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Innovation Research of Battery Separator Under Low Carbon Background

Nanjing Fiberglass Research & Design Institute Co., Ltd.

Unity Struggle Innovation Intensify



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• www.fiberglasschina.com

Catalogue

■ Company Introduction

Main Product

Product Advantage

Industrial Distribution



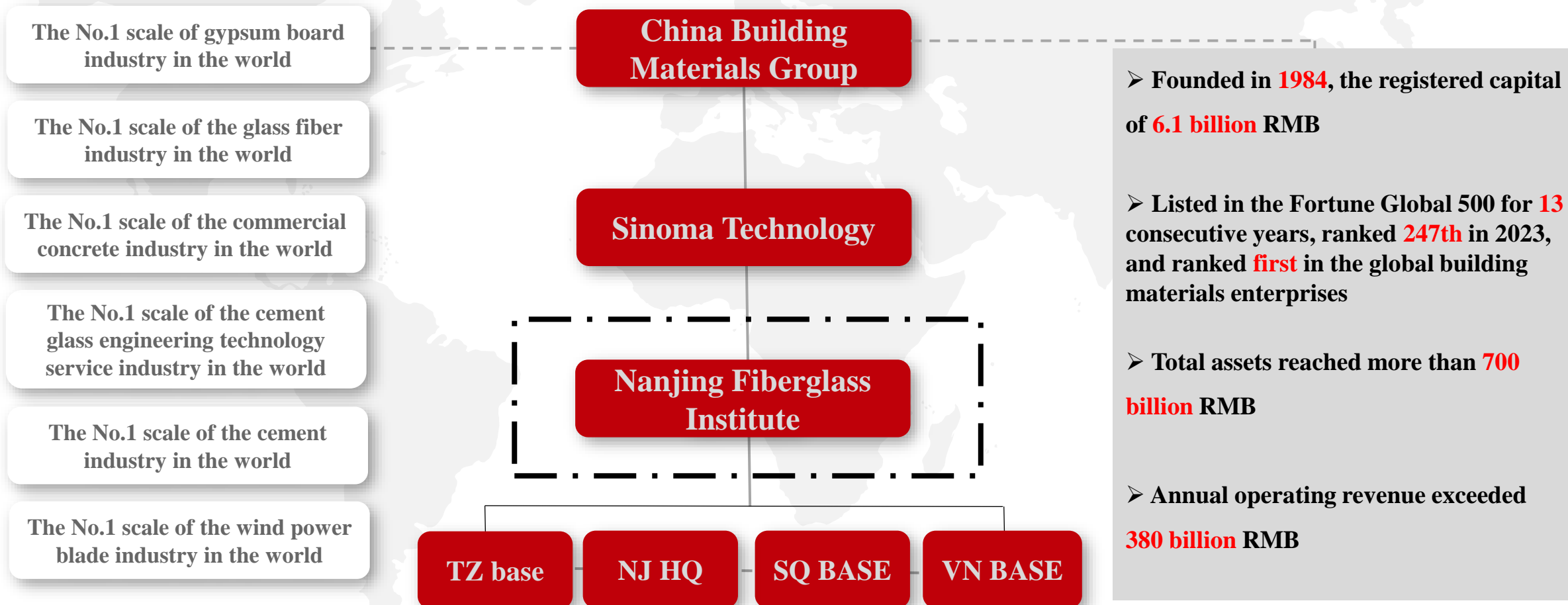
Company structure



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The world's largest comprehensive building materials industry group

The world's leading developer and integrated service provider of new materials



NGF Development history



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Nanjing Fiberglass Research & Design Institute Co.,

The **only one** with ability of **research, design, manufacturing and evaluation** in chinese fiberglass industry.

A **national research institute** with a series of core technologies and a improved innovation system

Keep leading the technological development direction of glass fiber composite materials in China.



