

Chemical Profile: Aniline

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Uses

Anilin's main use, accounting for 76% of consumption, is in methyl di-p-phenylene isocyanate (MDI), primarily used for polyurethane (PU) foams. End uses are 45.5% insulation (35% construction, 8.2% refrigeration, 2.3% tank/pipe); 12% rubber products; 10.7% consumer (3.8% textile/fiber, 2.3% coating, 1.5% footwear, 1.5% furniture/furnishing, 0.8% adhesive/sealant, 0.8% apparel); 6.8% transportation (2.3% body/parts, 1.5% seating/furnishing, 1.5% coating, 1.5% adhesive sealant) 6.7% packaging; 4% agriculture; 3.8% foundry core binder; 2.6% manufacturing; 2.1% photography; 1.1% pharmaceutical; 0.5% electronics; 0.5% pulp and paper.

Supply and demand

Global capacity was 7.14m tons/year in 2013, with 2.88m tons/year in Asia Pacific, 2.09m tons/year in western Europe, 1.41m tons in the US, 400,000 tons in Japan, 220,000 tons/year in Eastern Europe, 115,000 tons/year in Asia/Middle East, and 70,000 tons/year in Latin America.

Asia Pacific is the largest consumer, at about 1.85m tons/year, followed by Western Europe at 1.65m tons/year and the US at 1.15m tons/year. Japan, Eastern Europe, Asia/Middle and Latin America consume 427,000 tons/year, 188,600 tons/year, 145,600 tons/year and 60,000 tons/year, respectively. Global demand in 2013 was 5.48m tons/year.

Prices

There is a small merchant market and prices typically track benzene. Chinese prices in the first quarter were ¥10.7-11.5/kg. June contracts for Germany and the US were €1.25-1.39/kg and \$1.8-1.94/kg, respectively.

