

NETZSCH Provides Custom Diluent Injection Pumps for Major Energy Transporter

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With a goal of reaching the highest operational efficiencies at the storage facility, the customer was looking to install a pumping system that would take the heavy crude oil from the tanks and blend it with diluents to lower the viscosity of the crude oil to be pumped to the main pipeline for distribution.

Viscosity variability requires greater injection control of diluent

As the crude oil sits in storage tanks over a long period of time, lighter product settles to the top the heavier product to the bottom. NETZSCH noted, “Crude oil is drawn off the bottom of the tanks first and this is where most amount of diluent injection is required. As the product changes in viscosity there is a constant need to adjust the amount of diluent being used. NETZSCH approached the design of this pumping system with progressing cavity pumps to take care of operating issues associated with constantly changing viscosity.”

Custom pump design required

A critical design issue was the extremely cold operating temperatures during the winter months. With ambient conditions of -22 to -40 °F / -30 to -40 °C and diluent temperatures as cold as -8 to -13 °F / -22 to -25 °C, NETZSCH engineers needed to carefully consider the elastomer selection for this application. Because the NETZSCH progressive cavity pumps would operate outdoors, it was determined to use a reduced wall stator with heat tracing to insure that a 23 to 32 °F / -5 to 0 °C operating temperature was maintained within the elastomer. In addition, three resistance temperature detectors (RTD) were to be mounted in each pump to provide feedback data to the control system.

To compensate for the cold temperatures, NETZSCH designed a rotor that is slightly oversized in order to keep the interference fit at sub-zero temperatures. This presented an additional hurdle at assembly time. The solution for assembling a stator on an oversize rotor was to pack the stators in ice in order to make assembly possible.

By using four custom-designed progressing cavity pumps piped to a common header NETZSCH was able to provide the customer with the level of diluent injection control that he were looking for. With the NETZSCH system, the customer has the ability to run anywhere from one to all four pumps and with the use of VFD's one will have complete control over diluent injection. The large pump size (one the largest ever built by NETZSCH) also allows the customer to run the pumps slower for a longer life cycle – a critical maintenance advantage in the extremely cold operating environment.

For more than 60 years, NETZSCH Pumps & Systems has served markets worldwide with its NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, NOTOS multi screw pumps, grinding machines, barrel emptying units, dosing technology and accessories, providing customized, sophisticated solutions for applications in every type of industry. With a workforce of more than 2,000, Pumps & Systems is the largest business unit in the NETZSCH Group alongside Analysing & Testing and Grinding & Dispersing with an annual turnover of more than 240 Mio Euro (Business year 2014).

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Extreme cold, harsh operating conditions and the need for low maintenance drove NETZSCH engineers to develop custom-designed components and unique assembly procedures to satisfy customer requirements.

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