

Case study: Air Treatment
TransCanada Pipelines
Saskatchewan, Canada

BENEFITS

- Increased turbine efficiency
- Compact design
- Accommodates rapid temperature ramp
- Utilization of existing "free" heat source
- Low pressure drop

Thermo-Z® heat exchanger recovers heat from turbine exhaust and reheats inlet air in a severe environment

Increasing Turbine Horsepower in a Harsh Environment

TransCanada Pipelines pumps natural gas through underground pipelines from production facilities in western Canada to consumers in eastern Canada and midwestern U.S. states. Gas generators drive power turbines, which in turn drive compressors that compress natural gas to transmit it across the country.

Pipeline engineers learned long ago that these gas generators run more efficiently with their inlet air above 70°F. "Once you hit cold weather, you lose efficiency," says Marie Standing, senior mechanical engineer with TransCanada. To remedy low efficiencies during winter months, a Munters Thermo-Z® heat exchanger was installed on a turbine exhaust at the Compressor Station in Saskatchewan. The heat exchanger recovered heat from the turbine exhaust and used it to preheat a portion of the inlet air to 385°F. This in turn mixed with the remaining cold inlet air to bring the entire inlet airstream up to 75°F, reducing the horsepower needed to operate.

However, TransCanada also learned that because the turbines ramp up quickly to an operating temperature of over 1000°F,

turbine operation created a severe environment for heat exchangers. They originally used a heat exchanger from another manufacturer, but it failed after only three months of operation.

Standing says the quick ramp-up is inherent in turbine operation and hard to control. TransCanada couldn't reduce the startup rate because it would have held back operations on each startup. In response, Munters designed a special Thermo-Z heat exchanger that

accommodates rapid thermal expansion. A heat exchanger that can withstand such severe conditions is uncommon in the industry.

TransCanada now uses the heat exchanger for three to five months out of the year, and as Standing says, "It may not sound like much, but when you add up the number of days, it's quite a bit." With the success of this trial, the company plans to add a heat exchanger to other compressor station turbines.

