CCM Data & Business Intelligence

Company Research of Three Jo

The First Edition

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Researched & Prepared by:

Kcomber Inc.

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1 Company basic information

- Changzhou Joel Plastics Co., Ltd.

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Tel: 86-15995059194
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Email: czjoel@163.com
Contact: Mr. Xiao

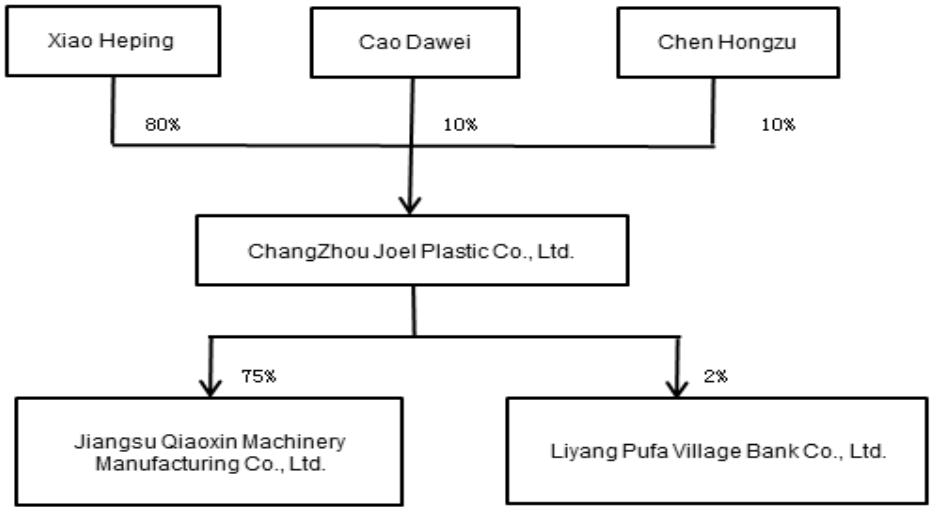
Changzhou Joel Plastics Co., Ltd. (Changzhou Joel) was established in 2005, with a registered capital of RMB30.8 million as of Nov. 2021. The company covers an area of 98,000 square meters. It is a private enterprise specialized in R&D, production and sales of urea formaldehyde molding compound (UFMC) and formaldehyde. As of Nov. 2021, the capacity of Changzhou Joel's UFMC and formaldehyde was 70,000 t/a (45,000 t/a powder type UFMC and 25,000 t/a granule type UFMC) and 150,000 t/a respectively.

Table 1-1 Key events in Changzhou Joel's history

Year	Event
2005	Changzhou Joel Plastics Co., Ltd. was established.
2006	Its 3,000 t/a UFMC production line was completed and put into production.
2011	1) Was recognized as a high-tech enterprise. 2) Co-built a new material technology research and development center with Beihang University. 3) Established the Jiangsu Engineering Research Center of Thermosetting Material.
2013	It signed a industry-university cooperation agreement with Sichuan University for technology development cooperation.
2014	The first phase (100,000 t/a formaldehyde) of the 150,000 t/a formaldehyde project passed the acceptance check.
2018	The second phase (50,000 t/a formaldehyde) of the 150,000 t/a formaldehyde project passed the acceptance check.

Source: Changzhou Joel Plastics Co., Ltd.

Figure 1-1 Ownership structure of Changzhou Joel, as of Nov., 2021



Source: CCM

- Liyang Josen Plastic Co., Ltd.

Address: Jiuxian Industrial Zone, Nandu Town, Liyang City, Jiangsu Province 213373, P. R. China
Website: http://www.lyjosen.com/
Tel: 86-13801494338
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Email: josen@joesd.com
Contact: Mr. Chen

