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Monosep™ High-flow Walnut Shell Filtration System

Siemens Water Solutions offers a complete line of products to remove oily contaminants from water. Our Monosep™ high-flow walnut shell filter offers improved technology in walnut shell filtration. The proprietary filter design requires no moving equipment to perform backwashes, and greatly reduces the volume of backwash water produced when compared to other walnut shell filter designs. This simplifies the design of the filter, reduces the weight and footprint, and lowers the cost of multiple filter systems.

Applications

Walnut shell filtration was developed as a more suitable method of filtering free oil and suspended solids in applications where sand filters have traditionally been used. Today, walnut shell filtration is used to treat oil field produced water, refinery wastewater, steel mill direct spray and caster water, ethylene plant quench water, copper concentrate decant and cooling water. In addition, due to the reduction in backwash water volume and reduction in weight and footprint, this redesigned filter is suitable for many off-shore oil production applications.

Principle of Operation

The Monosep™ high-flow walnut shell filter uses a deep bed of 100 percent black walnut shells, which have excellent surface characteristics for coalescing and filtration, plus superior resilience to attrition. The filter's deep nutshell bed (66 in., 168 cm) offers superior effluent quality, longer filtration runs, and greater throughput efficiency. The filter uses raw process water and gas or air for backwashing, eliminating the need for moving mechanical equipment or external scouring equipment. The filter operates at twice the flux rate of conventional sand filters in the same application, and can remove over three times the amount of solids before needing to be cleaned.

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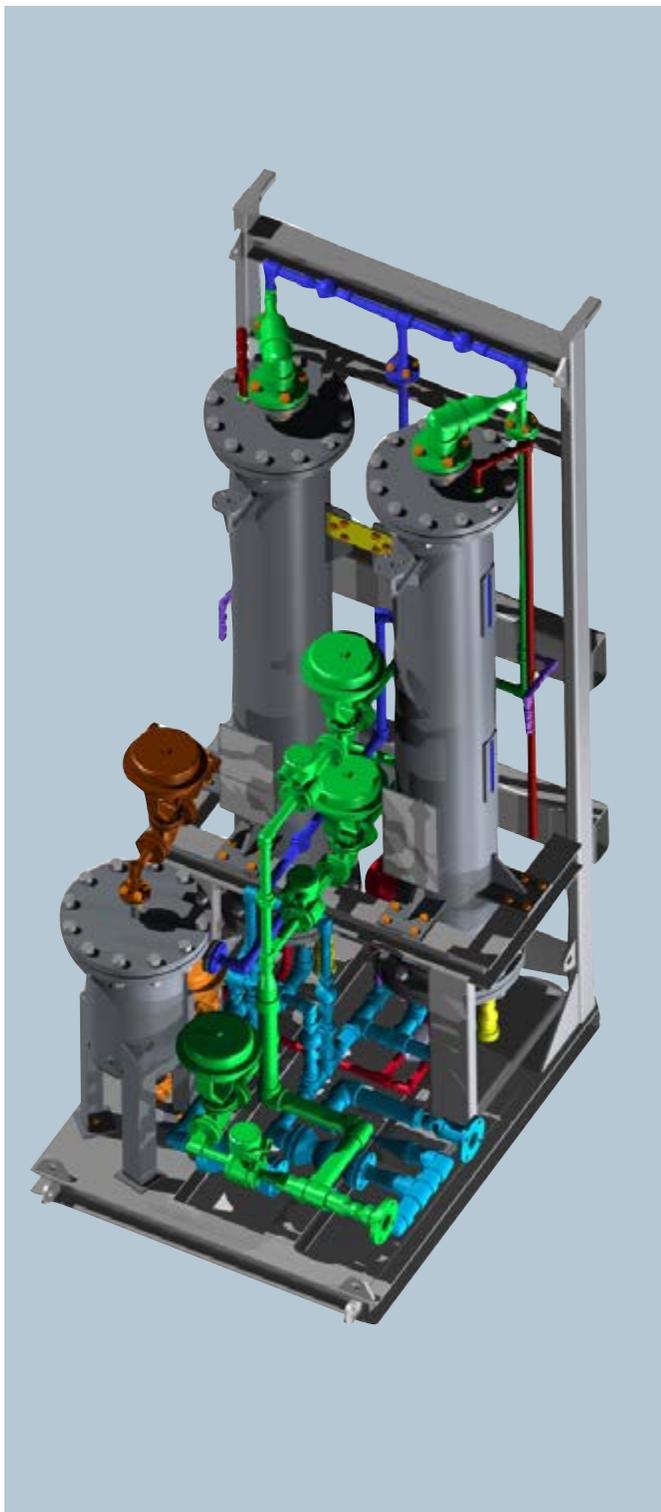
Filter Operation

During the filtration cycle, dirty process water passes through the filter from top to bottom. As the water passes through the walnut shell media, free oil and suspended solids are removed. After 24 hours of filtration, the dirty process water is redirected and pulsed into the bottom of the vessel to fluidize the media bed. In addition, air or process gas is added in a proprietary manner to create an airlift pump.

The airlift pump lifts the contaminated media to the top of the vessel where the turbulence of the backwash water and gas separates oil and suspended solids from the walnut shells. The use of air or gas greatly reduces the amount of backwash water required. The mixture of air or gas and backwash water is separated in an external vessel. One separator vessel can be used for multiple walnut shell filters. Upon completion of the backwash cycle, the flow of dirty process water is again returned to the top of the vessel.

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