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China fibre cement industry update and its application development

Elkem fibre cement technical centre
Lin Zhen

Report content

- Historical evolution of China fibre cement industry.
- Chinese fibre cement industry standards and product catalog.
- Production capacity and product structure.
- Today’s technology.
- Applications areas.
- Future prospects

Chronicle of China fibre cement development history.

~1930	Asbestos corrugate sheet was produced in China.
1960-1970	Asbestos flat sheet was produced in China.
1980-	Non-asbestos concept was promoted in China.
1980-1990	Non-asbestos corrugate sheet was tried in few factories with the support from China building materials academy.
1990~2000	Non-asbestos flat sheet was produced successfully.
2000-	Coating technology started to be used on the fibre cement product.
2018	High performance decoration fibre cement board was produced with the development of the UHPC product.

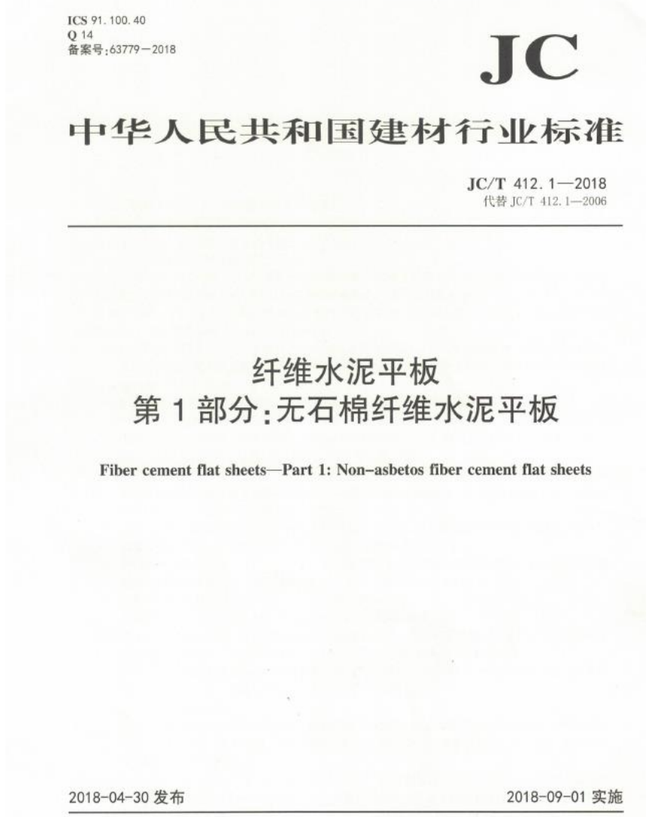
Chinese industry standard regarding the fibre cement

- JC/T 412.1Fiber cement flat sheets
  - Part 1: Non-Asbestos Fiber cement flat sheets
  - Part 2: Asbestos Fiber cement flat sheets

- JC/T 564 Fiber reinforced calcium silicate boards
  - Part 1: Non-Asbestos calcium silicate boards
  - Part 2: Asbestos calcium silicate boards

- JC/T 396 Non-load bearing fiber-reinforced-cement sheet for exterior wall
- GBT 9772-2009 Fibre cement corrugated sheet and ridge tile

Reference standards (flat sheet) : ISO 8336, ISO390, ASTM 1186, EN 12467


ICS 91.100.40
Q 14
备案号:63779—2018

JC

中华人民共和国建材行业标准

JC/T 412.1—2018
代替 JC/T 412.1—2006

纤维水泥平板
第 1 部分:无石棉纤维水泥平板

Fiber cement flat sheets—Part 1: Non-asbetos fiber cement flat sheets

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Quality requirement of flat sheet according to different standard

