



# CCR Platforming™ Process For Motor Fuel Production

## Refining

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.

### 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.

- On stream factor of more than 95%
- Flexibility to process a wide variety of feedstock.
- Only two catalyst lifts for minimal catalyst attrition.
- Stacked reactors for economical design.
- Optimized heat and compression integration for on 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

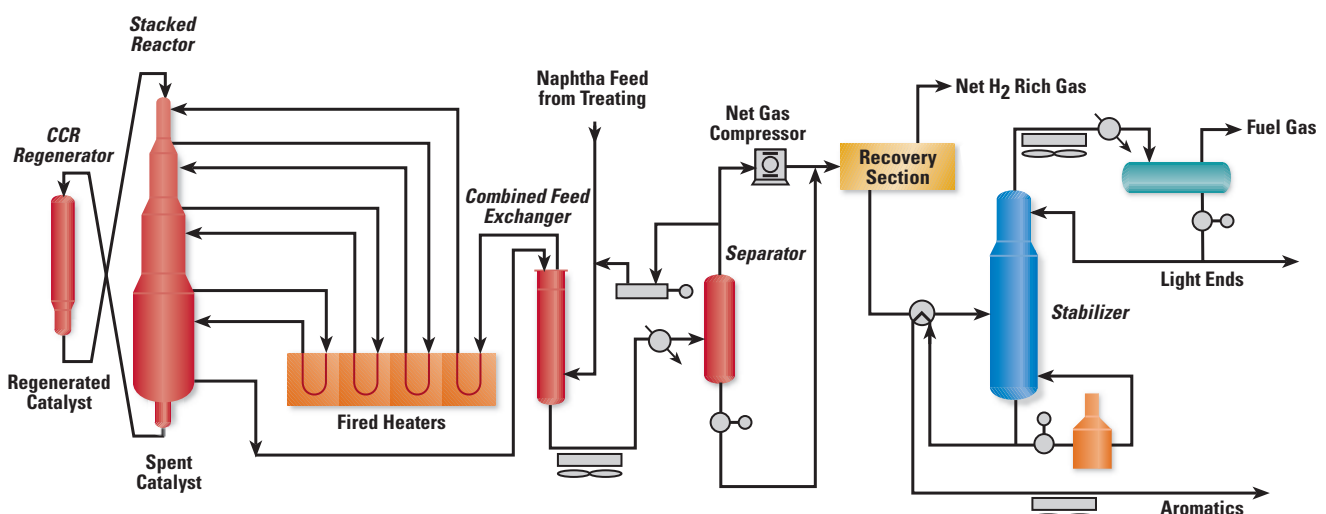
the reactor section. Radial-flow reactors are arranged in a vertical stack. The predominant reactions are endothermic, so an interheater is used between each reactor to reheat the charge to reaction temperature. The effluent from the last reactor is heat exchanged against combined feed, cooled and split 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.

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 Partially deactivated catalyst is continually withdrawn from the bottom of the reactor stack and transferred to the CCR™ regenerator.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 reformat and hydrogen yields) throughout catalyst life is the ability of the CCR regenerator to completely regenerate the catalyst. The CCR regenerator is optimized for

Figure 1 ■ CCR Platforming Process



continuous steady-state regeneration. Features of the CCR regenerator include:

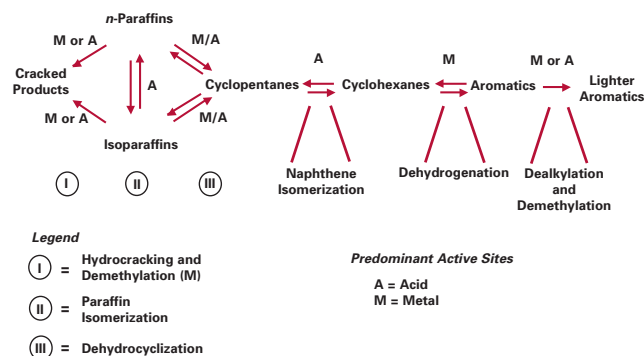
- An elegant design that rejuvenates spent catalyst to like-fresh condition while maximizing catalyst life
- A safe transition between hydrocarbon and oxygen-containing equipment is automatically assured by UOP's reliable Catalyst Regeneration Control System
- Valveless control of catalyst flow is extremely 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



### UOP experience

UOP commercialized the CCR Platforming process in 1971 and now has more than 180 units on stream (more than 3,900,000 bpd of capacity) with another 30 in various stages of design, construction and commissioning. The combination of radial-flow, reactor stack and a CCR regenerator has proven to be extremely reliable. Commercial on stream efficiencies of more than 95% are routinely achieved in CCR Platforming units and every CCR Platforming unit that ever started is still operating today.

### For more information

CCR Platforming technological services are available on request. For more information, contact your local UOP representative or our Des Plaines sales office:

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