1964

Founded with national project 'Two Bombs, One Satellite'



1989

Researching wet process product



1999

Becoming a scientific and technological enterprise



2001

Join Sinoma Tech



2006

Sinoma Technology successfully listed



2016

Join CNBM

Change Development



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Full series of battery separator



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❑ SSB sepa- for start-stop battery

❑ CB sepa- for telecommunication

❑ EB separ- for electric bike

❑ EVB separ-for four-wheeler vehicle

❑ TB sepa- for traction battery

❑ PP (scrim) sepa-

❑ UB sepa- for standby battery

❑ TI sepa- for thermal insulation

❑ SB sepa- for energy storage battery

❑ MB sepa- for motorcycle

❑ TAB sepa- for parking air conditioner battery

❑ LT sepa-for lithium-thionyl battery

Application scenarios



EB separator series

- Mainly used in electric bicycle batteries;
- EB series has the characteristics of small pore size and high strength;
- Meet the performance of deep cycle, vibration resistance ...



EVB separator series

- Mainly used in locomotive, electric forklift and golf cart batteries;
- EVB series has excellent acid absorption and strength performance;
- Meet the performance of instantaneous high current discharge, deep cycle ...



MB separator series

- Mainly used in maintenance free battery for motorcycle starting;
- MB Series has good acid absorption capacity;
- Meet the performance of battery instant starting ...



TB separator series

- Mainly used in high-speed rail car, urban rail batteries;
- TB series has excellent acid absorption and resilience;
- Meet the high and low temperature performance, high-power startup ...

Application scenarios



CB separator series

- Mainly used in communication industry;
- CB series has good strength 、 acid absorption and porosity;
- Meet the needs of power supply of base station...



SB separator series

- Mainly used in new green energy storage batteries such as solar and wind energy;
- SB series has excellent strength , resilience;
- Meet the performance of high current acceptance, long service life and temperature resistance...



UB separator series

- Mainly used in backup power batteries, like data center, aerospace, national defense, transportation systems, power systems, etc.
- UB series has outstanding PS 、 TS 、 resilience, and low max pore size;
- Meet the performance of short-term high-power discharge, long cycle life...



TAB separator series

- Mainly used in parking air conditioning battery;
- TAB series has excellent TS、 PS、 acid absorption;
- Meet the dual needs of battery SS and deep cycle...

Application scenarios



SSB separator series

- Mainly used in automobile start and stop batteries;
- SSB series has excellent TS、PS and acid absorption performance;
- Meet the harsh requirements of high current discharge of batteries...



TI & BP series

- Mainly used in thermal insulation materials and multi-industry gaskets;
- TI & BP series has the characteristics of high thickness and high porosity;
- Meet the requirements of high-end household appliances, cold chain, home insulation...



PP separator series

- Mainly used in advanced battery production processes such as continuous casting and rolling;
- PP series has excellent strength and thin thickness;
- Meet the requirements of production assembly and battery performance...






LT separator series

- Mainly used for lithium thionyl chloride and manganese batteries;
- LT series has the advantages of high mechanical strength and resistance to electrolyte corrosion;
- Used in water、electric、gas meters, ETC, tire pressure detection, shared bicycles...

