

## High-Capacity Trays Increase Debutanizer Capacity

**Customer:** Refinery

**Location:** North America

**Tower Name:** Debutanizer

**Mass Transfer Equipment:** NYE TRAYS® and SUPERFRAC® Trays

**Objective:** The refinery wanted to increase the feed rate to the FCC. This meant the rate to the debutanizer would increase by 12%. In addition, the refinery wanted the increase the recovery of C4's from the unit.

**Solution:** Koch-Glitsch, Inc. recommended replacing the existing trays with one-for-one with high capacity trays without welding to the tower shell. NYE TRAYS were used in the rectification section and SUPERFRAC trays were used in the stripping section. The refinery had other tray options available, but none except for SUPERFRAC could handle the high liquid loadings for the revamp case without adding additional downcomers. Adding more downcomers was not beneficial, as it would compromise tray efficiency. Since the tower was already heat removal limited, this would incur additional scope of work for the revamp.

**Results:** The tower was tested at a feed rate of 37,500 BPD. This feed rate is slightly above the design feed rate of 37,000 BPD. The tower was to a reflux rate of 17,600 BPD prior to the onset of flooding conditions. The flooding was apparent during a performance test run at 18,550 BPD. At the 17,600 BPD reflux rate, the tower operation was steady and fractionation was maintained. The tower lined out and data showed that the internal loadings for the trays were approximately 13% above design on a volumetric basis. The tray efficiency for the revamp was calculated to be 78% above the feed and 74% below the feed.

### Debutanizer Tower Conditions: Existing and Revamp Design

	Existing	Revamp Design
Feed Rate, BPD	33,000	37,000
O/H Rate, BPD	10,220	12,230
Reflux, BPD	12,300	16,660
Gasoline, BPD	22,780	24,870
Reflux Ratio	1.2	1.36