Process Engineering
Division

GEA Jet Pumps GmbH

Press release

Jet mixers for an 80,000 m³ crude oil tank

The filling of a large-volume crude oil tank originates from several supply ships. Since each oil batch has a different density, the oil tends to stay in layers. Some of the heavy components settle down in the tank.
With a tank diameter of 80 meters and a height of 20 meters it is difficult to get a proper homogeneous crude oil mass without mixing the content. Shaft-driven mixers entering the wall of the tank have difficulties in mixing the tank in a reasonable period of time. Other ways of mixing, e. g. with air, result in air pollution due to contaminated air bubbles, which should be avoided.

In close cooperation with the customer, GEA Jet Pumps have designed a jet mixing system ***(fig.).*** Several jet mixers are installed inside the tank. The oil itself is used as motive medium, i. e. the existing discharge pumps suck off the oil from the tank and convey it into the jet mixers as motive medium. The motive jets mix with the oil in the tank and create a circulating mixing stream.
Based on the adequate number and arrangement of the jet mixers, a three-dimensional flow is produced in the tank, which mixes the whole of the contents without producing a rotating motion.
For establishing the number of mixers required, the following criteria are taken into account: geometry and size of vessel or tank, type of liquid to be mixed, mixing time and maximum and minimum liquid levels.
Even if the viscosity in the 80,000 m³ tank varies between 200 and 800 cSt and the specific weight between 850 and 1,040 kg/m³, it takes about 4 hours of jet mixing to achieve the required homogeneity. This situation will remain stable for more than a week.

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For the customer and for GEA Jet Pumps it
was a big challenge: once closed, the tank will not be opened for 10 to 15 years. Therefore, the system has to perform a maintenance-free operation for such a long period of time. For this reason, jet mixers are perfectly suited as they are simple and reliable, having no moving parts and being hardly subject to any wear and tear.