
Question 23: The liquid recycle rate to a second stage of a hydrocracker can shift conversion, light end yields, cycle length and/or the required temperature to achieve a desired conversion. What strategies do you employ to reach optimum conditions

Vern Mallett (UOP)

In two-stage hydrocracking design there are several variables that need to be balanced for optimum performance. Desired product yields or selectivity can be affected by conversion per pass in each stage. Lower conversion per pass is desirable to maximize heavier product selectivity. Fixing first-stage conversion. Conversion per pass in the second stage can be lowered by increasing the liquid recycle. Increasing the recycle rate lowers conversion severity but increases space velocity and reduces treat gas rate for the second stage catalyst. This has a detrimental effect on catalyst life but lower conversion per pass reduces severity lowering the catalyst deactivation rate, however too low of a conversion will affect product qualities adversely. For optimum conditions one needs to consider unit design conditions like H₂ partial pressure, feed quality, minimum product quality requirements and catalyst life objectives. Strategy for optimum conditions would be to increase liquid recycle within the hydraulic limit of the unit and lower conversion severity in the first stage to the point where catalyst life, product quality or increased operating cost become an issue.

Print as PDF:

Year

2010

Submitter

[Licensor](#)

[Operator](#)
