

Semiconductor: Cooling Nitrogen

Exergy's compact Shell & Tube Heat Exchanger engineered to cool nitrogen gas from **160 °C to below 50 °C**, delivering reliable thermal performance for demanding semiconductor applications.

160°C

Inlet Temperature

Nitrogen gas entering the heat exchanger

<50°C

Outlet Temperature

Target achieved using 10 °C cooling water

260 lpm

Flow Rate

High-volume nitrogen gas stream

2–4 bar

Inlet Pressure

Operational pressure range maintained

The Challenge

Cooling a high flow rate of nitrogen gas (260 lpm) while meeting strict temperature reduction targets and maintaining compact equipment size was the key challenge. The solution also needed to withstand operational pressures between 2 and 4 bar, while providing long-term durability and minimal maintenance.

The Objective

The customer required a reliable and compact solution to cool a continuous stream of nitrogen gas from 160 °C down to below 50 °C. The cooling process needed to be achieved using water at 10 °C, with the inlet pressure ranging between 2 and 4 bar.

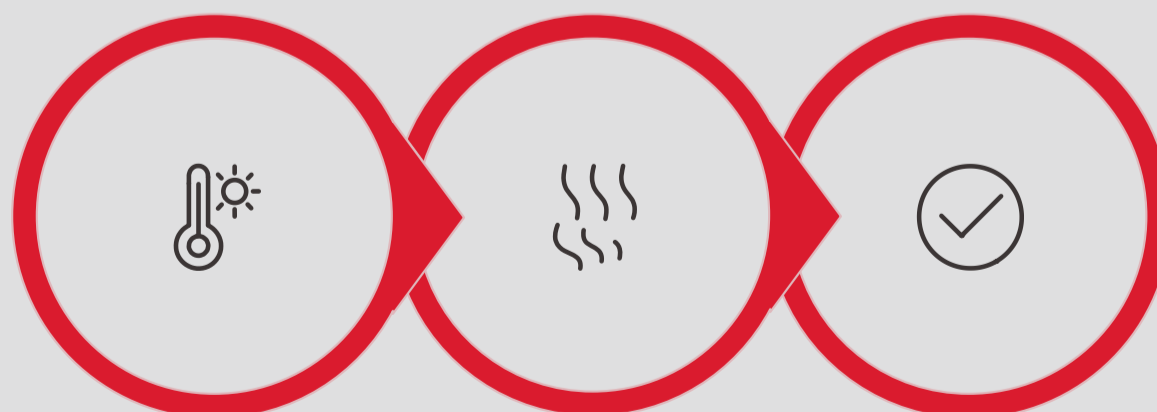
The Solution

Exergy provided a sanitary **Shell & Tube Heat Exchanger, Model 00540-01** from the 23 Series. Constructed entirely of **316L stainless steel**, the heat exchanger featured:

- Compact 8-inch tube length
- 1-inch shell diameter
- 0.58 ft² of heat transfer area
- Full sanitary design for semiconductor environments

The Results & Benefits

- Successfully cooled nitrogen from 160 °C to below 50 °C
- Seamless integration due to compact footprint
- Long service life with minimal maintenance
- Consistent performance across varying inlet pressures (2–4 bar)



Challenge

Solution

Result