Honeywell UOP

REFINING

# CCR Platforming™ Process for Motor Fuel Production

UOP's naphtha reforming process for high-octane gasoline and aromatics production

## Introduction

The CCR Platforming process is used throughout the world in the petroleum and petrochemical industries. It produces feed for an aromatics complex or a high octane gasoline blending product and a significant amount of hydrogen.

Convert heavy naphtha to gasoline and BTX aromatics using the technology preferred by more than 80% of all CCR reforming units.

## Benefits

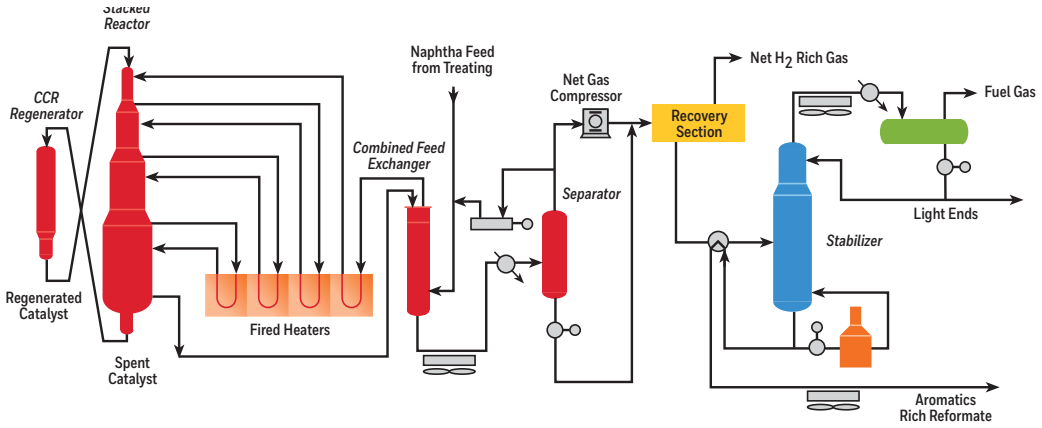
CCR Platforming technology has been the industry leader in reforming technology since the first unit came on stream in 1971 for many reasons. High utilization of feed due to low operating pressure.

- High on stream factor of more than 98%
- Flexibility to process a wide variety of feedstock.
- Minimal catalyst attrition.
- Stacked reactors for economical design.
- Optimized heat and compression integration for every unit.
- Liquid recovery optimized on every unit

## Process description

Hydrotreated naphtha feed is combined with recycle hydrogen gas and heat exchanged against reactor effluent. The combined feed is then raised to reaction temperature in the charge heater and sent to the reactor section. Radial-flow reactors are arranged in a vertical stack. The predominant reactions are endothermic, so an interheater is used between each reactor to reheat the charge to reaction temperature. The effluent from the last reactor is heat exchanged against combined feed, cooled and split into vapor and liquid products in a separator. The vapor phase is rich in hydrogen gas. A portion of the gas is compressed and recycled back to the reactors. The net hydrogen-rich gas is compressed and charged together with the separator liquid phase to the product recovery section. This section is engineered to provide optimum performance.

**Figure 1 – CCR Platforming Process**



Catalyst flows vertically by gravity down the reactor stack. Over time coke builds up on the catalyst at reaction conditions. Partially deactivated catalyst is continually withdrawn from the bottom of the reactor stack and transferred to the CCR™ regenerator.

## CCR Regenerator

One of the key factors in maintaining catalyst performance (particularly, constant reformate and hydrogen yields) throughout catalyst life is the ability of the CCR regenerator to completely regenerate the catalyst. The CCR regenerator is optimized for continuous steady-state regeneration. Features of the CCR regenerator include:

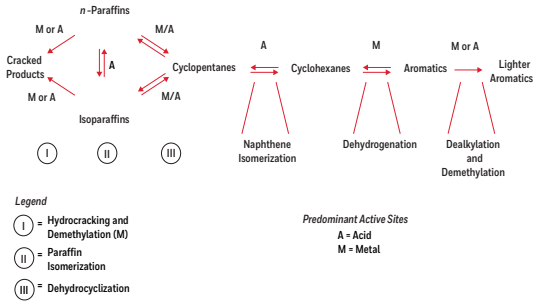
- An elegant design that rejuvenates spent catalyst to like-fresh condition while maximizing catalyst life
- A safe transition between hydrocarbon and oxygen-containing equipment is automatically assured by UOP's reliable Catalyst Regeneration Control System
- Valveless control of catalyst flow is extremely reliable without the maintenance costs of expensive control valves
- Operability and reliability has steadily increased through years of improvements

## Process Chemistry

The CCR Platforming process efficiently converts paraffins and naphthenes to aromatics with as little ring opening or cracking as possible. Figure 2 illustrates the key reactions.

UOP has made great advances over the past two decades combining improved catalyst formulations with lower operating pressures that improve yields in the key reactions. Catalyst system performance, as measured by activity and selectivity to desired reactions, is achieved by the balance between acid and metal sites.

**Figure 2 - Generalized Platforming Reaction Scheme**




## Experience

UOP commercialized the CCR Platforming process in 1971 and as of 2014 has more than 250 units on stream (more than 6,000,000 bpd of capacity) with another 70 in various stages of design, construction and commissioning. Almost all CCR Platforming units that have started are still operating today.

**For more information**
www.uop.com

**UOP LLC, A Honeywell Company**
25 East Algonquin Road
Des Plaines, IL 60017-5017, U.S.A.
www.uop.com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