

I-5 Brief Introduction to the Raw Material - Formaldehyde

Formaldehyde is the raw material. Formaldehyde polymerizes in both gas phase and liquid phase. Therefore, there is no commercial formaldehyde gas or liquid available. Formaldehyde is sold as formaldehyde solution.

Most of domestic PF producers use 37% formaldehyde as the raw material, and only some use 55% as the raw material for PF production.

PF producers adopt different concentration formaldehyde according to different production technologies they are adopting. Generally speaking, production with domestic production technology adopts 37% formaldehyde, and that with foreign production technology adopts 55% formaldehyde.

The production cost with 55% formaldehyde is lower than that with 37% formaldehyde. The main reason are listed as follows,

- ✓ the unit consumption of formaldehyde is lower when use 55% formaldehyde as the raw material
- ✓ 55% formaldehyde does not need the first phase desiccation because of its high concentration. So, it saves electricity and steam.

TableI-5.1 PF producers use different concentration of formaldehyde.

NO.	Abbr.	Formaldehyde source	Formaldehyde concentration
II-1.01		Captive production	37%
II-1.02		Captive production	55%
II-1.03		Captive production	37%
II-1.04		Captive production	37%
II-1.05		Out sourcing	37%
II-1.06		Captive production	37%
II-1.08		Captive production	37%
II-1.09		Captive production	37%
II-1.10		Captive production	37%
II-1.11		Captive production	45%-50%
II-1.12		Captive production	37%
II-2.01		Out sourcing	37%
II-2.02		Captive production	55%
II-2.03		Captive production	55%
II-2.04		Captive production	37%

Generally, formaldehyde is a basic and low value-added chemical. The property of formaldehyde decides that it is not convenient for the transportation. So usually it is consumed *in situ*. And both the import quantity and the export quantity are quite small. But the supply of formaldehyde in China has been relatively stable in the past years.

I-6 Brief Introduction to Technology of Paraformaldehyde in China

I-6.1 Summary of PF technology in China in 2007

Domestic PF technology starts with research on polyformaldehyde production technology, which is much simpler and easier compared to the polyformaldehyde production technology.

Most of the domestic technologies being used now come from Hebei Xinhua. With development of PF industry, this technology has changed little in recently years. Meanwhile, Chinese PF producers have started to introduce foreign technologies to improve the production level of PF.

➤ **Characteristics of Domestic Traditional PF Production Technology**

- ✓ 95%-97% PF is the mainstream category of PF in China. The 92% PF domestic producers produced with the domestic technology can't meet the requirement of the market because of its high water content. The depolymerization of 96% PF is not as good as that of 92% PF.



- ✓ Vacuum concentration has high requirement for equipment and consumes a great amount of steam. And in the concentration process, a little formaldehyde yields formic acid, which creates serious erosion to the facilities.
- ✓ Domestic improve the process of concentration and polymerization. Generally, 1MT PF needs about 3.8MTs industrial formaldehyde, making raw material cost to reach RMB 3,500~4,000/MT. The total cost is around RMB6,000/MT, while the imported price is up to RMB8,000/ton. Therefore, the domestic products have competitive advantage in price.

➤ **Technique acquisition**

- ✓ Domestic PF producers are trying to introduce the foreign technology. Shanxi Sanwei introduces the technology from Germany with the production capacity of 10,000 MTs/a, Yantai Wanhua introduces the technology from Denmark with the production capacity of 30,000 MTs/a and Zhejiang Guoguang introduces the technology from India Unite Resin Chemical with the production capacity of 20,000 MTs/a.
- ✓ The production scale of imported technology is more than 10,000 MTs/a, which is more than that of the domestic technology.

- ✓ The foreign technology adopts 50%-55% industry formaldehyde as the raw material to produce PF. Generally 1MT PF needs about 3.1 MTs industrial formaldehyde.
- ✓ 92% PF is the mainstream category of PF produced with the foreign technology. 92% PF have good products performance, such as good depolymerization.

Tablel-6.1 Production technology of PF in China

No.	Abbr.	Location	Status'07	Launch time	PF process	PF category
II-1.01	██████████	Jiangsu	Active	██████	██████████	92%
II-1.02	██████████	Jiangsu	Active	██████	██████████	96%(95%~97%)
II-1.03	██████████	Hebei	Active	██████	██████████	96%(95%~97%)
II-1.04	██████████	Hebei	Active	██████	██████████	96%
II-1.05	██████████	Hebei	Active	██████	██████████	96%
II-1.06	██████████	Shandong	Active	██████	██████████	96%~97%
II-1.07	██████████	Tianjin	Active	██████	██████████	96%
II-1.08	██████████	Hebei	Active	██████	██████████	96%
II-1.09	██████████	Shandong	Active	██████	██████████	96%
II-1.10	██████████	Hebei	Active	██████	██████████	96%
II-1.11	██████████	Hebei	Active	██████	██████████	96%
II-2.01	██████████ ██████████	Shandong	Potential	██████	██████████	92%, 96%
II-2.02	██████████	Shanxi	Potential	██████████ ██████	██████████	\
II-2.03	██████████	Shandong	Potential	██████	██████████	87%,93%96%
II-2.04	██████████ ██████████	Zhejiang	Potential	██████	██████████ ██████████	91%-93%