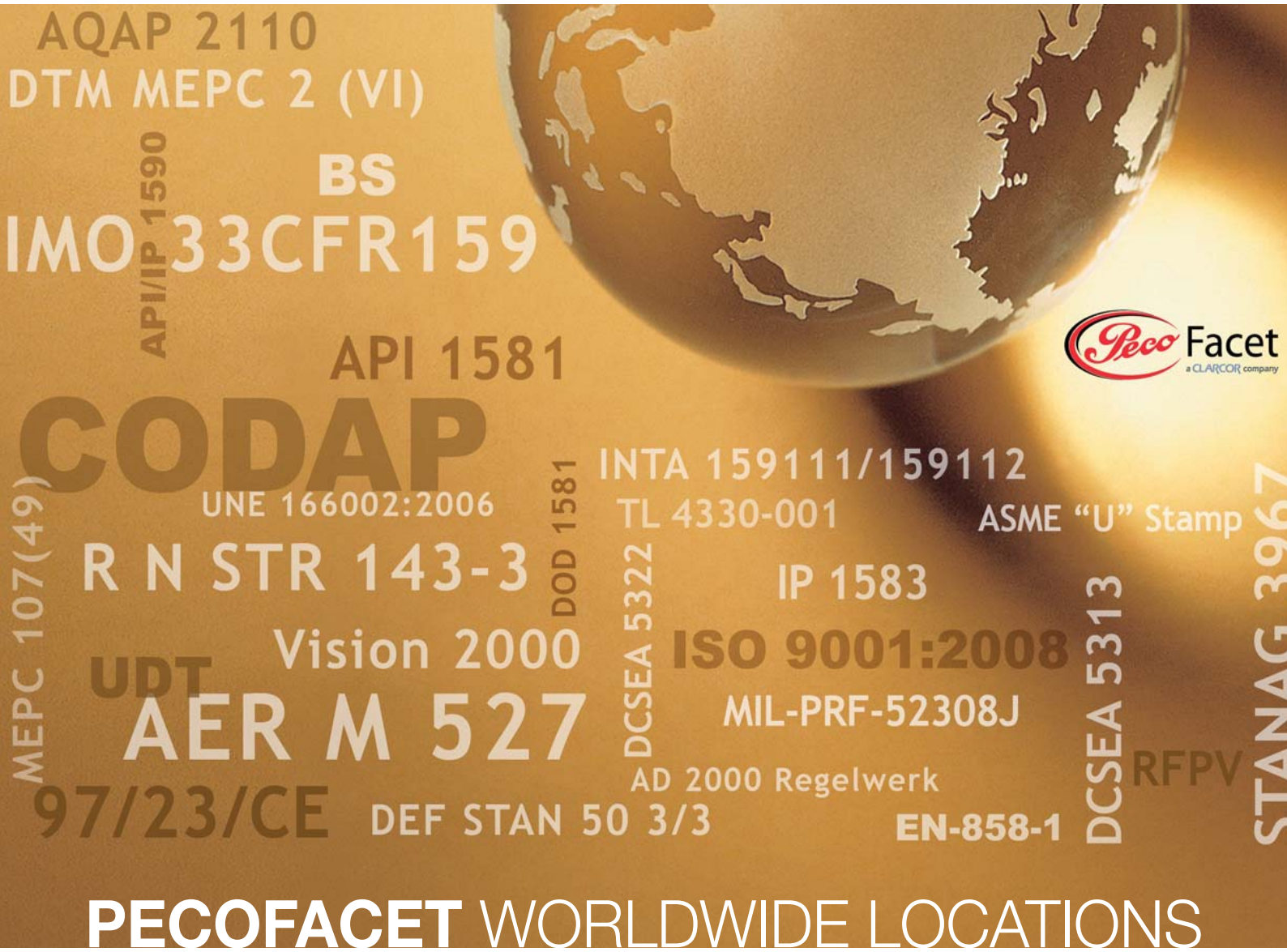


- 97/23/CE
- AD 2000 REGELWERK
- AER M527
- API 1581
- API/IP 1590
- AQAP 2110
- ASME "U" STAMP
- BS
- CODAP
- DCSEA 5313
- DCSEA 5322
- DEF STAN 50 3/3
- DOD 1581
- DTM MEPC 2 (VI)
- EN-858-1
- IMO 33CFR159
- INTA 159111/159112
- IP 1583

PECOFACET QUALITY & APPROVALS

PecoFacet's business depends on its products and services being of the finest QUALITY. This commitment is reflected in the fact that PecoFacet was the first filter manufacturer to receive the ISO 9001:2008 and AQAP 2110 quality approvals. Today, PecoFacet holds more technical approvals for its commercial and military products than any company in the world.

- ISO 9001:2008
- MEPC 107(49)
- MEPC-159(55)
- MIL-PRF-52308J
- R N STR 143-3
- RFPV
- STANAG 3967
- TL 4330-001
- UDT
- UNE 166002:2006
- VISION 2000



PECOFACET WORLDWIDE LOCATIONS

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