



The Maritime Industry: Unexpected Opportunities for Filtration & Separation Professionals

By: Gerard J. Lynch

The Marine Industry presents numerous challenges and opportunities for filtration and separation manufacturers. Historically, the Offshore Oil and Gas production industry has provided a major market for filtration and separation system development. It has been the focus of many large multinational filtration and separation manufacturers. Today however, opportunities exist for small, agile manufacturers who can focus on niche market opportunities. As examples, Desalination, Bilge Water Treatment, Ballast Water Treatment and innovative Pre-Treatment technologies present very active market segments.

Marketing Considerations:

Who is the buyer for Offshore Oil/Gas Production Platforms, Naval Ships and Vessels, Merchant Tankers, Maintenance and Repairs Yards, Commercial Fishing Vessels, Tug Boats, Ferries, and Yachts?

Who specifies their equipment needs: Shipboard Chief Engineers, Corporate Naval Architects, Marine Engineers, Ship Management and Crewing Companies, or Salvage Operators?

When launching new maintenance based products, you can approach various ship chandlers, repair yard buyers, or you might go directly to the vessel's owner/operator purchasing agents. It is unlikely however, in today's busy world, that a maintenance product buyer will push a new technology. For new breakthrough technology products, you should search out reputable specialty marine product agents/distributors who work on a global basis. These firms look for novel ease of use, and efficiency improvement products to introduce to their clients. If your target is the new construction mar-

ket, focus on those who specify and review marine systems. Vessel owner/operators and shipyards have engineering departments that can be approached. You may also want to consider introducing your concept to an innovative Naval Architect or Marine Engineering firm. Marine experts can provide insightful recommendations to improve your offering.

Applications and Strategies:

Most Marine Industry applications have tried and true solutions including compressed air filters for pneumatic equipment, hydraulic fluid filters for anchor windlass, towing winches and cranes, boiler feed water treatment, engine oil and fuel oil pre treatment. While there is room for improvement in these devices, it might be difficult to get a buyers attention. Devices such as extended life or self cleaning filters that will reduce the ships need for onboard stock have promise. Small innovative manufacturers who want to enter the market with new ideas and concepts might focus here. The entrenched larger competitors may not fight as hard to protect these mature, lower margin segments.

Solutions that focus on regulatory issues or large capital equipment also require new approaches. These include: Oil pollution prevention, ballast water treatment, HVAC cabin air, gas liquid separation, drinking water, electronic equipment cooling, environmental remediation, and bilge water treatment.

Possible "new technologies" include: Improved centrifuges, gas liquid separa-

tors, scrubbers, emulsion breakers, mist eliminators, self cleaning pre-filters, reverse osmosis, ultrafiltration, micro-filtration, and ceramic membrane systems.

It is my opinion that new technologies can be positioned to replace the less robust solutions of the past.

Seawater System Considerations:

The wide range of operational parameters onboard ships make for interesting design challenges. Ships are mobile factories and they use seawater to serve their cooling systems, ballast systems, and fire fighting needs. Natural ocean water has a pH of 8.2 – 8.4, a specific gravity of 1.02 – 1.03, and salinity of near 36,000 ppm (mg/l). Ambient temperatures range from below 32F to 104F depending on the geographical location of the ship. Near Shore water (littoral) and Open Ocean water offer remarkably different total suspended solid loading challenges. The variability of solids loading generally makes seawater filtration more difficult in port than out at sea. High levels of silt loading found while ships are in ports near river deltas can overload seawater systems designed for lower

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Last year, the US Navy tested seven different commercial systems as candidates for use as desalination pre-filtration devices.

ppm expectations. For the filtration engineer, the solution is to develop an appropriate design criteria including: maximum and minimum temperature, total dissolved and suspended solids loading, as well as the expected maximum particle size.

In cooling processes, seawater corrosion presents unique challenges. A review for potential crevice corrosion, stress corrosion, and localized pitting must be performed. Even type 316 stainless steel pits when the process flow velocity is below 3 feet/second. Wetted components on commercial seawater systems are often made from stainless steel, FRP or PVC. US Navy combatant ships use titanium or 90/10 copper nickel.

Another major concern in seawater systems is marine growth bio-fouling. Materials that are in contact with seawater must resist marine macrofouling from Mollusks (mussels, oysters) and barnacles. Ships that operate in freshwater (Great Lakes) must also consider fouling from Asiatic Clams and Zebra Mussels.

Ablative and Leaching antifouling coatings are used successfully for coastal seawater structures and offshore platforms. Other technologies include chemical injection systems and thermal sprayed coatings.

General Marine System Design Considerations:

The very nature of marine operations creates distinctive design challenges. Shipboard machinery is expected to remain 100% operational in rough seas. It is not uncommon for ships to continue their mission in sea states producing 50 feet swells. Many vessels will work in equatorial as well as arctic climates. During North Atlantic and Arctic voyages equipment icing requires special consideration. Often salt spray environmental tests are performed for equipment that will be installed on deck. It is not uncommon to see shock, inclination, and vibration testing listed as pre-delivery

purchase order requirements. These are often used to validate equipment for specific marine applications.

To be successful, these unique industry factors must be considered in the design, fabrication and installation of any sea going equipment.

Quality and Regulatory Considerations:

As in other large industries sectors, the Marine Industry has its own regulatory bodies. In the USA the US Coast Guard (USCG) and the American Bureau of Shipping (ABS) review proposals for shipboard installations. At times the US EPA, NOAA or other US governmental groups with specific jurisdiction may require special review submittals. Internationally, many countries have their own classification societies. Major Classifi-

cation societies include: Bureau Veritas (BV), Det Norske Veritas (NV), Hellenic Register of Shipping (HR), Lloyds Register, Nippon Kaiji Kyokai (NKK), and Registro Italiano Navale (RI).

Conclusion:

The Marine Industry is ready for innovative product and system solutions. It is our responsibility as filtration and separation specialists to uncover and meet these challenges. Opportunities are often as simple as taking a solution from an existing industry and modifying it for a new industry application.

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