Advanced Manufacturing : Seawater

The Objective

Design a submersible heat exchanger capable of operating under seawater conditions at 5500 psi, while managing multiple thermal scenarios.
The system needed to handle a flow rate of 2.5 GPM and accommodate temperature ranges of 137°F–122°F, 128°F–113°F, and 119°F–104°F, all while ensuring corrosion resistance and long-term reliability in a harsh marine environment.

The Challenge

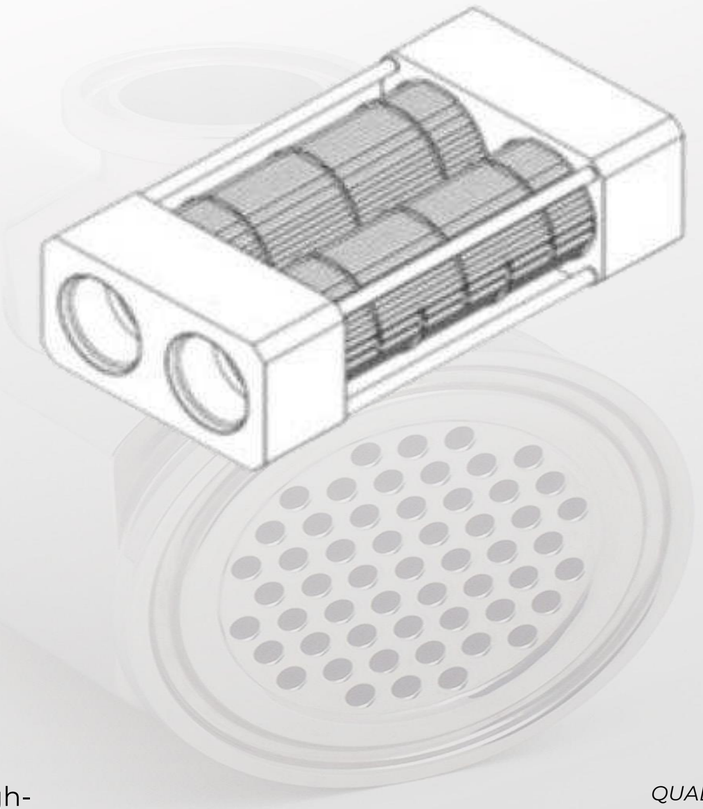
Operating under deep-water pressure (5500 psi) presented a major engineering challenge, requiring a heat exchanger that could maintain structural integrity and efficient thermal performance in corrosive seawater.
Conventional materials would quickly degrade in such conditions, risking leaks or performance loss.
The customer also needed a custom-built configuration capable of maintaining stable performance across three unique thermal operating conditions—each with strict flow and temperature requirements.

The Solution

Exergy designed a custom shell-and-tube heat exchanger (54 Series) specifically engineered for underwater operation and seawater exposure.
The system was constructed using Hastelloy C-276, a premium corrosion-resistant alloy ideal for extreme marine environments.
Key attributes included:

- All-welded construction for maximum pressure containment
- Custom geometry to meet multi-scenario thermal requirements
- Optimized tube design for 2.5 GPM flow consistency
- Fully corrosion-resistant materials for long service life

This solution provided reliable performance in deep-sea environments where both pressure and corrosion resistance are critical.



The Results / Benefits

The Exergy underwater Hastelloy heat exchanger successfully managed all three operating scenarios with precise temperature control and zero corrosion-related degradation.
Its robust design ensured safe operation at 5500 psi and long-term reliability in seawater conditions, significantly reducing maintenance and downtime.
This case highlights Exergy's proven ability to engineer custom, corrosion-resistant heat exchangers for high-pressure marine and subsea applications—delivering durability, efficiency, and confidence under the most extreme environments.

ISO 9001:2015 CERTIFIED
QUALITY MANAGEMENT SYSTEM