Standards	ISO 8336-2009			ASTM C1186		EN 12467-2018				JJS A5430:2004			JC/T 412.1-2018 (China)			JC/T 564.1-2018 (China)			
Test parameter	A	B	C	A	B	A	B	C	D	Slate	CS (T2)	CS (T3)	L	M	H	D 0.8	D 1.1	D 1.3	D 1.5
Strength	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Density	○	○	○	○	○	○	○	○	○	-	○	○	○	○	○	○	○	○	○
Moisture movement	○	○	○	○	○	○	○	○	○	○	○	-	○	○	○	○	○	○	○
Water absorption	-	-	-	○	○	○	○	○	○	○	-	-	-	○	○	-	-	-	○
Water content	-	-	-	○	○	○	○	○	○		-	-	○	-	-	○	○	○	○
Water permeability	○	○	○	○	-	○	○	-	○	○	-	-	-	○	○	-	-	-	○
Non combustion property	follow different nations			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Freeze/thaw	○	○	-	○	-	○	○	-	○	○	-	-	-	-	○	-	-	-	○
Warm water	○	○	○	○	-	○	○	○	○	○	-	-	-	-	-	-	-	-	-
Dry/soak	○	○	○			○	○	○	○	○	-	-	-	-	-	-	-	-	-
Heat /rain	○	○	-	○	-	○	○	-	-	○	-	-	-	-	-	-	-	-	-
Thermal Shrinkage	-	-	-	-	-						-	-	-	-	-	○	○	○	○
Thermal conductivity	○	○	○	-	-	○	○	○	-	-	○	○	-	-	-	○	○	○	○
Water vapor transmission [4]	○	○	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	-
Release of dangers	-	-	-	-	-	○	○	○	○	-	-	-	-	-	-	-	-	-	-
Resistance to mould [4]	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Resistance to nail head pull -through[4]	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saturated shear bond perfomrance[4]	-	≥345KPa (7days)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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China fibre cement production capacity

