Honeywell UOP

FAST FRACTIONATION SOLUTIONS QUICKLY GET YOU TO MARKET

Fractionation

Proven Fractionation – Fast

The sooner your fractionation system is up and running, the sooner you start seeing profits. Honeywell UOP's fractionation portfolio is delivered to you in less than 40 weeks.

Key Benefits of Honeywell UOP Fractionation for Gas Processing

Expedited Schedules
- Delivered to you in less than 40 weeks
- Achieved by pre-engineered modules

Reduced Costs
- Utilization of UOP High Performance Trays
- Potential decreased column size (Column diameter and height)
- Potential reduction in number of columns
- Lower total facility costs
  - Smaller physical plot space
  - Reduction in number of heat exchangers and columns

Integrated Process
- Effective integration of the entire plant cuts costs

Lower Project Risk
- Integrated solution with a single vendor
- Proven technologies backed by unmatched dedication, innovation and expertise

Quality
- Modular fractionation plants are factory-built using a unique design and construction approach
- Quick construction and superior quality control
- Entire plants can be easily shipped by truck, train, barge or ship — even to remote locations

Proven Performance

UOP is a proven provider of NGL fractionation technology, with more than 800kbpd of installed fractionation experience. That experience includes successfully developing and commercializing a wide range of fractionation columns including Deethanizers, Depropanizers, Debutanizers and Deisobutanziers. In addition, UOP recently expanded its enhanced fractionation product portfolio for gas processing by developing a matrix of pre-engineered column designs with individual heat integration utilizing high capacity trays for separation of products.

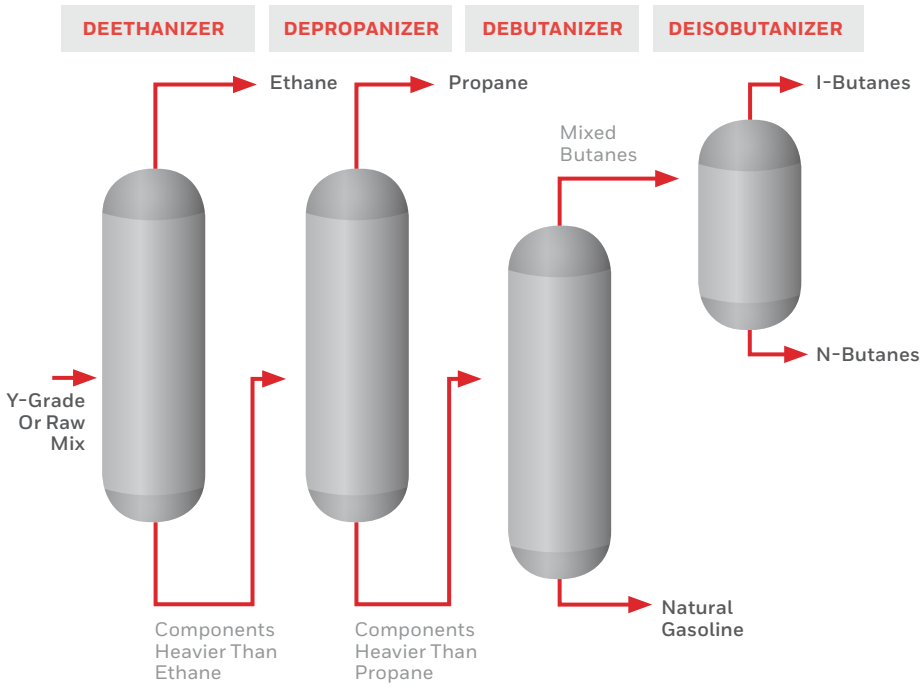
Efficient Design

The enhanced fractionation offering utilizes the high capacity of UOP's high performance UOP MD™ Trays, UOP ECMD™ Trays and UOP PFMD™ Trays, allowing for smaller column diameters than would be achievable with conventional multi-pass valve trays. Since high performance trays can be used at reduced tray spacing, they also allow for a reduction in height and/or diameter of a new column, further reducing vessel costs. In certain separations, the use of high performance trays can reduce the number of columns needed, resulting in a significant decrease in capital cost. Even more, a matrix of pre-engineered column designs allows for fast delivery of equipment at 40 weeks.

