

Semiconductor : Cooling Nitrogen

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 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 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 a compact design with an 8-inch tube length, 1-inch shell diameter, and 0.58 ft² of heat transfer area.

The Results / Benefits

The Exergy heat exchanger successfully cooled the nitrogen gas stream from 160 °C to below 50 °C using water at 10 °C. Its compact footprint allowed seamless integration into the customer’s system, while the durable stainless steel construction ensured long service life and minimal maintenance. The solution provided consistent performance under varying inlet pressures (2–4 bar).

Conclusion

Exergy’s compact Shell & Tube Heat Exchanger met the stringent cooling requirements for nitrogen gas, delivering reliable thermal performance, robust design, and ease of integration. This case study highlights Exergy’s ability to engineer efficient and durable heat transfer solutions for demanding gas cooling applications.



**ISO 9001:2015 CERTIFIED
QUALITY MANAGEMENT SYSTEM**