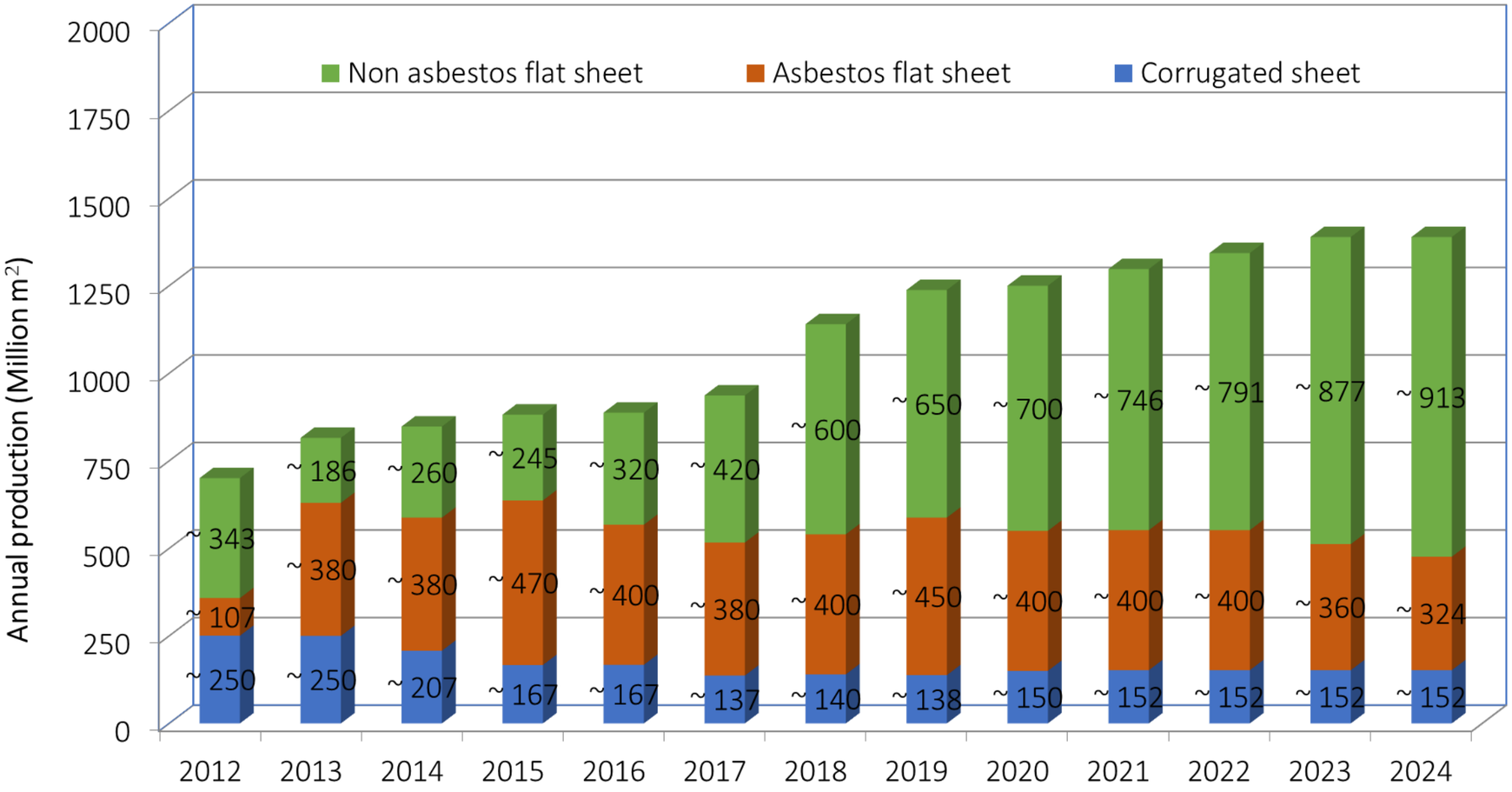

Figure 1 Annual AC/FC production capacity from 2012 to 2024

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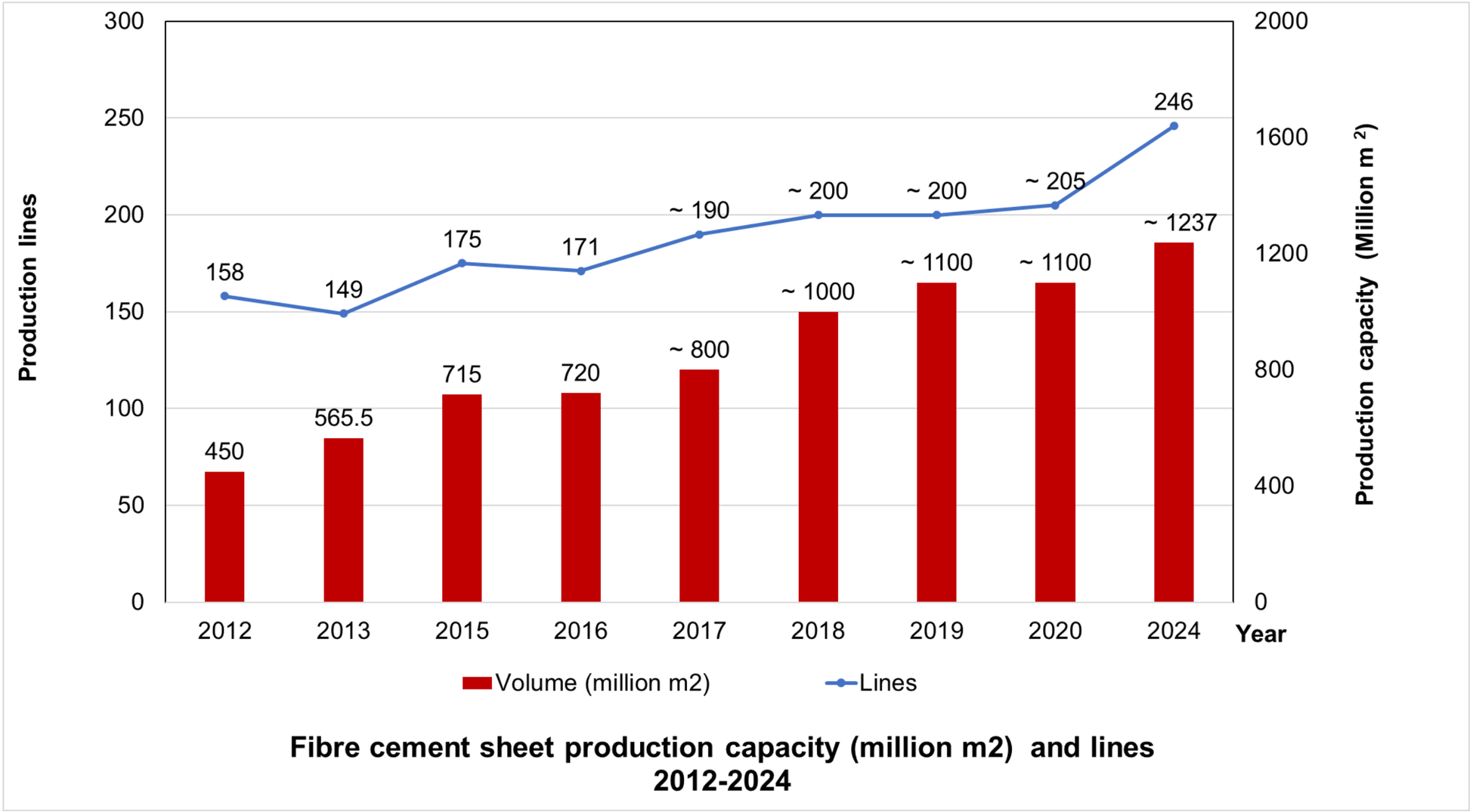
Production volume and lines of flat sheet.



