THE PROCESS

The following paragraphs describe aniline production from nitrobenzene via a liquid-phase hydrogenation process. The process can be divided into three main parts: nitrobenzene hydrogenation, dehydration and purification.

Nitrobenzene hydrogenation-

Nitrobenzene (mononitrobenzene or MNB) is fed with hydrogen into a plug-flow tubular reactor containing a noble metal catalyst supported on carbon. The hydrogenation is carried out in the liquid phase and the nitrobenzene conversion to aniline is near 100% in a single pass.

Dehydration-

The reactor effluent is virtually free of nitrobenzene due to the high conversion of the reaction. The hydrogen excess is separated from the reactor effluent and the liquid product is directed to a dehydration column. In this column, the water generated is removed as the overhead product and the bottoms stream is sent to the purification area.

Purification-

In the purification area, heavy impurities (tars) are separated from the crude aniline stream by the bottom of a distillation step. The final product obtained as the distillate of the column is high-quality aniline, with purity above 99.95 wt.% and containing less than 0.1 parts per million (ppm) of nitrobenzene by weight.

ANILINE PATHWAYS

Aniline was first commercially produced using nitrobenzene as starting material in

1930s. This pathway remains the most common for aniline production today. Currently, almost all existing plants producing aniline from nitrobenzene are integrated with facilities to produce nitrobenzene from benzene. The other existing production pathway for aniline is based on phenol as the starting raw material.