KBR Asphaltene Integrated Management System (AiMS™)

BENEFITS OF AIMS

Combined with the market leading, cost effective ROSE® process, costs ~25% less than a Coker

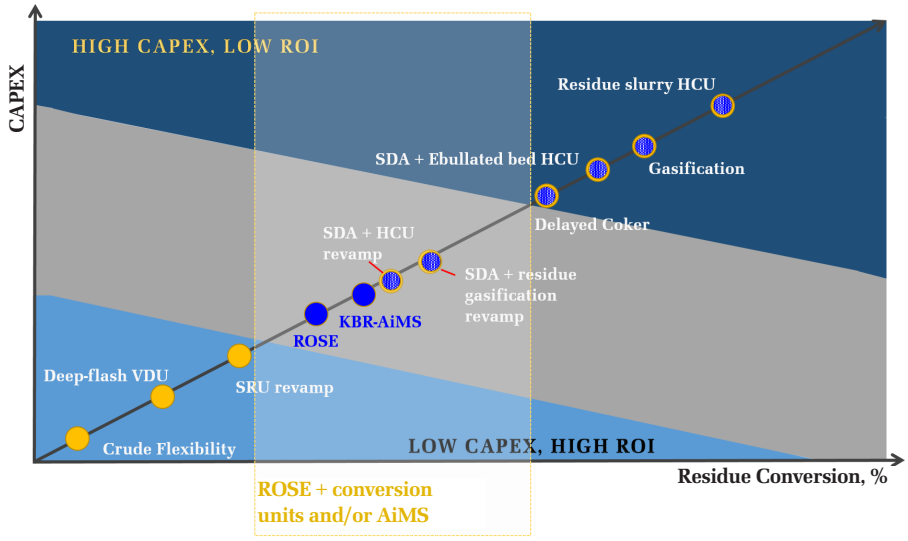
- Cost-effective solutions for reduction of fuel-oil exposure plus CAPEX and OPEX advantage
- As part of the AiMS services, our engineers work with you to design the best solution for your specific needs

SMOOTH OPERATIONS WITH ASPHALTENE MANAGEMENT

Asphaltene management is critical in every refinery to maintain the gross refinery margins (GRM) per barrel of crude oil. Asphaltenes are heavy liquids that are employed in different industries. The successful management of liquid asphaltene relies upon maintaining a pumpable viscosity. This requires a highly reliable and costly heat tracing system as any failure could lead to plant shutdown and loss of unit margin.

The pitch/residue stream or asphaltenes are produced as a by-product of vacuum-and atmospheric-residues upgrading processes in refineries, i.e. from processes such as SDA, slurry hydrocracking or certain ebullated-bed processes. In order to mitigate the problems associated with asphaltene storage, handling, and transportation, refiners employ KBR's Asphaltene Integrated Management System (AiMS™). The AiMS services offer a cost-effective, efficient, and commercially proven method of reducing liquid pitch and asphaltene to manageable solids in the form of flakes or pellets. With minimal investment, refiners can significantly make their lives simpler and their operations smoother, while adding commercial value to their residues by utilizing solidified asphaltenes as a suppliment for pet-coke.

Seamlessly integrate a cost-effective AiMS services scheme with other, complex residue upgrading processes



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KBR AiMS SERVICES

A unit with KBR AiMS engineering services includes a pumping station composed of two asphaltene pumps to assure liquid asphaltenes are being fed to form a solid product (flakes) through cooling. Each asphaltene solidifier consists of a cooled double-steel belt: a driven lower belt and an idling upper belt. The lower belt is cooled by spraying the underside with a full square pattern for maximum cooling efficiency. The upper belt is cooled by water fed by gravity. The cooling water system can operate on a closed loop, circulated by common pumps via plate heat exchangers linked to an external cooling water system.

The molten asphaltene feed is fed through hot jacketed pipes to the pelletiser machine's ribbon former mounted at the head of the lower belt. The ribbon former extrudes the hot liquid asphaltene onto the lead section of the lower belt. This section is enclosed to provide efficient exhaust air removal, which is evacuated by a vent system to a safe location.

The asphaltene is fed forward from the feed section by the driven lower belt into the gap separating the two belts and fed the full length of the cooling conveyor. The asphaltene, once in contact with the steel belts, is cooled by conductive heat transfer to the cooling water applied to both belts.

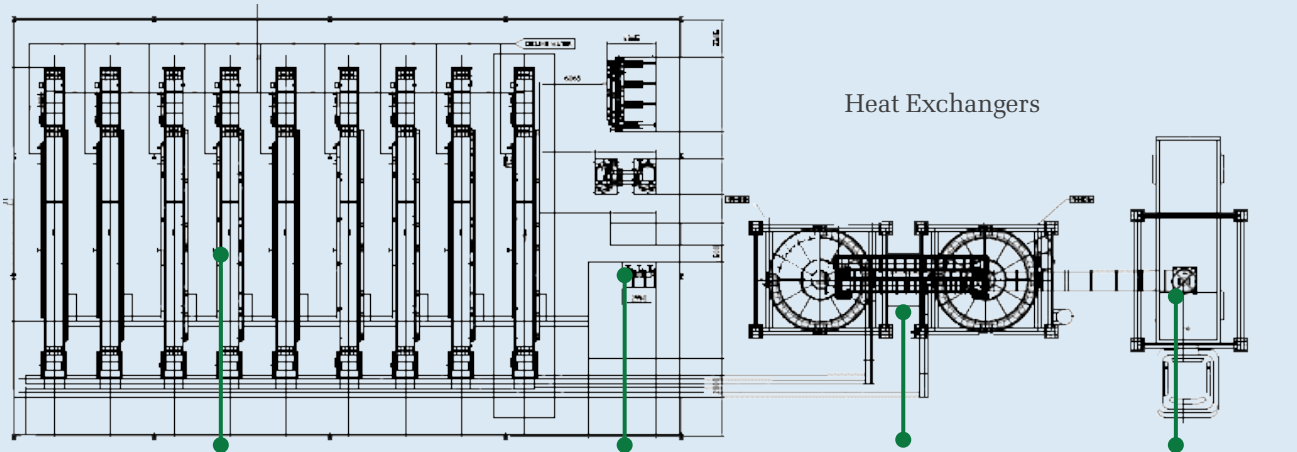
As the asphaltene travels the length of the cooling conveyor belt, the asphaltene solidifies. At the end of the cooling conveyor, the solid asphaltene is reduced to flakes by a pressure roller and discharged into a collecting conveyor by a fixed scraper installed inside the outlet chute. The collecting conveyor transports the asphaltene flakes from multiple asphaltene solidifiers to common storage.

AiMS GIVES A FULLY MODULARIZED UNIT

AiMS comes with a fully modularized unit with fool-proof integration of solidification belts, heat exchangers and water-pumping, silo-storage and truck-loading systems that occupy minimum space.

Modularization of the system minimizes risk while allowing its establishment on a shorter schedule and minimizing capital and operating costs. They are fabricated in a regulated shop environment that ensures efficiency and precision. Modules are subjected to careful scrutiny by subject matter experts during the entire life-cycle of their fabrication, ensuring highly reliable process assemblages that ensure safety and long unit life.

TYPICAL AiMS ENGINEERING SERVICES MODULE



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