

# Crude Oil Atmospheric Distillation

PEP Review 2018-03

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### Abstract

The crude distillation unit is the first unit that processes petroleum crude in any refinery. The petroleum refining process entails the separation of the different useful hydrocarbons present in the crude oil into useful fractions, followed by conversion of some of the hydrocarbons into products having higher-quality performance. The objective of the crude distillation unit is to separate the feed crude blend into different fractions, such as liquefied petroleum gas (LPG), naphtha, kerosene, light gas oil, and heavy gas oil. Atmospheric distillation and vacuum distillation of crude oils are the primary separation processes producing various straight-run products, from gasoline to lube oils. These products, particularly the light and middle distillates (i.e., gasoline, kerosene, and diesel) are more in demand all over the world than their direct availability from crude oils. In this review, the crude blend selected has a specific API gravity of 27.62°API. The selected crude blend is a mixture of Saudi heavy 60 wt%, Saudi medium 30 wt%, and Marlim 10 wt%. The blend feed crude is fractionated into light gas, LPG, naphtha, kerosene, light gas oil, heavy gas oil, and atmospheric residue.

This review presents a technoeconomic evaluation of an atmospheric crude distillation unit, including estimated capital and production cost estimates, with details on important process cost parameters such as battery limits and offsites costs, variable cost, plant cash cost, plant gate cost, production cost, etc. A brief market overview summarizes the major global producing companies, as well as regional and countrywide crude distillation unit capacities. This review also includes the material balance, equipment list, and a brief technology review.

This review was prepared using information derived from public domain information sources. The process design was simulated primarily through BR&E ProMax<sup>®</sup> 4.0 software simulations. Plant and process economics (CAPEX and OPEX) were worked out using IHS proprietary PEPCOST software, using in places our own design judgments based on operational experience.

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