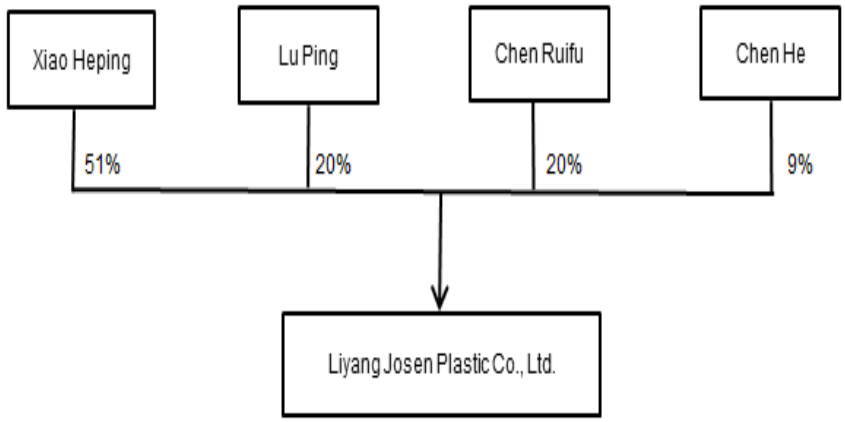
Established in 2009, Liyang Josen Plastic Co., Ltd. (Liyang Josen) had a registered capital of RMB20 million and about 80 employees as of Nov. 2021. The company covers an area of 53,000 square meters. It specializes in the production of granular type UFMC.

Table 1-2 Key events in Liyang Josen's history

Year	Event
2009	Liyang Josen Plastic Co., Ltd. was established.
2010	Its 30,000 t/a granular UFMC production line was completed and put into operation.
2012	The company was recognized as a high-tech enterprise in Jiangsu Province.

Source: Liyang Josen Plastic Co., Ltd.

Figure 1-2 Ownership structure of Liyang Josen, as of Nov., 2021



Source: CCM

- Liyang Jody Plastic Co., Ltd.

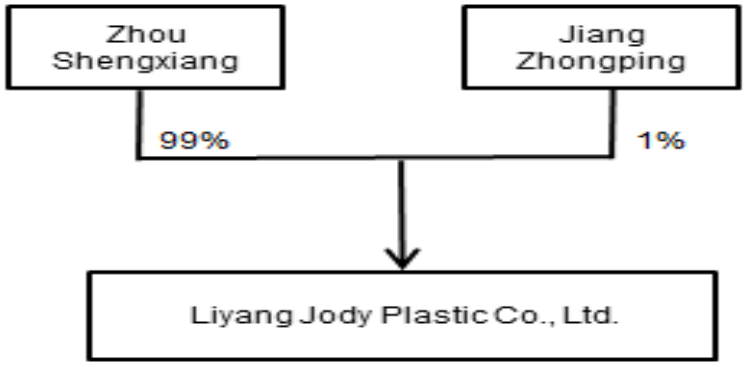
Address: No. 281 Yong'an Road, Nandu Town, Liyang City, Jiangsu Province 213371, P. R. China
Phone: 86-519-87623109
Email: 475262332@qq.com
Contact: Mr. Zhou

Established in 2009, Liyang Jody Plastic Co., Ltd. (Liyang Jody), formerly known as Liyang Yongan Thermosetting Plastic Co., Ltd., was invested and established by Xiao Hepinghe, Xia Yiping, Huang Guoxing and Gu Xuan. The company now has registered capital of RMB3.78 million.

Liyang Jody ceased production at the end of 2018, as Changzhou Municipal People's

Government promoted workplace safety and environmental protection in the chemical industry; its production capacity was transferred to Changzhou Joel. And in 2019, Xiao Heping and others withdrew from the company's operation and management.

Figure 1-3 Ownership structure of Liyang Jody, as of Nov., 2021



Source: CCM

2 Production of UFMC in China 2015-2021 H1

2.1 Changzhou Joel Plastics Co., Ltd.

Table 2.1-1 Capacity and output of UFMC in Changzhou Joel, 2015–H1 2021

Year	Capacity, t/a	Output, tonne
2015	45,000	38,000
2016	45,000	40,000
2017	45,000	38,000
2018	45,000	39,000
2019	70,000	50,000
2020	70,000	51,000
H1 2021	70,000	30,500

Source: CCM

2.2 Liyang Josen Plastic Co., Ltd.

Table 2.2-1 Capacity and output of UFMC in Liyang Josen, 2015–H1 2021

Year	Capacity, t/a	Output, tonne
2015	30,000	20,000
2016	30,000	25,000
2017	30,000	23,000
2018	30,000	24,000
2019	30,000	25,000
2020	30,000	25,000
H1 2021	30,000	13,000

