

Note: Key data/information in this sample page is hidden, while in the report it is not.

## I Amines production in China

Table I-1-1 Amines production situation in China, 2009

No	Amines	Capacity, t/a	Output, tonnes	Value, million USD
1	Aniline			
2	Melamine			
3	Methylamine			
4	Acrylamide			
5	Caprolactam			
6	Ethanolamine			
7	Thiourea			
8	Urotropine			
9	Isopropylamine			
10	1, 6-Hexamethylenediamine			
11	Dicyandiamide			
12	Nitroaniline			
13	Ethylamine			
14	Isopropanolamine			
15	Tert-butylamine			
16	N-butylamine			
17	Ethylenediamine			

Source: CCM International

For some amines, there is some weakness which limits their development.

- ✓ Technology: At present, [REDACTED] and [REDACTED] needs technology breakthrough in China and in 2010 [REDACTED] has got some improvement as a production line with capacity of 10,000t/a has put into production.
- ✓ Raw material: [REDACTED] needs more key raw material (adiponitrile) resource. Its added value is high now in China.

Many amines producers are expanding their capacity fast, but each has different situation.

- ✓ Though the capacity of [REDACTED] and [REDACTED] is rather large and superfluous in China, spurred by the downstream demand, their capacity is now reasonably increasing and the prospect is promising. Capacity expansion of [REDACTED], [REDACTED] and [REDACTED] is also

fast in China, but the capacity can not satisfy the fast increasing demand, thus their prospect is rather bright.

- ✓ Some amines production is now relatively stable such as X [REDACTED], [REDACTED] and [REDACTED]. Their market is mature and the new entrant is hard to enter now.
- ✓ Some amines are limited by the policy, though the demand increases fast and the market prospect is good, the capacity may not increased fast in the future, such as [REDACTED], and [REDACTED], etc.

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### **I-3 Synthesis routes of amines in China**

In China, according to the raw materials and reaction types, there are mainly 9 production routes for amines as follows:

- ✓ Ammonolysis of alcohol/phenol
- ✓ Ammonolysis of chloralkane
- ✓ Addition reaction of ketone and ammonia
- ✓ Addition reaction of epoxide and ammonia
- ✓ Addition reaction of aldehyde and ammonia
- ✓ Hydration of nitrile
- ✓ Hydrogenation of nitrile
- ✓ Hydrogenation of nitril

Besides these routes, in China, there are some amines which are made from calcium carbimide or urea in China.

It is worth noting that some amines can be made from various routes, and each route adopts different raw materials with different raw material consumption for per unit of amines production. In order to reduce cost, producers may change their production routes. While some amines have only one economic route, producers and researchers try to develop more economic ones.

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## II Major amines products situation in China

### II-1 Amines via ammonolysis of alcohol/phenol

Currently, many common aliphatic amines are produced via ammonolysis of alcohol/phenol, such as [REDACTED], [REDACTED], [REDACTED] etc. Limited by the synthesis technology, various amines are produced at the same time, thus, one producer has a series of amines products.

#### II-1-1 Methylamine series

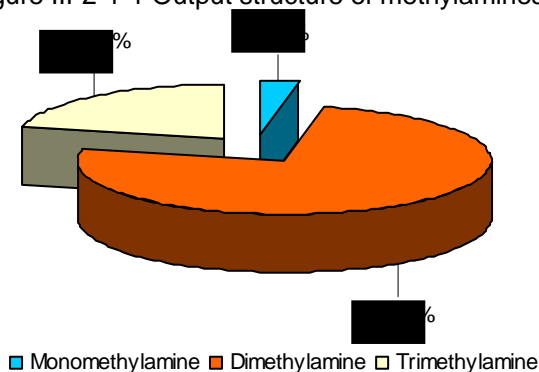
##### II-1-1-1 Production

As the production technology is simple and the raw materials are ample in China, methylamine production is greatly influenced by the downstream demand, especially [REDACTED]. Thanks to the fast increasing demand for [REDACTED], the capacity of methylamine has increased fast in recent years in China. In 2006, the total domestic capacity of methylamine was [REDACTED] t/a, while in 2009 and 2010, the capacity has reached [REDACTED] t/a and [REDACTED] t/a respectively.

