



Rail Car Unloading Solution with NOTOS® Pumps

CRUDE OIL UNLOADING AT TERMINAL

Requirements for a low noise and high flow positive displacement pump needed

A major industrial rail terminal operator in the United States initially wanted to improve the noise level and operation of a rail car unloading pump for crude oil at their facility.

The tank terminal design included a rail car unloading rack employing 3 gear pumps. Because these pumps were sensitive to changing weather conditions, they would vibrate which resulted in loud noise. Unfortunately, one pump was directly outside the manager's office and was extremely noisy (it was measured at greater than 100 decibels), prompting the Terminal Manager to contact a NETZSCH distributor to investigate pump replacement solutions.

The distributor contacted NETZSCH to assist with the pump selection. A visit was made to the rail car unloading facility to review that pump installation and to get an overview of the system requirements.

During the visit, it was discovered that the terminal not only wanted to replace that specific noisy gear pump,

but all 3 gear pumps used on the rail car unloading rack. This rack is basically a fixed structure, such as a platform or gangway allowing workers to safely access the rail car at the height needed for their application.

The initial quote was for a solution that was quiet, no leak, no vibration and offered a faster unload operation but the order was not quickly placed by the customer. After a time, NETZSCH learned that the terminal was in the process of designing 2 more unloading racks with 2 pumps per rack and so would require 6 new pumps. Consequently, another visit was scheduled to discuss the expansion project and what solution NETZSCH could offer.

New operating parameters were established. These included a greater viscosity range of the crude oil product and a desired higher flow that this terminal wanted to incorporate as part of their growth. The request to completely empty the rail cars was very important to the customer.

The API grade of the incoming crude oil at this terminal could be as low as 10 API and as high as 52 API which is a significant variation in viscosity ruling out a centrifugal style pump. This significant variation in product viscosity would also cause changes in the system pressures during unloading. Temperature changes could also change the viscosity of the product. *Coupled with the fact that the customer wanted to strip the rail cars, the NOTOS® 4NS Multiple Screw Pump, a positive displacement style pump with no metal to metal contact was definitely the best pump type for this crude oil rail car unloading project.* Along with this, the pump had to meet API 676 requirements.

As a result, a new pump choice—a NOTOS® 4NS pump—was chosen as the best pump selection for the rail car unloading application.

During the project timeline the terminal facility changed terminal managers, project managers, and engineering companies. This added a significant



NETZSCH proposed double mechanical seals with an API 54 seal plan that provided protection from a range of viscosities.

amount of complexity and it became a priority to continue developing relationships with each of these new individuals and companies.

Ultimately, the NETZSCH 4NS NOTOS® Multiple Screw Pump (MSP) was selected.

Stripping railcars, the process of draining each rail car until all fluid is removed, can cause a pump by itself to run dry (without fluid) for short periods of time. The 4NS pump can run dry without damage to the pump seals.

NOTOS® 4NS Multiple Screw Pumps are designed to operate at the most rigorous environmental conditions,



NOTOS® 4NS Cutaway

emptying train tank cars, tanker trucks and tank ships with low or high viscous products. The NOTOS® 4NS also:

- 1) Has a low NPSHr, therefore the pump can operate without cavitation.
- 2) Can run at high efficiency regardless of viscosity of the crude oil being pumped thereby lowering operating cost.
- 3) Have several optional mechanical seals including single, double, cartridge and packing gland.

With these benefits and all of the presentations and training, the customer selected NETZSCH to provide the NOTOS® 4NS pumps for their rail car unloading project.

Rail Car Unloading Pumps Data

Pump type:	NOTOS 4NS1548/16H4E
Flow Rate:	950 gpm / 216 m ³ /hr
Pressure:	75.4 psi / 5.2 bar
Medium:	Crude oil at grades from API 10 to 52
Temperature:	up to 170° F / 77°C

Contact NETZSCH:

NETZSCH customers rely on our rigorous standards in design, engineering and manufacturing to deliver products with absolute functional reliability and exceptional quality. NETZSCH service, like NETZSCH quality, is geared to surpass our customers' expectations.

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