

Greater process yields

Approximately 80 percent of the world's aniline production is used to manufacture polyurethanes. Regardless of whether polyurethanes ends up in furniture or footwear, KBR is delivering a vital product. KBR is the exclusive licensor of DuPont's aniline technology, which is currently used in four world-scale facilities. This benchmark technology is a testament to product quality, product yield, process safety and environmental controls. Offering comprehensive services including technology licensing, basic and detailed engineering, construction and support for plant operation such as operator training and start-up services, KBR brings the right people and technology to every project.



Aniline technology has been continuously improved, especially in the areas of process yields, energy consumption, waste minimization, product quality and greater operating efficiency.

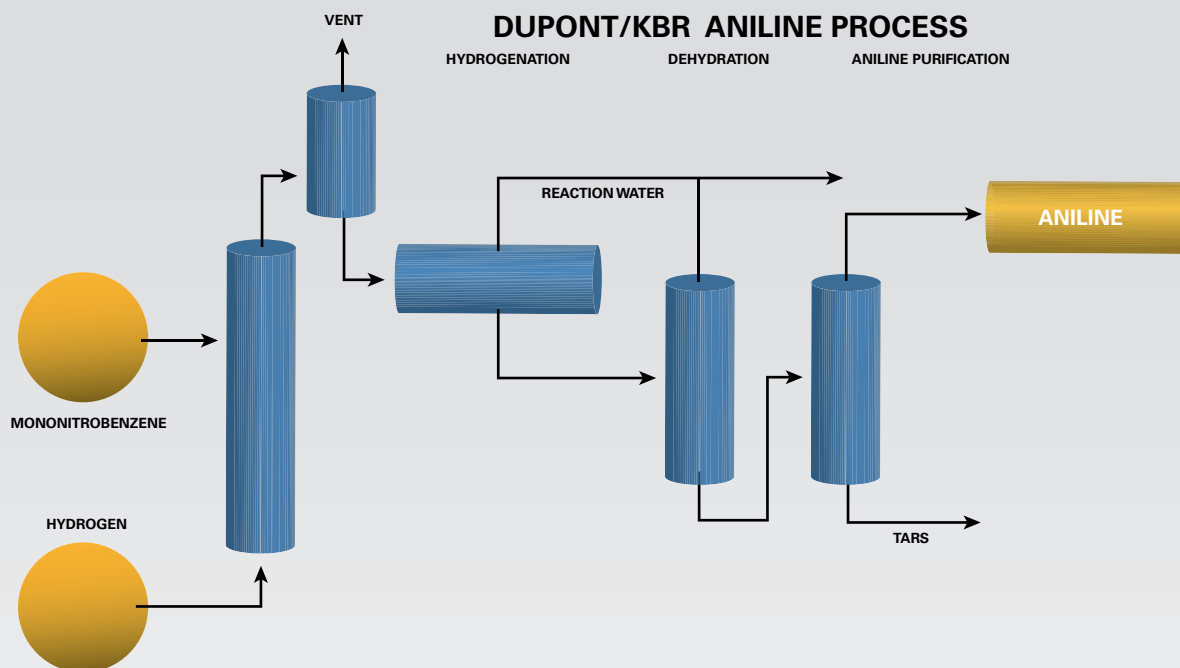
The Aniline Process

MNB is fed together with hydrogen into a liquid phase plug-flow hydrogenation reactor that contains a DuPont proprietary catalyst. The supported noble metal catalyst has a high selectivity and the MNB conversion per pass is 100 percent. The reaction conditions are optimized to achieve essentially quantitative yields and the reactor effluent is free of MNB. Excess hydrogen from the reactor effluent is vented and the reactor product is sent to a dehydration column to remove water of reaction followed by a purification column to produce high quality aniline product.

Product Quality

The DuPont/KBR aniline process consistently produces a very high quality aniline product, suitable for all methylene diphenyl diisocyanate (MDI) production technologies, and other specialty chemical applications. The typical product quality is:

Aniline, wt%	99.95
MNB, ppmwt	0.1
Water, ppmwt	300
Color, APHA	30
Freeze Point (dry basis) oC	-6.0



High-quality, low cost technology

The DuPont/KBR aniline process has been optimized to produce high quality aniline product at low manufacturing cost. Key features of this technology are:

High Yields –The process consistently achieves 99.5% efficiency of mono-nitrobenzene utilization.

High Purity Product – Aniline produced maintains constant high product purity without variations due to changes in catalyst activity, which are typical of vapor-phase fixed-bed hydrogenation technologies. The aniline product from this process is the highest quality in the industry, with less than 0.1 ppmwt MNB.

Superior Catalyst System – DuPont's proprietary hydrogenation catalyst and the liquid phase hydrogenation system provides excellent catalyst life. It also avoids the complexity of a catalyst regeneration system typical of vapor-phase technologies. The high selectivity catalyst achieves essentially quantitative yields with minimal by-product formation, resulting in a simple product purification system.

Low Capital Cost –The DuPont/KBR hydrogenation system is mechanically simple and compact. Unlike vapor-phase fluidized-bed or fixed-bed technologies, parallel reactor trains or multiple reactor stages are not required.