In 2009, the output of methylamines is about [REDACTED] tonnes (calculated by 100% methylamine, and the same below) including [REDACTED] tonnes of dimethylamines for [REDACTED] production consumed by methylamine producers.

According to different demand for each methylamine, the output of three methylamines can be adjusted though proportions of raw material inputted and production condition. The output of monomethylamine, dimethylamine and trimethylamine are [REDACTED] tonnes, [REDACTED] tonnes and [REDACTED] tonnes respectively in 2009 in China.

Figure III-2-1-1 Output structure of methylamines in China, 2009



Source: CCM International

## II-1-1-1-1 Producers

As the newly launched methylamine capacity is larger and larger, the degree of industrial concentration has been enhanced in recent years in China. In 2009, the total capacity of top three producers accounts for [REDACTED] % of the total domestic. While in 2010, after [REDACTED] [REDACTED] launched methylamine production with capacity of [REDACTED] t/a, the share of top three increases to 57.50%.

Methylamine production has close relationship with the coal industry in China, especially fertilizer industry. Among the ten key producers, [REDACTED], [REDACTED], [REDACTED], [REDACTED] and [REDACTED] all produce ammonia/urea. Besides, as [REDACTED] occupies important position in the methylamine consumption, almost all the methylamine producers have the capacity of [REDACTED].

Trimethylamine is also the by-product of [REDACTED], so some producers only sell trimethylamine and most of its dimethylamine is used for its [REDACTED] production, such as [REDACTED] and [REDACTED].

[REDACTED] now has not realized the normal continuous production at present, because it is a new entrant and its market share is still small, and thus its large capacity has not contributed to a low production cost to it.

[REDACTED] acquired methylamine and choline chloride business from [REDACTED] in 2007 and [REDACTED] [REDACTED] mainly produces trimethylamine for its choline chloride production.

Table III-2-1-1-1 Key active methylamine producers in China, as of Oct. 2010

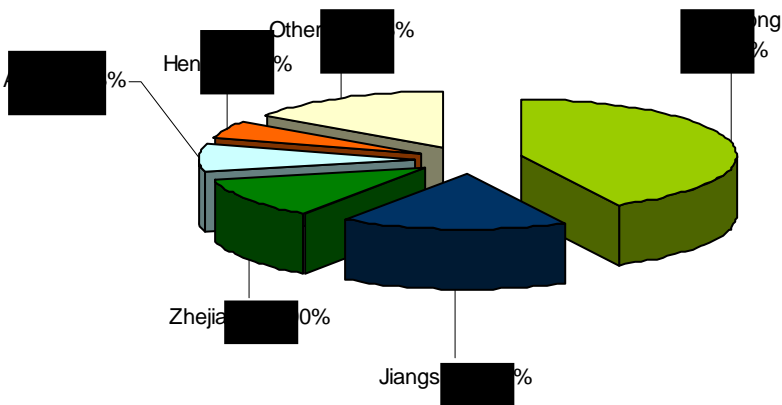
No.	Name	Abbreviation	Location	Capacity 2010, t/a
1	Shandong Hualu-Hengsheng Group Co., Ltd.	Shandong Hualu-Hengsheng	[REDACTED]	[REDACTED]
2	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
3	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
4	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
6	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
7	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
8	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
9	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
10	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source: CCM International

### II-1-1-1-2 Distribution

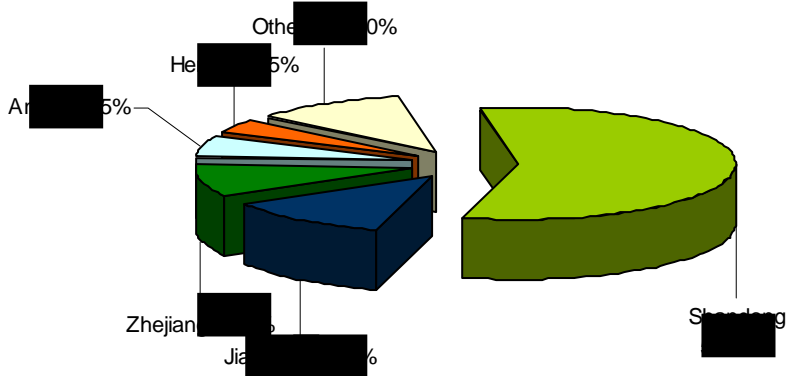
Obviously, the production of methylamine is concentrated in [redacted] and [redacted], mainly in [redacted] such as [redacted] and [redacted]. And the capacity tends to distribute in [redacted] especially in recent years, where a lot of coal chemicals are produced and nears [redacted] the key coal producing area in China.