Source: CCM

2.3 Liyang Jody Plastic Co., Ltd.

Table 2.3-1 Capacity and output of UFMC in Liyang Jody, 2015–H1 2021

Year	Capacity, t/a	Output, tonne
2015	25,000	12,000
2016	25,000	10,000
2017	25,000	12,000
2018	25,000	11,000
2019	0	/
2020	0	/
H1 2021	0	/

Note: Liyang Jody stopped production at the end of 2018, and its capacity has been transferred to Changzhou Joel.
Source: CCM

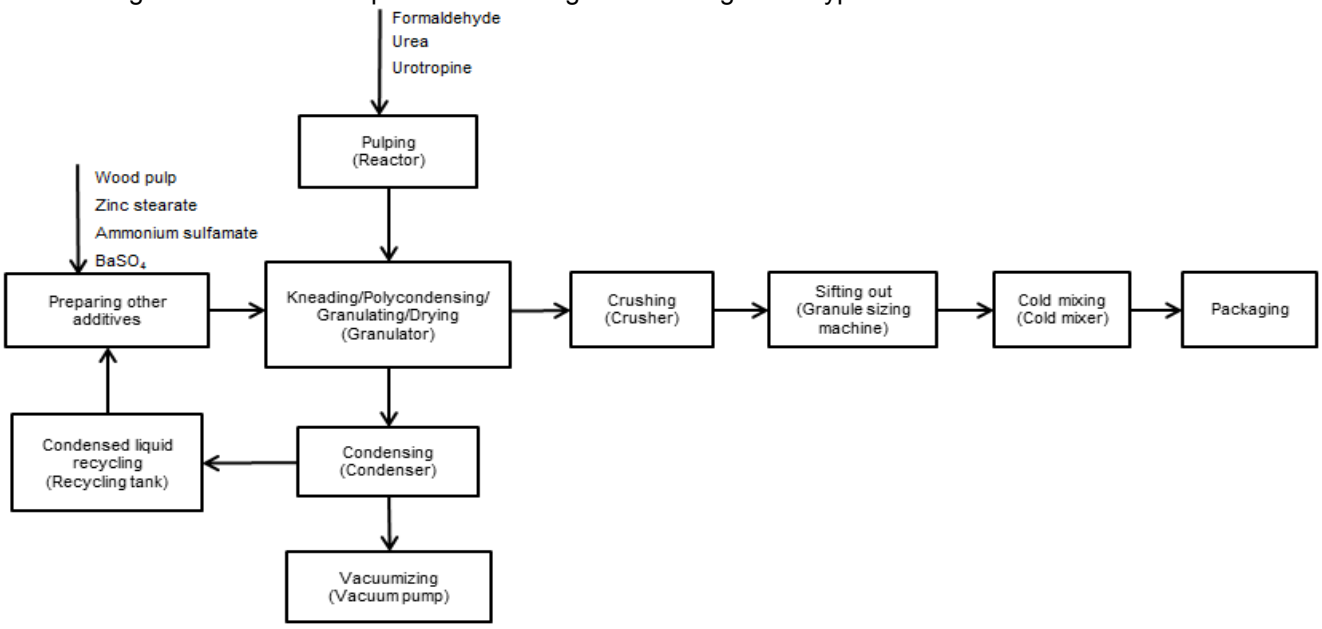
3 Technology and R&D

Table 3-1 Technology level of UFMC producers in China

Producer	Technology	Product type	Technology source	Technical level
Changzhou Joel	One-step granulating technology	Granule type	Buss AG	Changzhou Joel developed the technology by improving and optimizing foreign technology, using a vacuum granulator that integrates kneading, polycondensing, granulating and drying. This process is short and has the advantages of low cost and environmental friendliness. Besides, the company has worked out new functional additives, and developed utilization of wastewater containing formaldehyde residual and an online production monitoring system. Multiple devices and technologies it developed have broken the foreign monopoly situation. The production technology of Changzhou Joel is in the lead in China. Its 30,000 t/a high-performance and low-cost UFMC industrialization project and the industrialization project of key technology in producing high-performance and low-cost environmentally-friendly UFMC have been listed as National Torch Program projects. The company bagged 12 nationally authorized utility model patents throughout the former project. Changzhou Joel provides a complete variety of high quality UFMC products as well as customized products.
