

*Welcome to Criterion's
World of Catalytic
Reforming*



Criterion Catalyst Company offers a full range of reforming catalysts.

These catalysts are grouped by their promoter metals into the following categories:

Platinum only Catalysts

Offered with low or high platinum loadings.

Low platinum loaded catalysts are recommended when feedstock contains not more than 2 ppm sulphur. These are usually used in the lead reactor(s) position of fixed bed semi-regenerative or fixed-bed cyclic reformer units.

High platinum loaded catalysts are recommended when the feedstock contains more than 2 ppm sulphur. Again these are usually used in the lead reactor(s) position. They are typically used in cyclic reformer units with relatively high severity. The benefits and therefore payback of using higher platinum loaded catalyst increase as the severity of the operation increases.

Platinum/Rhenium Catalysts

Offered with equal or skewed loadings.

Equal metals loaded catalysts are recommended for general purpose reforming. Feedstock sulphur levels should be less than 1 ppm, with a target of 0.5 ppm. Bimetallic Pt/Re catalysts are used in place of platinum only catalyst to achieve a longer cycle length.

Skewed metals loaded catalysts are recommended for units targeting maximum cycle length. Feedstock sulphur levels should be less than 0.5 ppm with a target of 0.2 ppm.

Modified Platinum/Rhenium Catalysts

Offered with equal and skewed metals loadings.

The modified Pt/Re catalysts have been adjusted to increase hydrogen, C₅₊ and aromatics yield compared to the standard platinum/rhenium catalysts.

Equal metals loaded catalysts are recommended for general purpose reforming where the feedstock sulphur level is less than 1 ppm.

Skewed metals loaded catalysts are recommended for units targeting maximum cycle length where the feedstock sulphur is less than 0.5 ppm. The skewed metal modified Pt/Re catalysts provide even longer cycle lengths and utilize the lower platinum content of the catalyst more efficiently. Ideally these catalysts are best suited for reformer reactors that have a sulphur guard upstream.

Platinum/Tin Catalysts

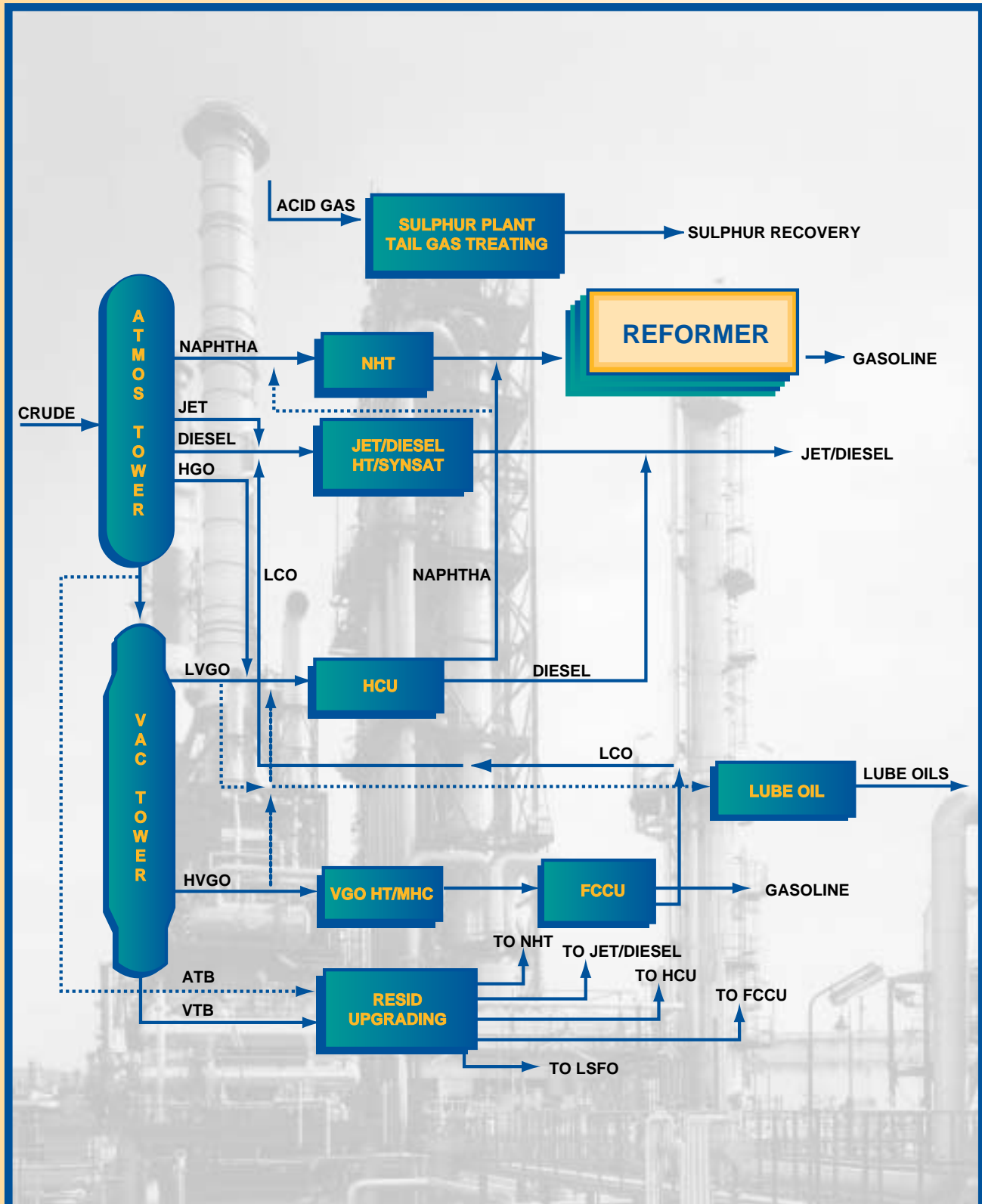
Offered as spheres for CCR units and extrudates for fixed bed units.