Figure III-2-1-2-1 Distribution of methylamine capacity in China, 2009



Source: CCM International

Figure III-2-1-2-2 Distribution of methylamine capacity in China, 2010



Source: CCM International

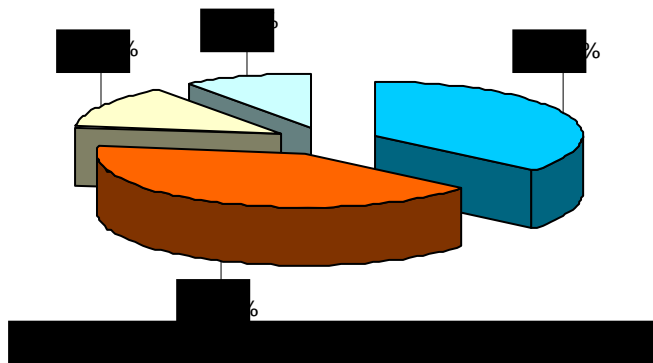
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## II-1-1-5 Downstream consumption of methylamine

### II-1-1-5-1 Monomethylamine

The apparent consumption of monomethylamine is [REDACTED] tonnes in China in 2009, and the major application is [REDACTED] and [REDACTED].

Figure III-2-5-1-1 Consumption structure of monomethylamine in China by volume, 2009



Source: CCM International

[REDACTED]

It is the largest downstream application of monomethylamines now in China, with its monomethylamine consumption volume of [REDACTED]. Monomethylamines is mainly used in [REDACTED] production and acts as sensitizer. [REDACTED] production is regulated by the government, with only a few producers approved to produce [REDACTED]. With the fast developing domestic economy, the demand for [REDACTED] increases rapidly, as the key factor driving up the demand for monomethylamine in recent years.

Table III-2-5-1-1-1 Key water gel explosive producers in China, 2010

No.	Name	Location	Capacity, 2010, t/a
1	[REDACTED]	[REDACTED]	[REDACTED]
2	[REDACTED]	[REDACTED]	[REDACTED]
3	[REDACTED]	[REDACTED]	[REDACTED]
4	[REDACTED]	[REDACTED]	[REDACTED]
5	[REDACTED]	[REDACTED]	[REDACTED]

Source: CCM International

✓ Pesticide

Pesticides were once the biggest downstream industry of monomethylamine, but due to increasingly intense competition in pesticide industry, the demand for monomethylamine increases more slowly in recent years. In 2009, monomethylamine consumption in pesticide production reaches [REDACTED] tonnes, ranking second in total monomethylamine consumption.

Table III-2-5-1-2-1 Key end users of monomethylamine in pesticides in China, 2010

No.	Name	Location	Pesticide type	Capacity, 2010, t/a
1	Hunan Haili Changde Pesticides & Chemicals Co., Ltd.	Hunan	[REDACTED]	[REDACTED]
2	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
3	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
4	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
6	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
7	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
8	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
9	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
10	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source: CCM International

✓ Pharmaceutical

Monomethylamine consumption in pharmaceutical is about [REDACTED] tonnes in China in 2009, mainly used in caffeine and ephedrine production.

China is one of the most important caffeine producing and export countries in the world, and most of [REDACTED] is for export. In 2009, domestic output of [REDACTED] is about [REDACTED] tonnes, among which the export volume is [REDACTED] tonnes. In recent years, the [REDACTED] production and export are stable in China.

Table III-2-5-1-3-1 Key end users of monomethylamine in pharmaceuticals in China, 2010

No.	Name	Location	Pharmaceutical type	Capacity, 2010, t/a
1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
2	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
3	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
4	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

*Source: CCM International*

✓ Others

In other applications, the consumption volume of monomethylamine is about [REDACTED] tonnes in China in 2009, including dyestuff, surfactant, spice, etc. Generally, consumption in these fields has little influence on the monomethylamine development.