	Wet pathway	Powder type	Liyang Yongan Thermosetting Plastic Co., Ltd.	The production lines of Liyang Jody were transferred to Changzhou Joel, and the process did not change significantly, so the technical level is equivalent to that of other domestic producers.
Liyang Josen	Wet pathway	Granule type	/	Compared with the mainstream wet process in China, Liyang Josen's production equipment has a higher degree of automation and continuity.
Other domestic producers	Mainly based on wet pathway	Powder type	/	The technology of producing UFMC in China originally came from the Soviet Union. Most domestic producers adopt wet process, which matures through years of improvement to the traditional wet process. And the production equipment has been greatly optimized. Production technologies and product quality & properties in most enterprises are similar. Some manufacturers gain advantages in product quality by optimizing the formulation of raw materials. Such technologies have the disadvantages of long process, high energy consumption, more dust during production, serious environmental pollution, low product density and poor appearance.

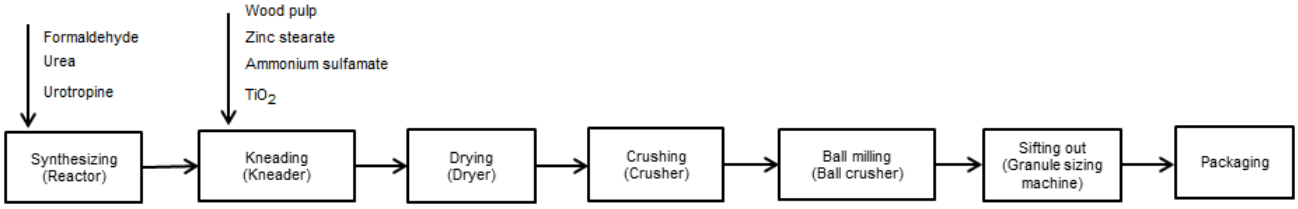
Source: CCM

Figure 3-1 Production process of Changzhou Joel's granule type UFMC



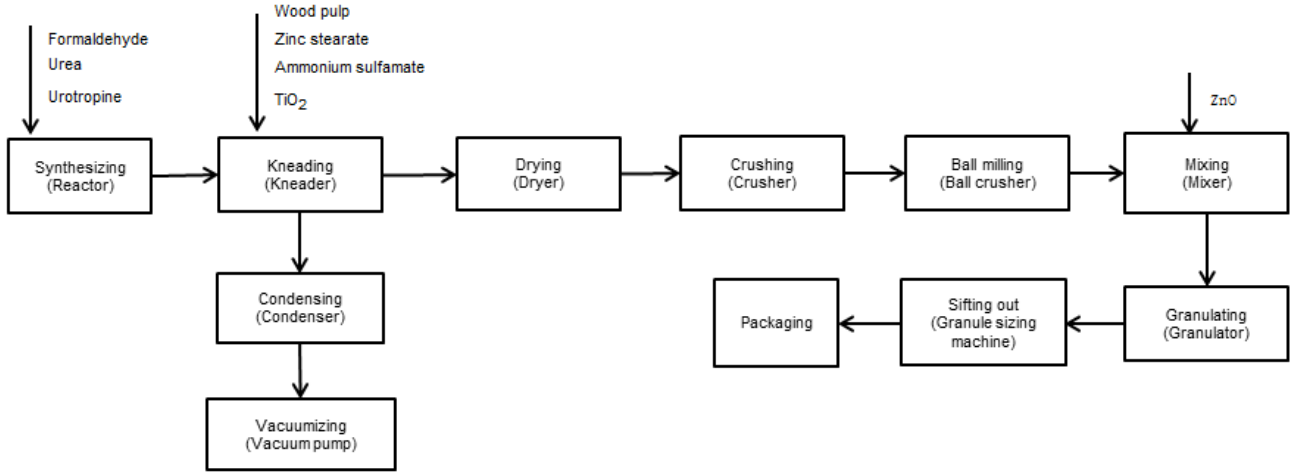
Source: Changzhou Joel Plastics Co., Ltd.