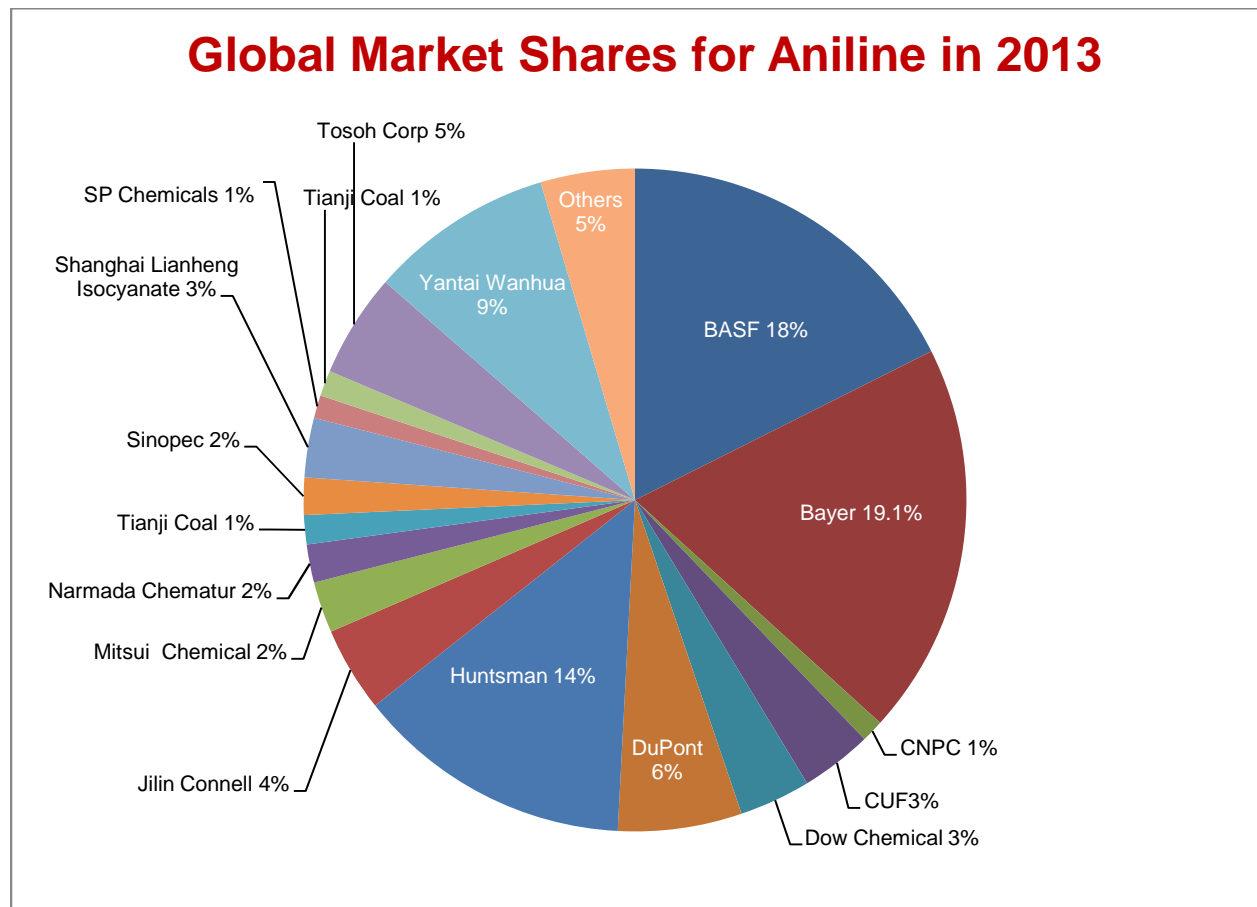
Technology

Most production is based on the catalytic hydrogenation of nitrobenzene, where benzene is mixed with a solution of nitric acid, hydrogenated and then purified by distillation. Both liquid and gas phase hydrogenation are practiced in industry. There are two major variants in gas phase hydrogenation process. with the conventional isothermic process, which is performed at a constant temperature, the substantial heat generated during the reaction must be dissipated using heat transfer oils. The reaction takes place inside a reactor block, in which many thousands of tubes containing the catalyst have been welded together. Finally, the aniline must be purified of byproducts before it can be used further. The adiabatic variant eliminates the need for heat transfer and enables a substantial gain in efficiency. Here the reaction takes place in a large steel vessel, in which the catalyst is placed on a grating. The heat of reaction is dissipated together with the gas flow, eliminating the need for the circulating oil loop. In addition, the

product is also of significantly higher purity. The recent aniline plant with a capacity of 350,000 metric tons in Shanghai, China, is based on this process.

Outlook

Global demand growth is put at 5.1%/year to 2018. Within this period, the Chinese market will grow around 9%/year. BASF and Mongolia Connell will bring new plants on stream in 2014. Yantai Wanhua will expand in both plants. There is plenty of capacity world-wide. The global utilization rate was 77% and only 60% in China.



Major Global Aniline Capacity '000 Tons/Year, 2013^a

Name	Location	Capacity
BASF	Yeochun, South Korea	250.00
	Geismar, LA, USA	290.00
	Antwerp, Belgium	610.00
	Chongqing, China*	300.00
Bayer	Caojing, China	350.00
	Sao Paulo, Brazil	60.00
	Antwerp, Belgium	215.00
	Brunsbuettel, Germany	180.00
	Uerdingen, Germany	166.00
	Niihama, Japan	100.00
	Baytown, TX, USA	250.00
CNPC (Lanzhou Chemical)	Lanzhou, China	70.00
CUF - Quimicos Industriais	Estarreja, Portugal	240.00
Dow Chemical	BSL, Germany	232.00
DuPont	Pascagoula, MS, USA	240.00
	Beamont, TX, USA	150.00
Gujarat Narmada Valley	Bharuch, India	89.00
Hebei Jizhong	Jizhong, China	30.00
Hindustan Organic Chemicals	Rasayani, India	25.00
Huntsman	Geismar, LA, USA	460.00
	Wilton, England	450.00
Jilin Connell	Jilin, China*	360.00
Liaoning Qingyang Chemical	Qingyang, China	27.00
Mangolia Connell Chemical	Tongliao, China	360.00
Mitsui Chemical	Yeochun, South Korea	160.00
National Petrochemical of Iran	PSEZ, Iran**	30.00
Shandong Haihua	Weifang, China	50.00
Shanghai Liansheng	Caojing, China	200.00
Shanxi Tianji Coal	Tianji, China	150.00
Sinopec (Nanjing Chemical)	Nanjing, China	135.00
Sinopec (Phosphate Fertilizer)	Nanjing, China	30.00
SP Chemical	Taixing, China	135.00
Tianji Coal	Shanxi, China	150.00
Tosoh	Nanyo, Japan	300.00
Volzhskiy Orgsintez	Novomoskovsk, Russia	50.00
Yantai Wanhua	Ostrava, Czech Republic***	150.00
	Yantai, China****	540.00

^a Capacity over 20

* New in 2014 ** New in 2016 *** Expansion to 300 in 2015 **** Expansion to 1,080 in 2015

For more information about market and site-specific/technology-specific investment and production cost data for polycarbonates and some 1000 more chemicals, please send your inquiries to trantech@chemplan.biz