

## Athos-1 paraffin isomerisation catalyst

Athos-1 is a new pentane/hexane isomerisation catalyst based on Shell Hysomer Process catalyst technology that builds on the commercially proven benefits of the Criterion paraffin isomerisation catalyst Z-700A. Athos-1 offers significant operational and commercial advantages compared with previous paraffin isomerisation catalysts and has been specifically designed for the isomerisation of pentane and hexane to high-octane-number branched-chain hydrocarbons. It combines additional functionality for the saturation of benzene to cyclohexane.

### Applications

Athos-1 is designed for use in refineries and petrochemical complexes where operators produce high-octane gasoline blending components by isomerisation of pentane and hexane. Performance tests on Athos-1 have demonstrated its ability to outperform Z-700A and to maximise octane yield. Athos-1 is suitable for all the reactor types utilised for pentane and hexane isomerisation, including classical axial- and radial-flow reactors.

### Feeds

Athos-1 is intended for use with feeds such as hydrotreated, straight-run light naphtha or C5/C6 normal paraffins from a recovery unit. Athos-1 has been extensively tested and evaluated and is available for improving the profitability of the paraffin isomerisation unit.

### Product advantages

Athos-1 provides higher selectivity than Z-700A and will deliver a significant improvement in octane yield while matching research octane number (RON) (Figure 1). Athos-1 performs well at high temperatures as a result of less liquid feed cracking.

Athos-1 provides a similar level of activity to Z-700A but at a much lower density product, which reduces the total fill costs for refinery operators. Converting to Athos-1 can deliver a 33% reduction in platinum fill costs. Athos-1 can be used in a stacked arrangement with other catalysts; the fill cost reductions associated with this approach will depend on the proportion of installed Athos-1.

Athos-1 is a robust catalyst that offers a similar run life to Z-700A. The typical catalyst life is about 10 years. A top-bed catalyst in heavy-feed and high-sulphur-content conditions may last 3–5 years, whereas a bottom bed catalyst in a clean feed service may last up to 20 years.

### Regeneration

During operation, the catalyst's activity slowly declines, mainly as a result of coke deposits. A carbon burn-off can result in a significant restoration of catalyst activity. The carbon burn-off operation can be conducted in situ, but ex situ burn-off offers improved temperature control and more effective catalyst regeneration.

To learn more about CRI/Criterion's Athos-1 paraffin isomerisation catalyst, please contact your nearest CRI/Criterion sales representative or visit our website at [www.zeolyst.com](http://www.zeolyst.com).

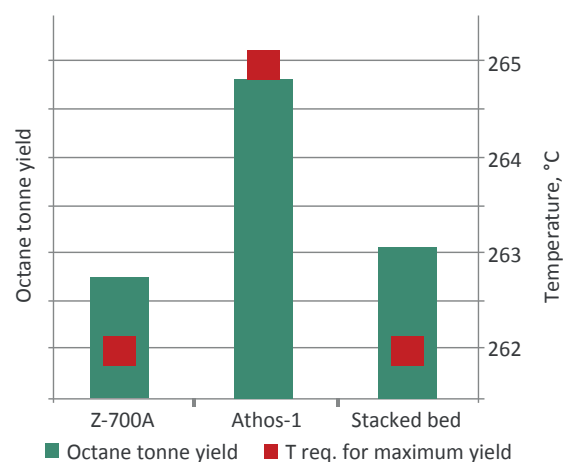


Figure 1: The results from a Zeolyst International aromatics standard test demonstrate that Athos-1 delivers a significantly higher octane yield than either Z-700A or a stacked-bed arrangement with both catalysts.

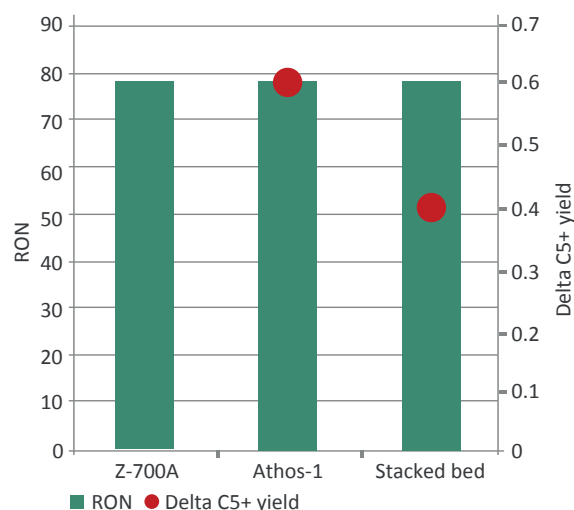


Figure 2: The results of tests conducted with equal catalyst volumes indicate that, with comparable RON performance, Athos-1 produces a higher delta C5+ yield.