Figure 3-2 Production process of Changzhou Joel's powder type UFMC



Source: Changzhou Joel Plastics Co., Ltd.

Figure 3-3 Production process of Liyang Josen's UFMC



Source: Liyang Josen Plastics Co., Ltd.

Table 3-2 Product quality of Changzhou Joel's granule type UFMC

No.	Property	Specification
1	Mold shrinkage, %	0.30–0.60
2	250μm Residue on sieve, %	≥85
3	Fluidity (Raschig), mm	140–200
4	Tensile strength, MPa	≥45
5	Bending strength, MPa	≥80
6	Charpy impact strength, KJ/m^2	≥5.5
7	Charpy notched impact strength, KJ/m^2	≥1.5
8	Deflection temperature at 1.8 MPa, ℃	≥130
9	Deflection temperature at 8.0 MPa, ℃	≥90
10	Combustibility, mm	≤10
11	Volume resistivity, Ω·cm	$\geq 10^{12}$
12	Surface resistivity, Ω	$\geq 10^{11}$
13	Dielectric strength, MV/m	≥10
14	Water absorption (24 hours), mg	≤115
15	Density, g/cm^3	≤1.52
16	Ball indentation hardness, N/mm^2	≥270

Note: The product quality of top-grade Compound granule type UFMC has already met the UL certification standard of America, DIN7708 part III standard of Germany and ISO14527:1999.
Source: Changzhou Joel Plastics Co., Ltd.

Table 3-3 Product quality of Changzhou Joel's powder type UFMC

No.	Properties	Specification
1	Mold shrinkage, %	0.60–1.00
2	Fluidity (Raschig), mm	140–200
3	Specific volume, mL/g	≤3
4	Volatile matter, %	≤4
5	Water absorption (24 hours), mg	≤100
6	Heat deflection temperature, ℃	≥115
7	Charpy notched impact strength, KJ/m^2	≥1.8
8	Bending strength, MPa	≥80
9	Dielectric strength, MV/m	≥9

Source: Changzhou Joel Plastics Co., Ltd.

Table 3-4 Product quality of Liyang Josen's UFMC

No.	Properties	Specification
1	Mold shrinkage, %	0.60–0.90
2	250μm Residue on sieve, %	≥90
3	Fluidity (Raschig), mm	140–200
4	Molding speed, s	14–18
5	Tensile strength, MPa	≥45
6	Bending strength, MPa	≥85
7	Charpy notched impact strength, KJ/m^2	≥5.5
8	Deflection temperature at 1.8 MPa, ℃	≥130
9	Deflection temperature at 8.0 MPa, ℃	≥90
10	Combustibility, mm	≤10
11	Volume resistivity, Ω·cm	$\geq 10^{12}$
12	Surface resistivity, Ω	$\geq 10^{11}$
13	Water absorption (24 hours), mg	≤110
14	Density, g/cm^3	1.48–1.52

Source: Liyang Josen Plastic Co., Ltd.

4 Conclusion

Three Jo companies include Changzhou Joel, Liyang Josen and Liyang Jody. Changzhou Joel and Liyang Josen are major UFMC manufacturers in China. As of H1 2021, the capacity of Changzhou Joel and Liyang Josen was 70,000 t/a and 30,000 t/a respectively.

Changzhou Joel produces powder type and granular type UFMC. The company independently developed one-step granulating technology after introduction and absorption of foreign advanced technologies, and has continued to increase efforts in R&D and innovation. Its granular type UFMC is of relatively high quality, and can meet the requirements of many customers at home and abroad.

Liyang Josen and Liyang Jody mainly produce UFMC through the wet process, though the process has the disadvantages of long process and serious pollution. Liyang Jody mainly produced powder type UFMC; at the end of 2018, it withdrew from this industry and the capacity was shifted to Changzhou Joel. Liyang Josen produces granular type UFMC, converted from powder type.

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