Product family-AGM separator



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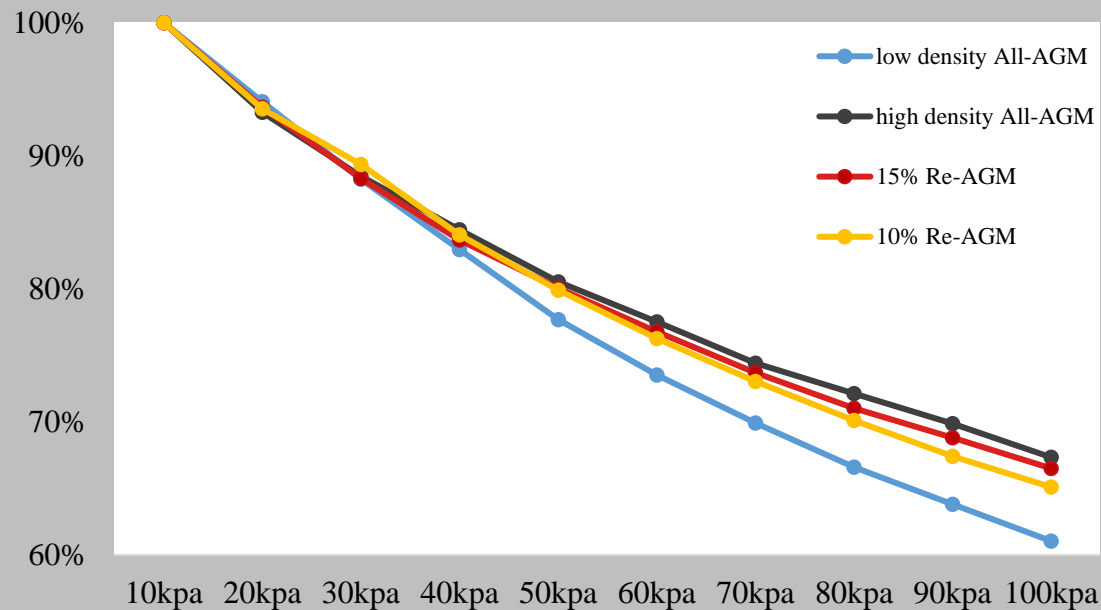
Species			10kPa Thickness mm	Specific surface area m ² /g	Basis weight g/m ²	Tensile MD kN/m	Puncture strength N	Resilience %	LOI %
	Start-Stop	All-Glass Series-1	1.55	1.4	255	0.5	3.5	93.0	—
		Series-2	1.55	1.8	255	0.8	4	93.5	—
	Reinforced	Series-3	1.55	1.5	238	0.6	5	93.0	5.5
		Series-4	1.55	1.8	232	0.9	6	93.5	8
	Industrial	All-Glass Series-1	1.55	1.4	217	0.65	5	93.0	—
		Series-2	1.55	1.6	233	0.9	10	94.0	10
	Reinforced	Series-3	1.55	1.8	248	1.2	15	96.0	15
	Power	All-Glass Series-1	2.5	1.8	400	1.5	8	94.5	—
		All-Glass Series-2	2.5	2.1	400	1.5	10	95.0	—

