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Opinion Article

Analysis of the Crude Oil Production and Evaluation of Viscosity

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DESCRIPTION

Crude oil transmission is an important part of oil production. Deep within the formation, crude oil is in an emulsification condition that creates very minute amounts of both "oil-water" and "water-oil" mixtures. Crude oil's water content varies across development blocks and is an important metric for assessing oil field yield. It can be divided into five levels: ultra-low (20% or less), low (20% to 40%), moderate (30% to 70%), high (70%) and super-high (90%). Crude oil that has been emulsified with water frequently has contaminants including related gas and sulphides. Before resolving and fracturing the emulsified state, the yield must be measured. To produce the initial separation of oil, water, and gas, the three-phase flow of emulsified oil-water-gas produced from the oilfield is communicated from the metering room to the transfer station and enters the settlement tank with demulsifies.

The oil transfer pump unit typically consists of a centrifugal pump and a high-power explosive decompression motor. During production, the oil transfer pump unit will definitely make noise while functioning. The motor's electromagnetic and aerodynamic noise, the centrifugal pump's liquid-dynamic noise, and the mechanical noise of the unit operation are all included in the total operating noise. In actuality, the flow-solid interaction noise and fluid turbulence noise are the two main ways in which the liquid-dynamic noise is reflected during normal operation of the unit. Water is used as the fluid medium to examine the liquid-dynamic noise in a centrifugal pump because its viscosity is constant. The aqueous medium is thought to be an incompressible fluid. The viscosity of the crude oil fluid medium for the two-phase flow of oil-water conveyed in the oil transmission pump varies with the working temperature, pressure, and water content. Using the ansys fluent numerical simulator, this paper investigated the effects of viscosity variations on the static pressure distribution and the transient properties of the crude oil in the oil transfer pump. The relationship between the flow field pressure distribution, the accompanying noise frequency spectrum distribution, and the viscosity of crude oil is established using our option of being able. As a result, the impact of crude oil's viscosity on the properties of liquid-dynamic noise is precisely characterized.

Analysis and calculation the viscosity of crude oil, the main factors influencing the viscosity of crude oil. The fluid temperature, transmission pressure, crude oil water content, and fluid density are the primary variables that affect the viscosity of crude oil used a high temperature, high pressure device technologies to measure the viscosity of crude oil using the falling ball test method while varying the water content and crude ratio. This is the established exponential connection between crude oil viscosity and fluid transmission temperature when both the fluid transmission pressure and the water content of the oil remain constant with increased pressures, the viscosity of the oil-water two-phase flow mixture increases, and the rise in viscosity is linearly correlated with the change in pressure. With an increase in pressure, the viscosity of the three-phase combination of gas, oil, and water initially decreases.

Simulation and analysis for the liquid dynamic noise of crude oil transfer pump unit construction of the Reynolds-averaged navier stokes turbulence modeling inside the centrifugal pump volute shell. Consumers specialize on the transfer of crude oil. We investigate how the internal flow field's viscosity affects the properties of liquid-dynamic noises in accordance with the connection between the viscosity and water content of crude oil. The principles of conservation of mass, velocity, and energy must be observed by the flow of crude oil in the centrifugal pump. Using the definition of the fluid mass conservation law, the net mass moving into a micro fluid system equals the mass increase the system receives each second.

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