

Submersible Heat Exchanger for Deep-Sea Seawater Conditions

A custom-engineered shell-and-tube heat exchanger designed to operate at **5,500 psi** in corrosive seawater environments delivering precision thermal control across three demanding operating scenarios.

The Objective

Design a submersible heat exchanger capable of operating under seawater conditions at **5,500 psi**, managing a flow rate of **2.5 GPM** across three thermal scenarios:

- 137°F → 122°F
- 128°F → 113°F
- 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 presented a major engineering challenge maintaining structural integrity and efficient thermal performance in corrosive seawater.

- Conventional materials degrade rapidly under such conditions
- Risk of leaks or performance loss without specialized alloys
- Three unique thermal operating conditions with strict flow and temperature requirements

The Solution

Exergy designed a custom **54 Series shell-and-tube heat exchanger** constructed from **Hastelloy C-276**, a premium corrosion-resistant alloy ideal for extreme marine environments.

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

5,500

PSI Operating Pressure

Deep-water rated structural integrity

2.5

GPM Flow Rate

Consistent across all thermal scenarios

3

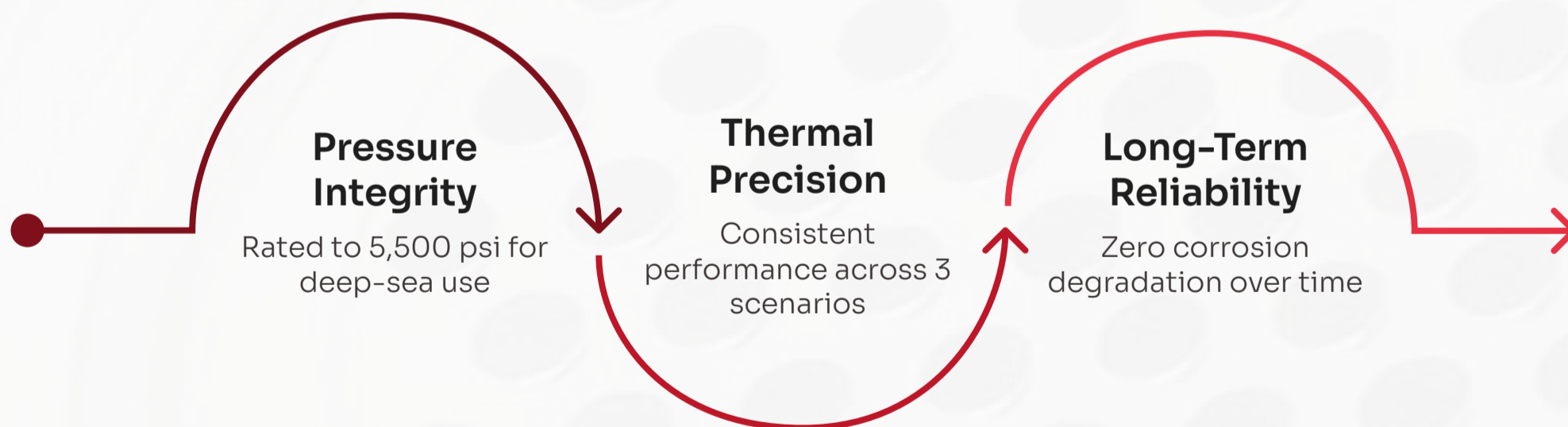
Thermal Scenarios

Precisely managed temperature ranges

0

Corrosion Degradation

Zero corrosion-related failures recorded



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 5,500 psi and long-term reliability in seawater conditions, significantly reducing maintenance and downtime — demonstrating Exergy's proven ability to engineer custom, corrosion-resistant heat exchangers for high-pressure marine and subsea applications.

✔ 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.