Product family-AGM separator

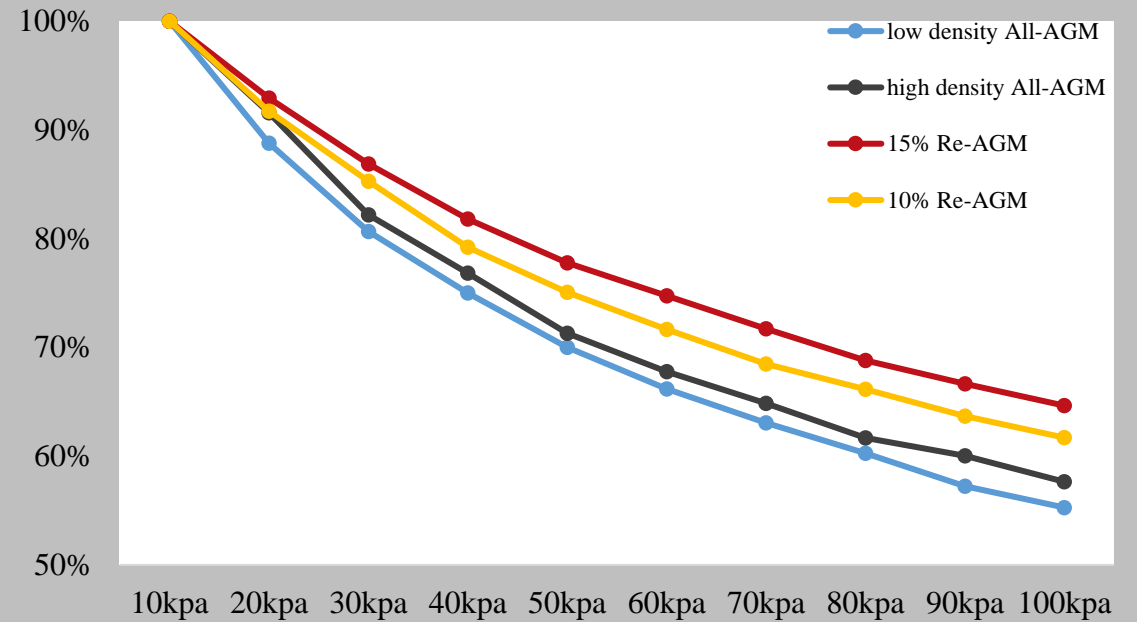


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Dry AGM Compression Ratio



Wet AGM Compression Ratio




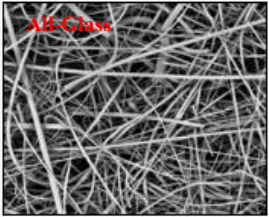
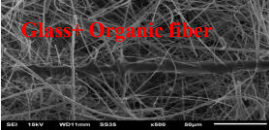
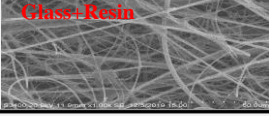

Four types of AGM, All-AGM separator with low density and high density、 Re-AGM separator with 10% OF and 15% OF

- Resilience of Re-AGM separator is higher than All-AGM separator
- For All-AGM separator, higher of the density, better of the resilience
- For Re-AGM separator, higher of the organic fiber content, better of the resilience

Product family-GF Scrim

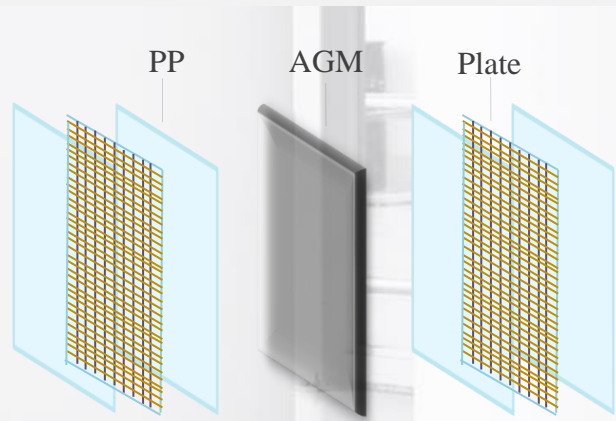


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Species		Thickness mm	Basis weight g/m ²	Tensile MD kN/m	Wicking Height mm/2min	LOI %	SEM
	All-Glass Series-1	0.16	26	0.1	60	—	
	Reinforced Series-2	0.16	26	0.2	55	14	
	Reinforced Series-3	0.16	26	0.4	40	6	
	Reinforced Series-4	0.16	26	0.5	35	10	

Advantage:

- ♥ Good acid resistance
- ♥ No adhesion between plates
- ♥ Good acid absorption, reducing acid stratification;
- ♥ “three-layer” structure, increase cycle life;





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Main Product

■ **Product Advantage**

Industrial Distribution



Production Advantage

Enclosed low-carbon environment



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Photovoltaic power



Energy saving

Real zero-emission static power generation method
Clean energy, energy conservation, emission reduction



Low economy

Reduce production cost

Drying Steam Cycle



Steam source

Steam generated by waste incineration to generate electricity
contributing to a green and low-carbon economy