Resource: China Calcium silicate board association-Sep 2024

Today’s technology in China.

Process

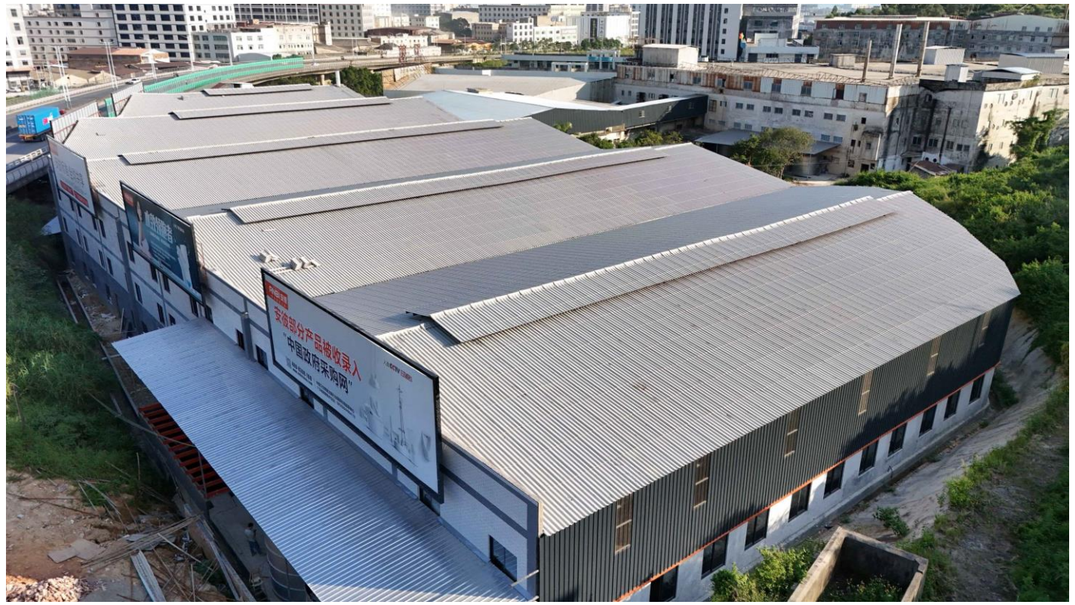
- Hatschek process
- Flow-on process
- Extruding process
- Casting process
- Spray process

Curing technology

- Air-curing (steam)
- Autoclaving

Application-corrugate sheet.