Simply put, UOP trays are proven to increase separation performance, reduce capital and increase column capacity in a wide range of applications.

The UOP Fast Fractionation Process

UOP's fractionation process creates operational efficiencies to reduce costs while ensuring top-quality output.



1. Deethanizer to the Depropanizer

At the start of the process, C2+ plus is fed to the Deethanizer unit and heated by exchange with Deethanizer bottoms in the Deethanizer Feed/Bottoms Exchanger. This hot feed is then fed between column trays. The Deethanizer Tower produces an overhead product (ethane) and a bottoms product (C3+). Overhead vapors from the Deethanizer are fully condensed in the Deethanizer Reflux Condensers using a propane refrigerant, and are sent to the Deethanizer Reflux Accumulator. Flow is split out of the Deeethanizer Reflux Accumulator, with part as reflux for the Deethanizer and the rest as purity ethane product. The reflux rate can be adjusted via flow control based on overhead composition. Sweet purity ethane is sent to the Ethane Surge Tank via pressure control. Ethane is then pumped to pipeline pressure. The vapor needed to drive the separation is generated by vaporizing a portion of the bottom liquid in the Deethanizer Reboiler. The C3+ will produce specification HD-5 propane as well as BG mix with subsequent fractionation. The C3+ is cooled prior to being sent to the Depropanizer or storage in a Feed/Bottoms Exchanger.

2. Depropanizer to the Debutanizer

At this point in the process, the C3+ fed to the Depropanizer produces an overhead product (propane) and a bottoms product (BG Mix). Overhead vapors from the Depropanizer are fully condensed in the Depropanizer Reflux Condenser. Indirect contact with water or air is used to fully condense these vapors, which are sent to the Depropanizer Reflux Accumulator. The reflux rate can be adjusted via flow control based on overhead composition. Next, the propane product is metered and taken to the C3+ Surge Tank via level control. The vapor needed to drive the separation is generated by vaporizing a portion of the bottom liquid in the Depropanizer Reboiler. When the feed hits a specified temperature, a BG Mix Cooler is used in conjunction with an exchanger to cool the product. BG Mix is then sent to storage or to a Debutanizer.

3. Debutanizer

In this step, the BG Mix is preheated by exchange with gasoline product in the Debutanizer Feed/Product Exchanger and fed via pressure control to the Debutanizer with a feed point between trays. The Debutanizer splits the feed stream into a low-vapor-pressure natural gasoline and a mixed butane stream. Overhead vapors from the Debutanizer are fully condensed in the Debutanizer Reflux / Deisobutanizer Reboiler and sent to the Debutanizer Reflux Accumulator. Because the Debutanizer Reflux Exchanger utilizes the Deisobutanizer bottoms reboiling, a reflux condenser using air is provided for startup. The reflux rate can be adjusted via flow control based on overhead composition. Then, the mixed butane is fed to the Deisobutanizer via level control. Reboiler heat is provided by the Debutanizer Reboiler. Low-vapor-pressure natural gasoline is cooled in the Debutanizer Feed/Product Exchanger. The amount of cooling achieved by the heat exchanger depends on the BG Mix feed temperature; therefore, a Gasoline Product Cooler is provided downstream to cool the gasoline as needed.

