

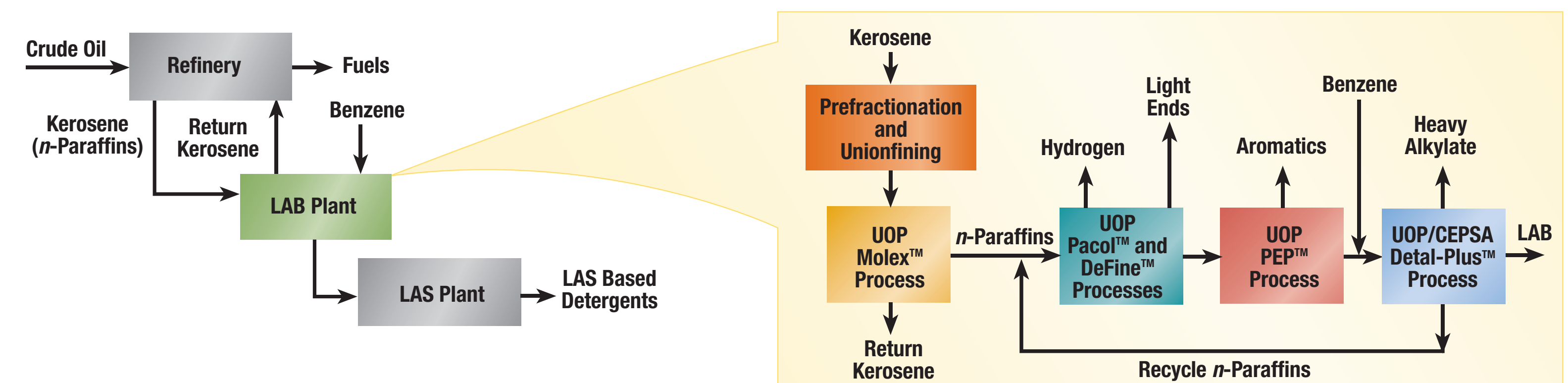
Energy Efficient Plant Designs for Linear Alkylbenzene (LAB)

by: UOP LLC, A Honeywell Company:
Larry C. Erickson, Stephen W. Sohn and Yuree K. Whang

Cost reduction improvements are being implemented into the latest LAB plant designs for a significant reduction in energy and capital requirements.

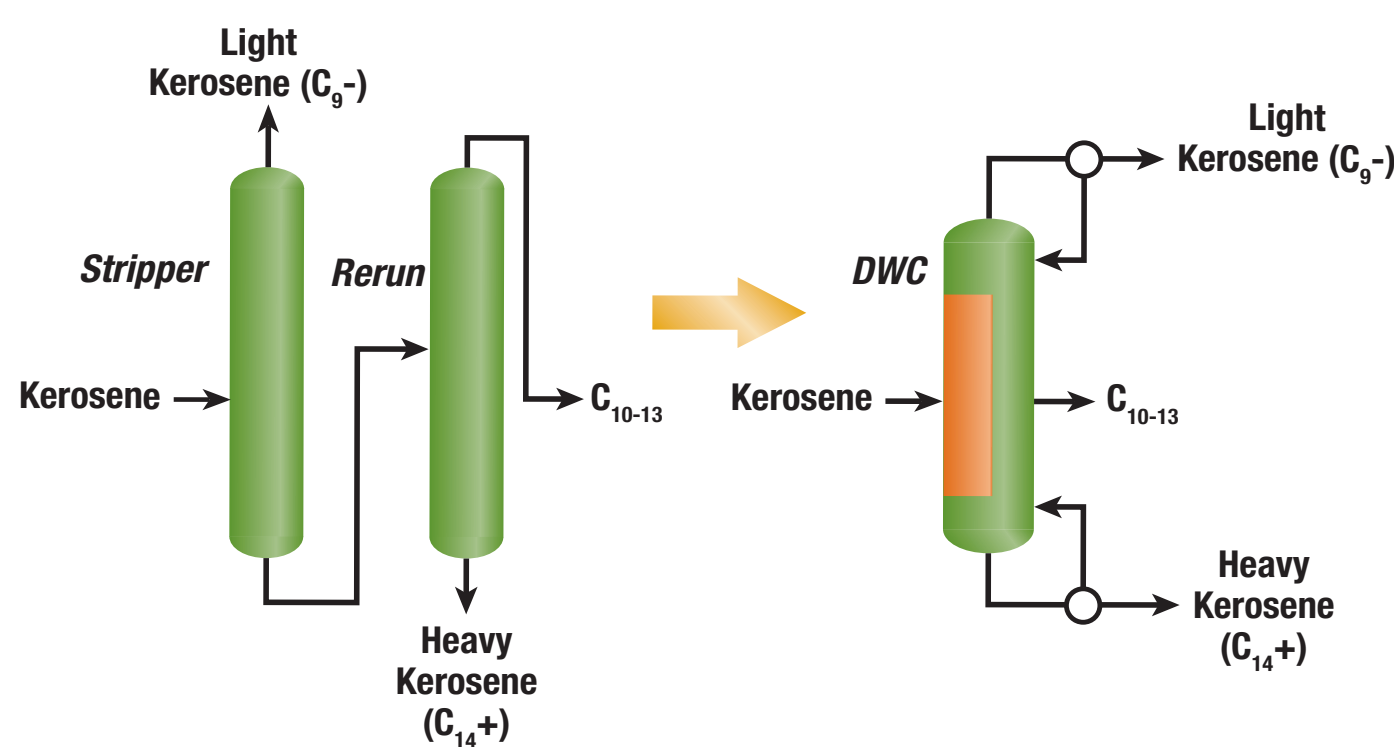
Linear Alkylbenzene Sulfonate (LAS) accounts for more than 40% of all surfactants used in household laundry detergents

