

Adsorber Tower**Product Coding**
PXXXXXXXXX**Introduction**

Contaminated gas or liquid enters the adsorber tower from the top or bottom, depending on the design. The flow is evenly distributed over the adsorbent bed using high efficiency inlet distributors. As the fluid passes through the packed bed of adsorbent (molecular sieve, activated alumina, silica gel, or activated carbon), impurities are captured on the surface of the media. The tower is segmented into multiple floors. Each floor consists of a V-Wire holders and an adsorbent layer.

Tower Specifications

- **Design codes:** ASME section VIII, EN, or client-specific standards
- **Design pressure:** Up to 150 bar
- **Design temperature:** -40°C to $+450^{\circ}\text{C}$
- **Materials:** Carbon steel, SS 304/316, duplex, inco-nel, or cladded vessels

- **Diameter range:** 500 mm to 6000 mm
- **Length:** Up to 25 meters
- **Connections:** Flanged or welded nozzles, custom manway sizes
- **Surface finish and coating:** Internal lining, epoxy, rubber lining, or alloy cladding as required

Internals

- High performance inlet distributors
- Top and bottom V-Wire screen or perforated plate type
- Bed limiters and hold down screens
- Catalyst/adsorbent support beams and rings
- Drip rings and redistributors for multi bed systems
- Dust filters and demisters
- Unloading and inlet nozzles



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Process Overview

Feed introduction: A hydrocarbon stream containing aromatics enters the tower through an inlet nozzle. Flow is distributed evenly across the adsorbent bed using distributors.

Adsorption phase: The feed stream passes through the adsorbent bed. Aromatic molecules are attracted and held on the solid adsorbent surface by van der Waals forces or molecular sieving, then the cleaned stream exits from the top.

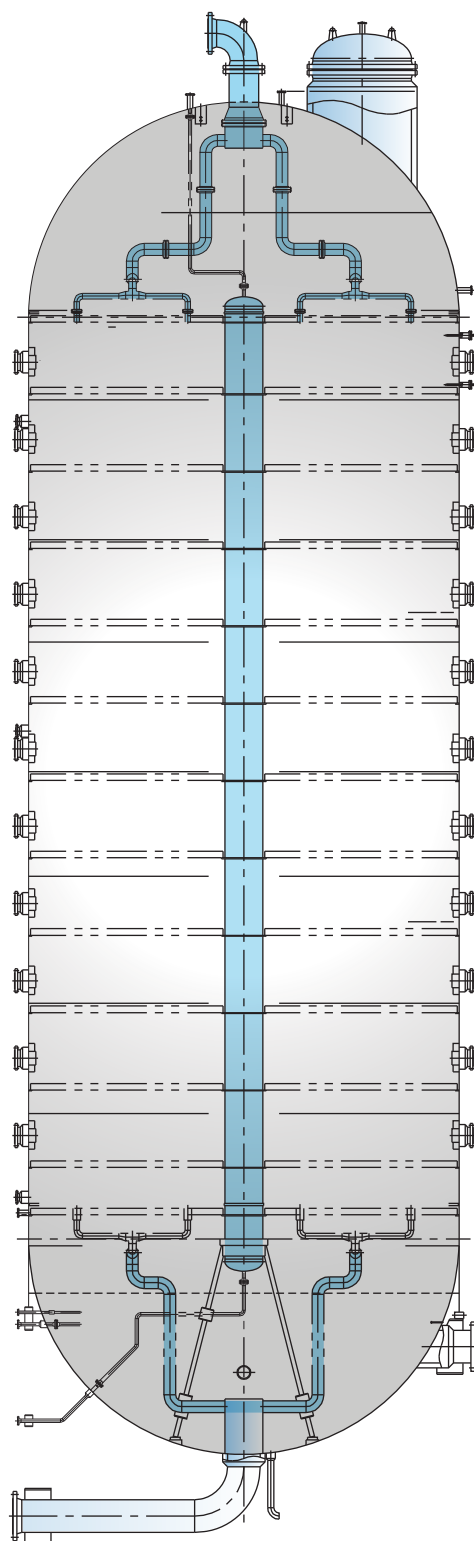
Breakthrough point: Over time, the adsorbent becomes saturated with aromatics. At this point, adsorption efficiency drops, and the tower needs regeneration.

Regeneration phase: A hot regeneration gas (steam, nitrogen, or hydrogen, depending on the process) is introduced. Heat drives off the adsorbed aromatic hydrocarbons, desorbing them from the adsorbent. The rich regeneration gas is cooled and condensed downstream to recover the aromatics.

Cyclic operation: Typically, two or more towers are installed in parallel, one in adsorption mode, another in regeneration mode, switching back and forth to allow continuous operation.

Applications

- Aromatic plants
- Natural gas dehydration and sweetening units
- LPG and NGL purification
- Hydrogen and syngas drying systems
- Sulfur removal in refinery fuel gas systems
- Feed purification for reformers, hydrogen plants, and polymer units
- Petrochemical product polishing units



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