4. Deisobutanizer

At the final stage of the process, the Deisobutanizer splits the mixed butane feed into an overhead product (isobutane) and a bottoms product (normal butane). Overhead vapors from the Deisobutanizer are totally condensed in the Deisobutanizer Reflux Condenser and sent to the Deisobutanizer Reflux Accumulator. The reflux rate can be adjusted via flow control based on overhead composition. Then, the isobutane product is metered and taken to on-site storage via level control. The bottom of the Deisobutanizer is reboiled by condensing the Debutanizer overhead in an exchanger and by utilizing HMO in the Deisobutanizer Trim Reboiler. Normal butane is cooled in the N-Butane Product Cooler. The N-Butane is metered and taken to on-site storage via level control.

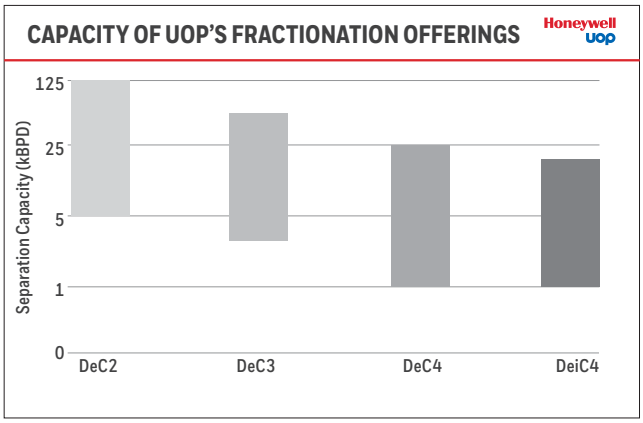
FAST FRACTIONATION!

Ready to go in less than 40 weeks

UOP MD™ & ECMD™ Trays

- High liquid handling capability — long total weir length and large downcomer area
- Close tray spacing — enables reduction in column height
- No receiving pan area maximizing tray active area to increase capacity or reduce column diameter
- 90° rotation of downcomers on successive trays promotes lateral mixing and provides easy scale-up
- No bolting bars required — supported on a 360° ring
- Fast, simple installation thanks to unique downcomer lengths
- Low tray pressure drop — as low as 0.05 psi per tray

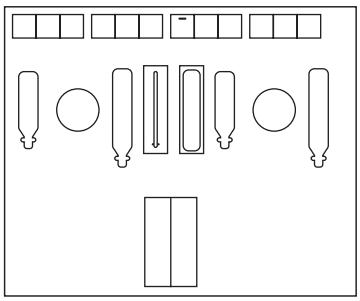
Rigorous Performance Standards



Cost Reduction

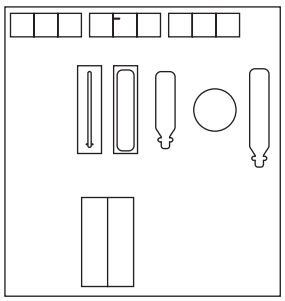
The cost reduction is dependent on the customer application. For example, when comparing UOP's Fast Fractionation offer to historical projects, there is a $2M savings and 14% cost reduction on the Deethanizer. This particular savings resulted from the use of a single-tower design with UOP advanced tray technology, in comparison to a two-tower design using conventional trays.

- Potential decreased column size
- Potential reduction in number of columns
- Plot space can be decreased (i.e., number of heat exchangers and columns can be reduced from 2 to 1); see diagram below



before

For customers who's site lists are limited by shipping dimensions. they would need to install two deethanizer columns in order to achieve their desired capacity.



after

Through the use of UOP's high capacity trays, a smaller column can now be used enabling many installations to utilize just a single column saving on both plot space and cost.

*Results will vary based on the number of columns, column size, plot space, and any additional equipment used in the system.

Customer Portal

The Honeywell UOP portal offers information on products and services pertinent to our customers and partners. The portal also offers site-specific support and tools that will help you manage and operate your Honeywell UOP processes. Login at **www.accessuop.com.**

Learn More

For more information about Honeywell UOP's fast fractionation solutions, please contact your Honeywell UOP representative or visit **www.uoprussell.com.**

UOP LLC, A Honeywell Company
25 East Algonquin Road
Des Plaines, IL 60017-5017
Tel: +1-847-391-2000

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