

Corrosion-Resistant Heat Exchanger Solution for Aggressive Chemical Environments

A customer required cooling solutions for highly corrosive process fluids — including LiOH (6 M), HCl (3 M), H₂SO₄ (3 M), and LiCl (4 M) — that were incompatible with standard 316L stainless steel. Budget constraints ruled out Hastelloy® for four heat exchangers and a chiller, demanding a more cost-effective path to equivalent corrosion performance.

The Challenge

- Highly corrosive fluid matrix spanning both extreme-pH bases (LiOH, 6 M) and strong acids (HCl, H₂SO₄)
- Standard 316L SST incompatible with process chemistry
- Previous Hastelloy® components exceeded budget for a 4-unit + chiller configuration
- Compact form factor and lightweight installation required

The Solution

Exergy 23 Series Shell & Tube Heat Exchanger, Model 05211-01 — coated with **SilcoTek® Dursan® 2500**

- 8-inch shell length, 0.58 sq. ft. heat transfer surface area
- Under 2 lbs — compact and easy to install
- Base material: 316L SST with Dursan® 2500 CVD coating
- Hastelloy®-equivalent corrosion resistance at a fraction of the cost

Dursan® 2500 Coating Performance

Exergy collaborated with SilcoTek® to apply Dursan® 2500 — a chemical vapor deposition (CVD) coating engineered for aggressive chemical service. Soak testing validated performance across the full pH spectrum of the customer's process fluids, confirming suitability before field deployment.

High-pH Durability

Engineered to withstand strong alkaline environments, including 6 M LiOH — a condition that degrades uncoated stainless steel rapidly.

Acid Resistance

Up to **160× improved corrosion resistance** in 6 M HCl at room temperature vs. bare 316L SST, validated through soak testing.

Full-Spectrum pH Coverage

Single coating solution addresses both acidic (HCl, H₂SO₄, LiCl) and basic (LiOH) chemistries eliminating the need for multiple material grades.

Cost vs. Hastelloy®

Matches Hastelloy® corrosion performance at significantly lower material cost, enabling the full 4-unit + chiller scope within budget.

160×

Corrosion Resistance

Improvement in 6 M HCl vs. bare 316L SST

<2 lbs

Unit Weight

Compact 23 Series, 8-inch shell length

4

Heat Exchangers

Delivered within budget constraints

0.58

sq. ft. Surface Area

Heat transfer area per unit

👉 **Outcome:** The Exergy + SilcoTek® Dursan® 2500 solution delivered full corrosion resistance across all four process chemistries, met compact installation requirements, and remained within budget — providing a validated, cost-effective alternative to Hastelloy® for long-term reliability in corrosive service.