Solid Bed Alkylation (Detal-Plus) is the alkylation technology of choice for new LAB plants



Prefractionation and Unionfining

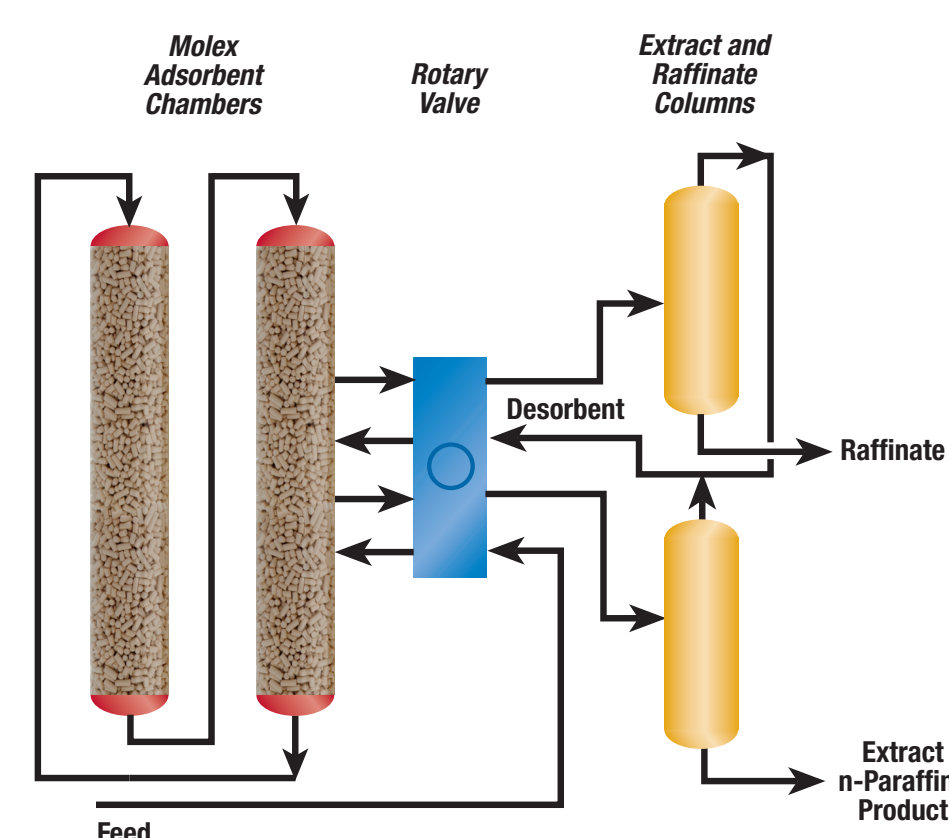
Kerosene Pretreatment Improvements



- Single Dividing Wall Column (DWC) replaces traditional 2-column unit for reduced capital and utility requirements
- Newly developed catalysts result in operation at lower separator pressures