Steam use

Containing high, medium and low temperature zone
Steam can be recycled



Production Advantage

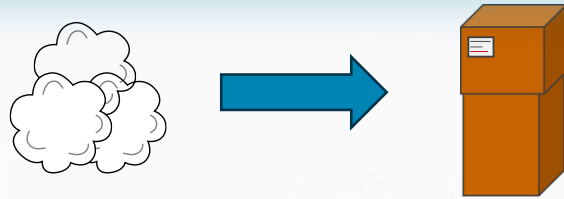
Operating process



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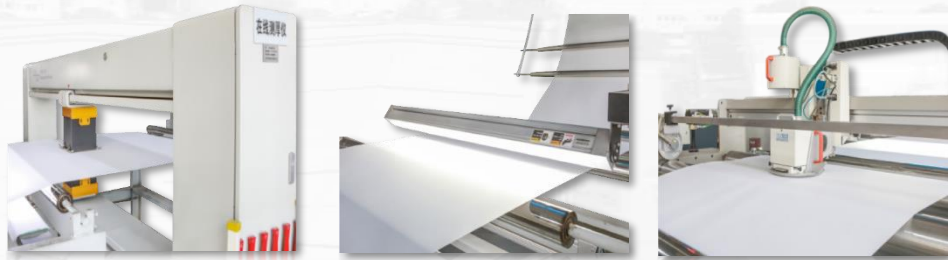


Production process monitoring, data capture, achieving the whole process tracking



Raw material Manufacturing process
Finished product Process link up

All products online real-time inspection



Manufacturing process Full data capture

DCS control Key process visualization





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Quality control of fiberglass separator

To realize the real-time acquisition and control of key performance indicators, appearance, equipment running status, production process parameters, product quality monitoring data in the whole production process.



Quality Advantage

System

ESG



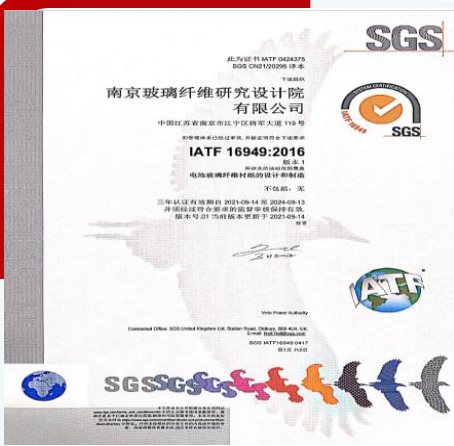
ISO9001



ISO14001



ISO45001



IATF 16949



Audit report

Design Institute Co., Ltd.
Nanjing District, Nanjing
China



Recommendation of the audit team

Based on the audit performed, the results and the score obtained in this report, the audit team makes the following recommendation:

POSITIVE for Certification level		Basic Level (BL)	
Results:			
Overall results CG:		61,0%	
Overall results SM:		58,1%	
Overall results EM:		76,0%	
Overall results ER:		55,1%	
Final Results		62,7%	
Further procedure:			
Next date: Annual monitoring			
Quarter 4, 2024			



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NGF Capacity Distribution



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Industrial layout is one belt, one road and one country

Four bases

Shandong, Tengzhou

Sinoma technology membrane materials (Shandong) Co., Ltd. has a battery separator of 12000 tons / year; pasting paper 1,000t/year

Jiangsu, Nanjing

The battery separator of Jiangjun Avenue factory is 6000 tons / year, pasting paper 2,000 tons / year.

