

Process Notes



Which do you want?

Processing Heavy Canadian Crude

Reducing crude oil cost is the major incentive driving crude and vacuum unit projects to handle heavy Canadian crudes. But such crudes—Albian Heavy, Christina Lake, MacKay River and others derived from oil sands—today present refiners with a unique set of problems not just because of extra-low API gravity, but also because of asphaltenes, vanadium and nickel, high solids content and extremely high viscosity vacuum residues.

To process such crudes reliably over a 4-5 year run length, and to maximize product yields and quality, demands fundamentally sound process and equipment design. And some features are unique.

Design of the vacuum unit is critical. Every component is important: the charge pump, the heater, the transfer line, the column, its internals and heat removal network, its ejector system. All are interdependent and must be integrated into a unified whole. Balancing performance against cost is critical. But what makes it particularly

difficult is the need to impart processing flexibility because the crude supply situation is still evolving. While typical crude unit designs assume fixed feed quality based on a given assay, the prudent designer accepts the fact that Canadian crude quality could vary significantly. The job is to determine the balance between operating flexibility and capital cost to maintain satisfactory product yield, quality and run length.

Some oil sands crudes produce heavy vacuum gas oil with total acid number (TAN) of 5-6. This means proper metallurgy selection may make the difference between being able to process low cost crudes and having to compete for low TAN feedstocks. A need for 317L stainless in some of the circuits, for example, drives home the point that specifying equipment solely on a heat and material design case and lowest initial investment is futile and ultimately costly. There is no room for value engineering as currently practiced.

In designing crude and vacuum units to process heavy Canadian crudes there is no getting around the fact that they are dirty, difficult and demanding of expertise based on experience and know-how.



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