UOP Molex Process

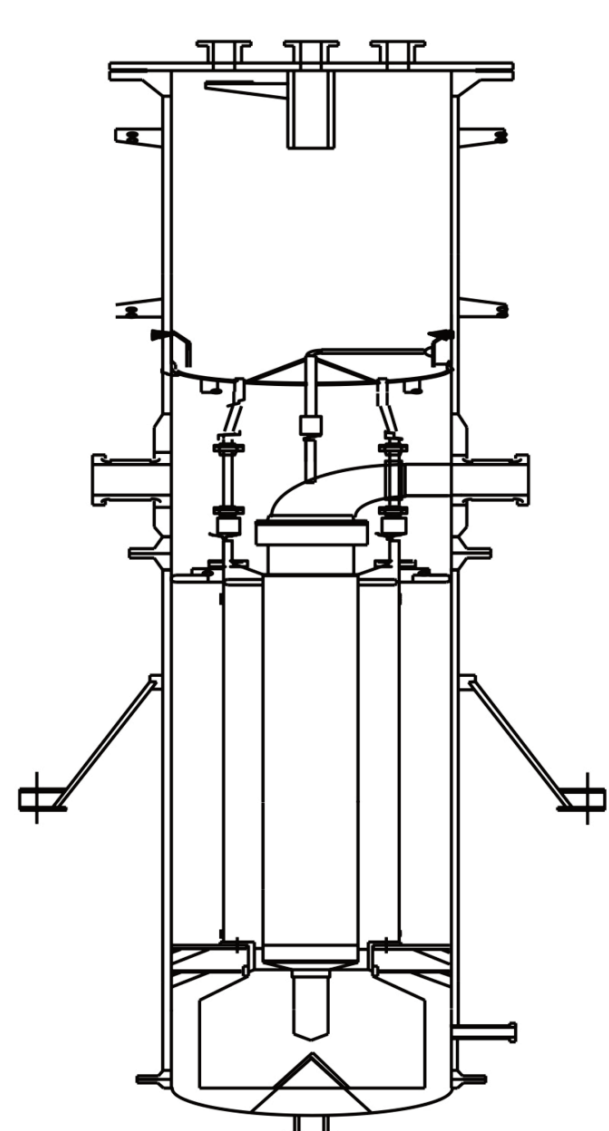
UOP Molex Process Improvements



- Reduced Rotary Valve cycle times increase throughput
- The addition of a tertiary flush, and reduction in circulation and reflux rates reduce the size of the columns in the unit and the utilities requirements

UOP Pacol and DeFine Processes

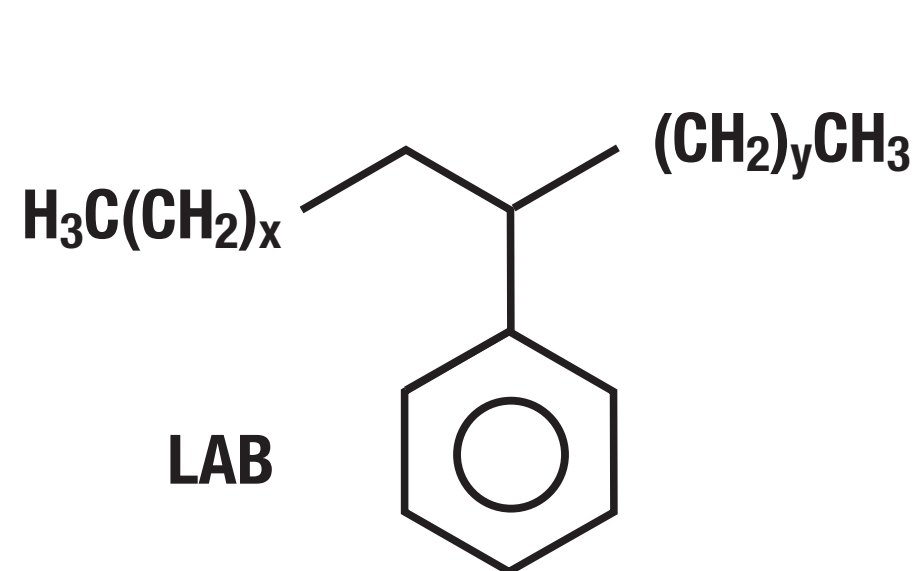
UOP Pacol Process Improvements



- Increased catalyst space velocity reduces the catalyst requirement and the reactor size
- Latest DeH-15 catalyst exhibits improved selectivity, reducing the size of the reactor
- Optimized hydrogen-to-hydrocarbon ratio reduces utilities

UOP/CEPSA Detal-Plus Process

UOP Detal-Plus Process Improvements



- New ZDA-2 catalyst allows for significantly reduced benzene circulation rates, which results in reduced vessel sizes and utility requirements
- Improved reactor and fractionation column designs also result in reduced vessel sizes and utility requirements

25% reduction in energy costs and capital costs from latest LAB plant technologies!

* 100 KMTA LAB Plant

25%

reduction
in energy cost

+

25%

reduction
in capital cost

=

50%

improvement
in the IRR