Jiangsu, Suqian

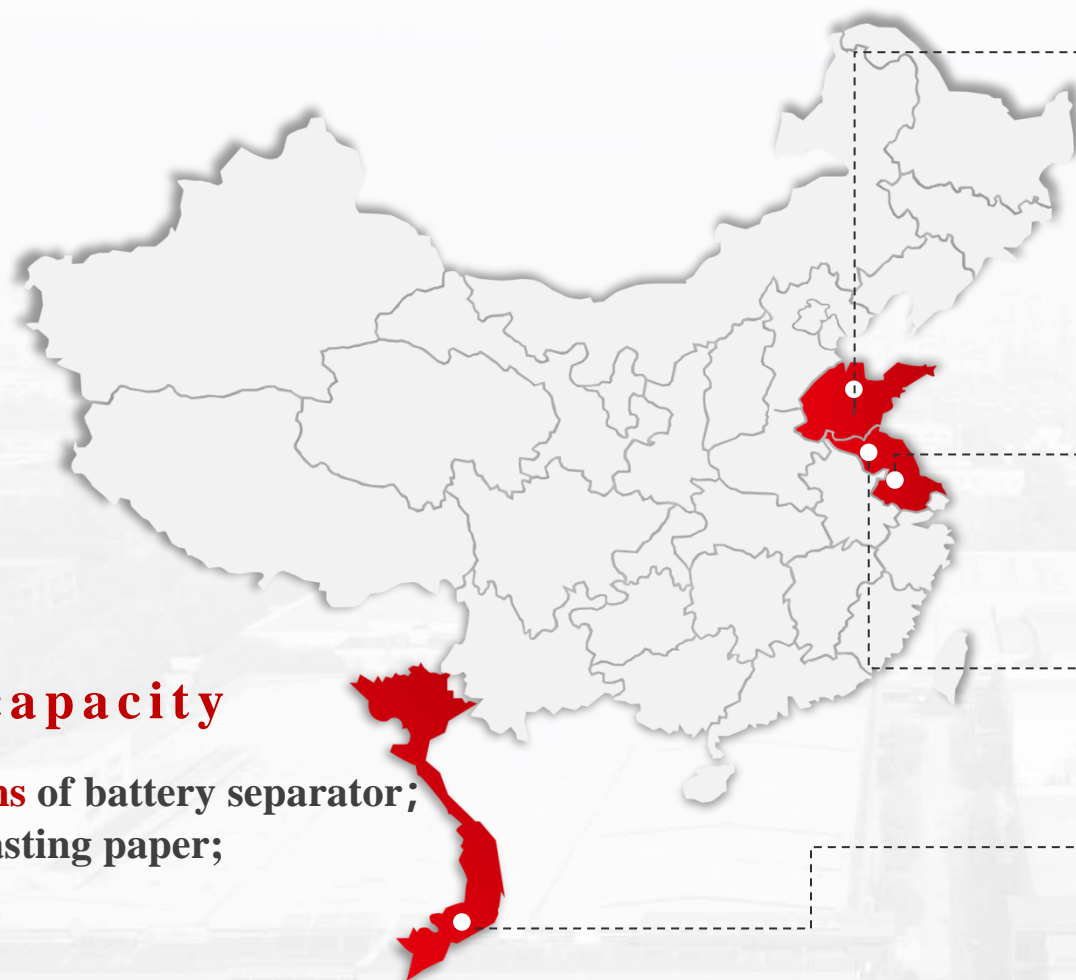
Wet-processing products 15000tons / year

Vietnam, Tongnai

Sinoma membrane materials Vietnam Co., Ltd. has 4 battery diaphragm production lines, 7000 tons / year

Annual capacity

- Over 40000 tons of battery separator;
- 2000 tons of pasting paper;



NGF Industrial Distribution



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Three overseas bases

Industrial layout close to the global service customers



USA Warehouse & Office

radiating throughout the Americas

Germany Warehouse & Office

radiating throughout Europe and Africa

Vietnam Production Base & Office

radiating throughout Southeast Asia

 **Business partner**



Chinese brand World stage

Around Thousands Domestic and foreign customers

- **Asia:** Japan, Korea, Vietnam, Thailand, Indonesia, Indonesia, Philippines, India, etc;
- **Europe:** Germany, Italy, Netherlands, Sweden, Romania, etc;
- **Africa:** Egypt, Togo and Benin;
- **North America:** USA, Canada and Mexico;
- **South America:** Brazil and Argentina.

Business partner



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THANK YOU!