

New Platforming Catalysts

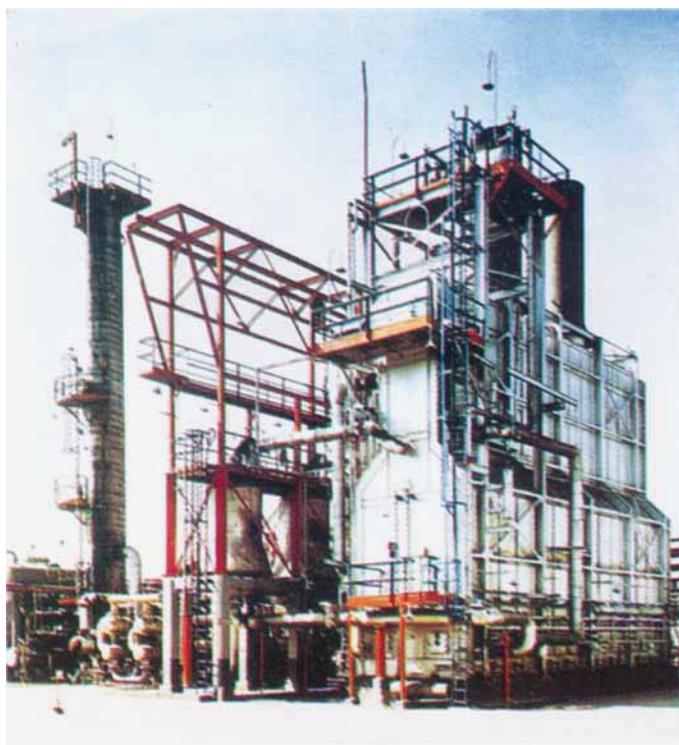
COMMERCIAL EXPERIENCE CONFIRMS IMPROVED STABILITY AND HIGH YIELDS

By more sophisticated preparative techniques and by adjustments to chemical composition and to physical properties, successive versions of the platinum on alumina catalysts developed and produced by Universal Oil Products over the past twenty years have steadily shown improved performance in their Platforming process. Research during the more recent years has given prominence, however, to the incorporation of a second metal into the platinum catalyst, and in 1968 a new catalyst, designated R-16, was announced, providing exceptionally good stability characteristics, especially at high operating severities and low operating pressures. This new member of the range introduces rhenium into the

catalyst. This has a synergistic effect on the performance of the platinum, leading to improved yields of both high octane gasoline and aromatics as well as larger quantities and greater uniformity of hydrogen produced as a by-product.

While pilot plant studies and a limited amount of commercial operation with the new rhenium-platinum catalyst showed its marked superiority over its predecessors, a paper presented by E. A. Sutton, of UOP, to the American Petroleum Institute during its meeting in Houston in May, reports on two years of commercial experience in a number of units that fully confirm the small-scale experience and demonstrate its significance in improved performance.

Since the first commercial Platforming process went into operation in 1949, Universal Oil Products has been constantly developing a series of improved versions of its platinum on alumina catalysts. One of the major objectives has been to improve their stability and so to give greater yields of both high octane petrol and aromatics. The two most recently announced catalysts in the series incorporate a second metal which has a synergistic effect on the performance of the platinum



New Platforming units have been designed and put into operation to take advantage of the improved stability characteristics of the rhenium-platinum catalyst to maximise yields of reformat, aromatics and hydrogen, while existing units have employed it in many ways to improve profitability. The benefits in the latter category have included:

- (1) Increased throughput.
- (2) Increased operating severity, with high reformat octane and higher yields of aromatics.
- (3) Improved yield of both reformat and aromatics by reduction in operating pressure.
- (4) Less frequent regeneration.
- (5) Reduced catalyst investment.

The commercial units described in the paper represent only a few of the many available examples of existing Platforming units that have utilised the improved catalyst to increase the profitability of operation. Some 32 existing units with a combined capacity of 250,000 BPSD are currently using the rhenium-platinum catalyst, these including both motor fuel and aromatics

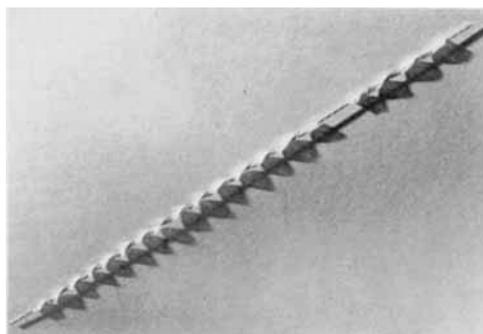
producing units with feedstocks ranging from highly paraffinic Arabian and Kuwait naphthas to high cyclic content California naphthas. In addition, five newly designed Platforming units have started operation with the new catalyst, while a further 20 units have been designed to take more complete advantage of its great stability.

Closely following the development of the R-16 rhenium-platinum catalyst is a more recent advance in Platforming technology. The latest addition to the range is another binary platinum catalyst designated as R-20. Pilot plant data show that R-20 has stability characteristics similar to the R-16 types but also has a significant selectivity advantage in terms of Platformate and aromatics yields.

Both these new catalysts will have a place in the refiner's armoury. The newest addition, R-20, has been in successful commercial use for the past several months, but in units not specifically designed to take full advantage of its outstanding characteristics, particularly the low operating pressures, which favour the greatest yields of very high octane Platformate or of aromatics.

Platinum Spiral Spinning Bands for Distillation Columns

Good design of fractional distillation columns results in high fractionating efficiency during operation at low pressures. A spinning band column to operate thus for Midland Silicones Limited incorporates this complex spiral screen band fabricated from platinum. It is nearly one metre in length and the teeth of the spiral gauge touch the glass wall of the still, causing violent agitation of the refluxing liquid and intimate contact between the descending liquid and ascending vapours. The spiral band



throws both liquid and vapour on to the heated column walls and the pitch and direction of rotation create a downward pumping action to minimise holdup in the still and also to ensure steady distillation by preventing flooding. Platinum was chosen for the spiral because of its freedom from corrosion by the liquids and vapours in the still.