In low pressure operations, these catalysts offer higher hydrogen and C₅₊ yields than platinum/rhenium promoted or modified platinum/rhenium promoted catalysts. These catalysts are used in CCR units and are also suited for use in fixed bed cyclic design units.

Platinum/Tin catalysts can also be used in combination with platinum/rhenium catalysts in staged reactor catalyst loadings in fixed bed cyclic design units. The platinum/tin system preserves the ring compounds in the feed to obtain higher yields of aromatics and hydrogen. A C₅₊ yield improvement of 2 wt% greater than base (platinum/rhenium) has been observed.

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Introduction to Criterion's World of Reforming

Our company was formed in 1988 by combining the international catalyst businesses of American Cyanamid, Shell Oil Company and Shell International Chemical Company. At the formation of Criterion, it was American Cyanamid who contributed the reforming business to the Criterion partnership. Our plant at Willow Island, WV began production in 1954, manufacturing the first extruded reforming catalysts in 1956 and the first commercially available platinum-rhenium catalyst in 1969. Capacity to manufacture shaped carriers was added in 1983 and spherical reforming catalysts used in the continuous catalyst regeneration (CCR) process in 1990.

Over the years, the plant has been expanded and modernised to increase its sophistication, quality controls, and ability to serve its customers. Criterion's own-brand catalysts have been actively marketed since 1975 with installations throughout North and South America, Europe, Middle East, South Africa, Korea, Japan, Philippines and Australia. In addition, Criterion also manufactures custom proprietary catalysts for process licensors.

Through leading-edge research and development, Criterion has developed the full range of reforming catalysts, from monometallics used in the front-end of a cyclic reformer, to new fixed bed catalysts that combine high stability with a significant boost to the yields of hydrogen and reformate. These catalysts add value by increasing the reformer's flexibility to increase through-put, octane or upgrading lower quality naphthas. New catalysts are devel-

oped at the R&D centres of our parent companies: in Houston TX, Stamford CT and Amsterdam, the Netherlands. Each laboratory specializes in one or two application areas and all carry out extensive testing of prototypes. Commercialisation of new products is done at our Willow Island plant where final certification of plant produced catalyst is carried out before a new product is launched.

Criterion combines international resources with local knowledge. Our technical and sales teams are located where they can best serve the needs of our present and future customers, and our staff understand the cultures and requirements of the people they serve. These catalysts are backed up by extensive technical service including guidance on operating and regenerating catalysts, data-tracking to monitor the operations and advice on optimisation to help you get the most out of your unit. The rapid growth which has made Criterion one of the world's premier catalyst suppliers has been driven by responsiveness to its customers. Our products are designed to improve the cost competitiveness of our customers wherever they are.

Joining Criterion's world of reforming catalysts gives you access to state-of-the-art products supported by excellence in catalyst manufacture, customer service, R&D and technical service. You will find that Criterion is committed to finding the lowest cost solutions to improving the profitability of your reforming unit.



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