Overview of Petroleum Refinery Types

Petroleum refineries are industrial complexes designed to convert crude oil into valuable products such as gasoline, diesel, jet fuel, lubricants, and petrochemicals. The complexity and configuration of a refinery depend on the type of crude oil being processed, the desired end- products, and market regulations. Refinery configurations range from simple distillation plants to highly complex facilities with advanced upgrading processes. Below is a detailed overview of the main types of petroleum refineries.

تمثل مصافي البترول مجمعات صناعية مصممة لتحويل النفط الخام إلى منتجات قيمة مثل البنزين، الديزل، وقود الطائرات،

زيوت التشحيم، والبتروكيماويات. تعتمد تعقيد وتكوين المصفاة على نوع النفط الخام المعالج، والمنتجات النهائية المطلوبة، واللوائح السوقية. تتراوح تكوينات المصافي من وحدات التقطير البسيطة إلى المنشآت المعقدة التي تحتوي على عمليات متقدمة

.لتحسين جودة المنتجات. فيما يلي نظرة تفصيلية على األنواع الرئيسية لمصافي البترول

1. Atmospheric Distillation

The Crude Distillation Unit (CDU) is the first and most essential step in the refining process. It is also known as the topping unit or atmospheric distillation unit. The primary function of the atmospheric distillation tower is to separate crude oil into its components (or distillation cuts, distillation fractions) for further processing in other refining units. Due to the high flow rates handled by this unit, its size and operational costs are the largest in the refinery.

The capacity of the CDU ranges from 10,000 barrels per stream day (BPSD) to 400,000 BPSD, as larger units are favored in refinery economics. A moderately sized CDU can process around 200,000 BPSD.

Structure and Design of the Atmospheric Distillation Tower

* + Height: These towers can reach 150 feet (50 meters).
	+ Fractionation Trays: They contain 20 to 40 trays, spaced at regular intervals, which help in separating different hydrocarbon fractions.

Operational Mechanism

Before entering the distillation column, desalted crude oil is preheated through a network of heat exchangers. This initial heating is done using hot material drawn from the bottom of the distillation tower, which raises the temperature of the crude oil to about 450°F.

After preheating, the crude oil is directed to a heating furnace, where its temperature is further increased to approximately 650°F.

