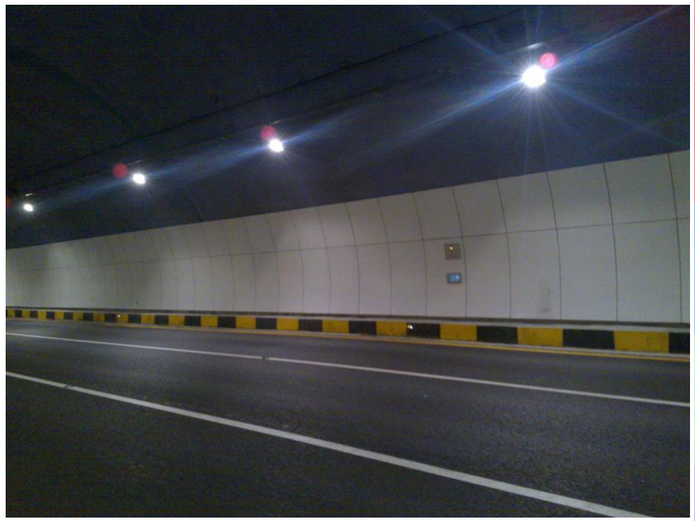
- Corrugated sheet is still mainly asbestos product in China today.
- Corrugated sheet is mainly used for the roofing of breeding farm or some temporary building of industry.



Application-flat sheet.

Flat sheet has been used widely in the construction.

- Internal and external siding board.
- Ceiling
- Ventilation pipe
- Concrete formwork
- Fire resistance board
- Flooring
- Furniture
- ….



UHPC(or UHPFRC) : Ultra High Performance (Fibre Reinforced) Concrete)

- **ACI 239 (2012) - Ultra High Performance Concrete:** Concrete, Ultra- high performance concrete that has a minimum specified compressive strength of 150MPa (22,000 psi) with specified durability, tensile ductility and toughness requirements; fibers are generally included to achieve specified requirements.

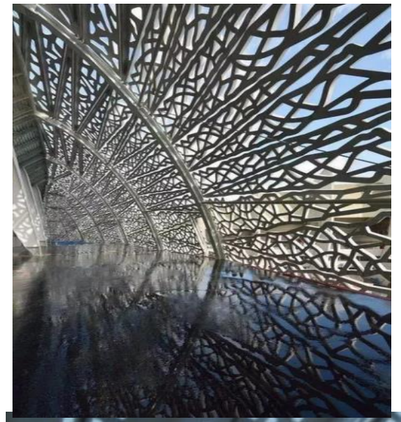
- **ASTM C1856:** concrete, ultra-high performance, a cementitious mixture that has a specified compressive strength of at least 120MPa (17,000 psi) , generally containing fibers and has others measured by standard test methods that comply with specified durability, ductility and toughness requirements.

UHPC(or UHPFRC) : Ultra High Performance(Fiber Reinforced) Concrete)

Chinese industry standard regarding the UHPC panel

- Reactive powder concrete, GB/T31387-2015(material standard) ;
- Fundamental characteristics and test methods of ultra-high performance concrete, T/CBMF 37-2018 (material standard) ;
- Premix for ultra-high performance concrete》 T/CBMF 96-2020 (material standard) ;
- Technical requirement for ultra-high performance concrete, T/CECS 10107-2020 (material standard) ;
- Standard for test method of ultra-high performance concrete, T/CECS 864-2021(test method standard) ;
- Specification for Design of Ultra-high Performance Concrete Structures, T/CBMF 185-2022 (engineering design standard) ;
- Manufacture for production of precast ultra-high performance concrete components, T/CBMF 127-2021 (engineering production standard) ;
- Recommendations for on-site placing ultra-high performance concrete, T/CBMF 128-2021 (engineering technical standard) ;
- Ultra-high performance concrete (UHPC) panel for exterior wall, T/CBMF 171-2022 /T/CCPA 30-2022(product standard) ;
- Ultra-high performance concrete (UHPC) decorative product, T/CBMF 172-2022 /T/CCPA 31-2022(product standard) ;
- Other standards …..on-going

UHPC: Ultra High Performance(Fiber Reinforced) Concrete)



Future prospects of China Fibre cement industry

- The asbestos-free trends is going continually.
- The application scope of the fibre cement-based products will further expand (e.g., UHPC).
- Application of low-carbon cement would be gradually increasing.
- Application of recycled fibre materials will be further increased.
- Curing system for adapting to new material formulas will continue to innovate with the focus on the reduction of energy and CO2 footprint.
- CO2 capture and storage technology will be developed.

Thank you for your attention!

lin.zhen@elkem.com
+86 13911739482

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