

COKING

**Overview** The delayed coking process is one of the most important conversion techniques being used to convert today's heavy residue oils to transportation fuels. Petroleum residues are used as a feedstock for coking. One of the main products of Delayed Coking is Heavy Coker Gas Oil (HCGO), often processed in a downstream catalytic unit (such as a HCU).

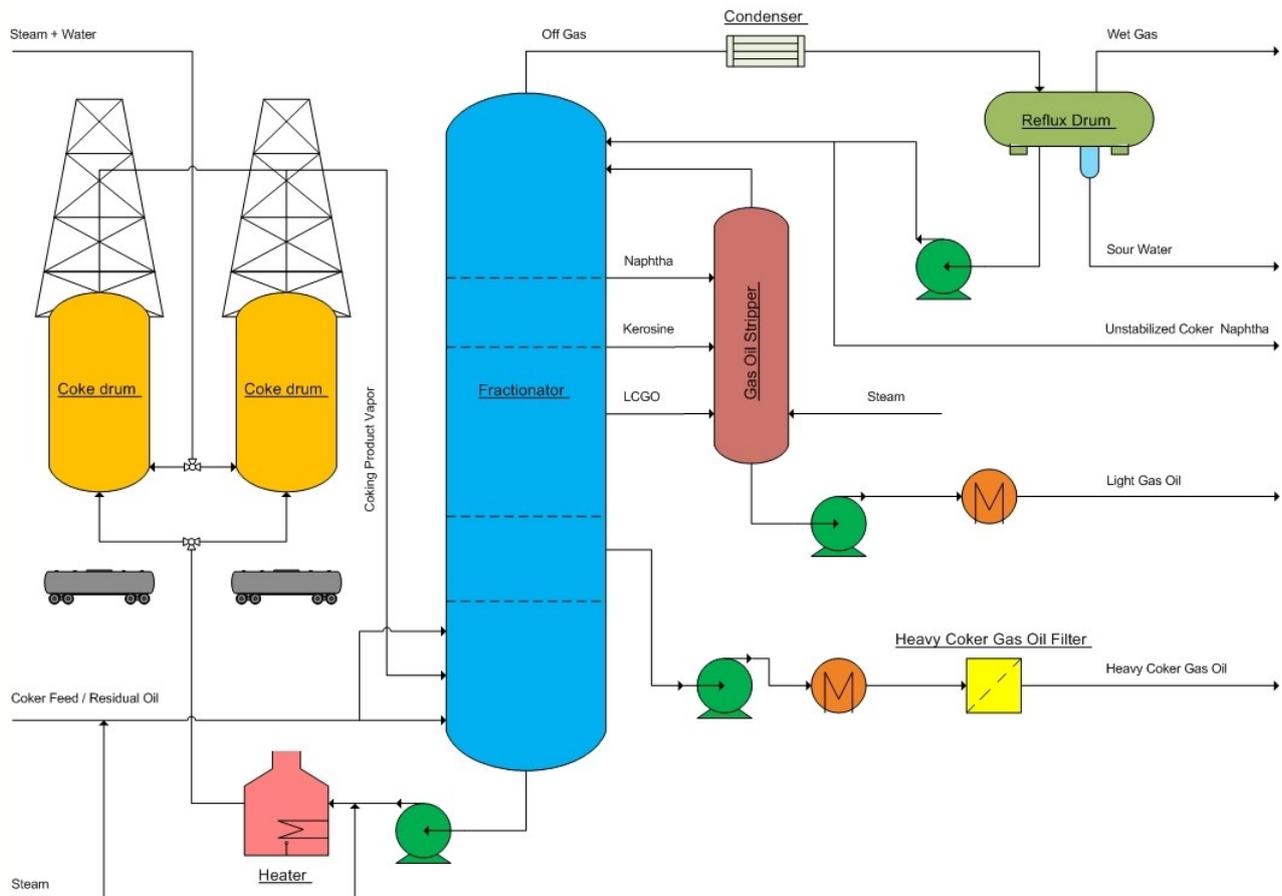
HCGO product consists of heavy (polyaromatic) hydrocarbons, predominantly in the range of C13 to C60. The heavier ones are so called asphaltenes, in the shape of long, un-cracked (cyclic) hydrocarbon chains. Asphaltenes can form larger hydrocarbon structures which can precipitate on the surface of

HCGO FILTRATION

filtering media. HCGO product also often contains fine coke particles which, on penetrating filter media, might cause plugging and poses a big threat for reliable operation.

In this respect, a robust and reliable filtration system is required. Not only to prevent fouling of the filtration system itself, but also to prevent any of your downstream equipment and catalyst beds.

DAHLMAN has performed extensive field testing and as a result, our proven HCGO filtration technology is nowadays available on industrial scale, for reliable and safe operation in your refinery.



Coker Process Flow Diagram

**Process Description** The HCGO filtration package is fed with straight-run HCGO. Once the filter's delta P has reached its pre-set value after normal filtration mode, the package its cleaning sequence is automatically started. The feed and filtered product connections are both closed and subsequently, the valve connecting a gas accumulator will open towards the HCGO filter vessel. This results in pressurization of the HCGO contained in the filter vessel. When a quick-opening valve installed below the filter vessel opens, the gas pocket pressurizing the HCGO from above rapidly expands. This results in a

reverse flow of the HCGO, from the outside to the inside of the filter elements. As a consequence, the collected particles/filter cake (cokes, asphaltenes), dislodges over the entire surface of the filter tubes. The filtered liquid is even forced further back by the expanding gas, transferring the separated solids to the backwash receiver vessel in a matter of seconds. Dahlman's gas-assisted backwash technology eliminates channeling and incomplete cleaning. It is considered to be one of the most effective and efficient *in-situ* cleaning methods.

Features	Benefits
Skid mounted package supply	Reduction of site installation costs
Full process performance guarantee	Single point responsibility
Extensive pilot plant and commercial data base	Optimization of operating conditions
Advanced PLC or DCS control system	Operational cost savings
Low backwash volume	Maximization of HCGO production
Elimination of filter plugging	Enhanced operational safety & reliability
Competitive pricing	Reduced investment costs
No moving or rotating parts, no pump required	Negligible maintenance costs, less operator headaches
Gas assisted backwash cleaning	Long lifetime of filter elements since plugging and ineffective cleaning is avoided, optimal unit availability

**Supportive Tools** From pilot testing and operating experience, DAHLMAN has developed a design package and computer software to predict delayed

coking HCGO filtration behaviour. Also for unusual feed stocks, DAHLMAN's pilot testing unit can be used to obtain the required design parameters.