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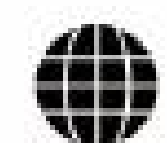
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TechnoPark, Luoyang Institute of Science and Technology University,  
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**PCE Liquid (50%/55%/60% content)**  
**PCE Powder**  
**PCE Synthesis Equipment**  
**Admixture Compounding Equipment**  
**PCE & Admixture technology**  
**PCE & Admixture technical training**



Henan Fuluorui New Materials Co., Ltd

Luoyang Florey Import and Export Co., Ltd

Luoyang Florey Intelligent Equipment Co., Ltd

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# MOST CONCERNED ABOUT

Yeah, and if you work with cement, this is where I can help you a lot.

- 1 If you are engaged in the concrete industry and are usually using PCE series of water reducing agents, we teach you to use PCE mother liquor or PCE powder fully dissolved in water to prepare concrete superplasticizers, so that you learn to produce your own concrete admixtures. We can help you reduce production costs, reduce the cost of water reducer, help you save money.
- 2 If you are engaged in the production of PCE water reducer, using our technology enhancement solutions and excellent PCE powder products, we can help you save costs and increase profits.

In the following, we take **PCE water-reducing agent with 1.0kg (L) /100kg cement content and 20% solid content as an example for comparison.**

| Liquid PCE (50%)         |             |                           |           | PCE powder (98%)         |             |                           |           |
|--------------------------|-------------|---------------------------|-----------|--------------------------|-------------|---------------------------|-----------|
| Materials                | Dosage (kg) | Estimated unit price (\$) | Money(\$) | Materials                | Dosage (kg) | Estimated unit price (\$) | Money(\$) |
| Water-reducing type PCE  | 260         | 1000                      | 260       | Water-reducing type PCE  | 132         | 1785                      | 235.6     |
| Comprehensive type PCE   | 80          | 1080                      | 86.4      | Comprehensive type PCE   | 41          | 1857                      | 76.13     |
| Slump retaining type PCE | 40          | 1100                      | 44        | Slump retaining type PCE | 20.5        | 1928                      | 39.5      |
| Sodium gluconate         | 20          | 800                       | 16        | Sodium gluconate         | 20          | 800                       | 16        |
| Air entraining agent     | 1.2         | 2150                      | 2.58      | Air entraining agent     | 1.2         | 2150                      | 2.58      |
| Deodorant                | 0.3         | 1720                      | 0.516     | Deodorant                | 0.3         | 1720                      | 0.516     |
| Water                    | 598.5       | 0                         | 0         | Water                    | 785         | 0                         | 0         |
| Sum                      | 1000        |                           | 409.5     | Sum                      | 1000        |                           | 370.3     |

To achieve the same result the cost of producing mother liquor is saved about \$40 per 1000kg.

The above table only calculates the cost of raw materials, and does not calculate the packaging cost of liquid. If IBC ton drums are used for packaging, the packaging cost needs to be calculated, and the liquid packaging also requires the investment of storage tanks. The overall production equipment investment will also be greater than that of powder PCE-PD products, according to the statistics in the above table. Take a 20-foot container as an example:

| Liquid PCE in 20-foot container (packing specification 1100kg/IBC) |         | Powder PCE in 20-foot container PCE (packing specification 25kg/bag) |          |
|--------------------------------------------------------------------|---------|----------------------------------------------------------------------|----------|
| Adjustment accuracy                                                | 1100kg  | Adjustment accuracy                                                  | 25kg     |
| The quantity of entire container                                   | 22000kg | The quantity of entire container                                     | 23000kg  |
| The quantity of finished goods that can be produced at one time    | 58000kg | The quantity of finished goods that can be produced at one time      | 118800kg |

This calculation shows that the use of PCE powder can save a port fee, sea freight, customs clearance fees and freight to your factory.

Fully water-soluble PCE powder is a typical product in the production technology of PCE, with obvious technical and cost advantages.





# FLOREY CONCRETE COMPANY

We are one of the few technology-based companies working on chemical adjuvant materials for concrete. It has strong R&D capabilities, excellent professionalism, fully automated production lines, rich application experience, and excellent reputation for the R&D, production and application of concrete admixtures and raw materials. Engaged in concrete and concrete admixture industry for more than 20 years. Accumulated a lot of field application experience and data. Our company is located in the cradle of talents in cement industry in China Luoyang Institute of Science and Technology National University Science park, we are the Henan Fuluorui New Material Co.,Ltd.



## YOU CAN PRODUCE CONCRETE ADMIXTURES BY YOURSELF

We can assist you in manufacturing concrete admixtures including Naphthalene Based Water Reducing Agent, Polycarboxylate Superplasticizer, Set Retarding Type Water Reducing Admixture, etc.



For concrete mixing plants, we can assist you to produce water reducing agent by yourself, and provide technical supports at the same time.

If you have been already buying high concentration polycarboxylate water reducing agent and formulating it, you may comprehensively try our product, which will provide you more choices and let us offer you better, professional solutions.



If you are interested in making water reducing products, we can offer you with devices, raw materials and technical supports and all other services helping you kicking start this business.

If you want to build a water reducing agent factory, we can offer you comprehensive, one - stand solution.



# YOUR R&D CENTER IN CHINA



We established a concrete admixture R&D center occupying 1,500 square meters area. We have cooperation with more than 1,000 admixture producing enterprises, it's all because we have strong research ability, high efficiency in problem solving, and steady product quality. So far we are in procedure of providing our technology and products to your country, helping you succeed in this business. Our R&D center is exactly your R&D center in China.



There are 12 fixed personnel in our center, including 5 with doctor's degree, 4 with master's degree. We are researching and updating our technology every single day. Our R&D center is renewing constantly to offer you nice products in the future, including cement-based and gypsum-based new type chemical admixture of all categories. We warmly invite you to communicate with us.

# PRODUCTION BASE



FINISHED GOODS WAREHOUSE



PRODUCTION ROOM



PRODUCT SHIPPED



Our factory meets the needs of different kinds of concrete superplasticizers manufacturing. The annual capacity of productivity is 50,000 tons of high concentration polycarboxylate water reducing agent. We adopt full automatic devices with centralized control. Our factory realized zero pollution-emitting goal, which means it's green and environmentally friendly.

# PCE MAIN RAW MATERIALS FOR PRODUCTION

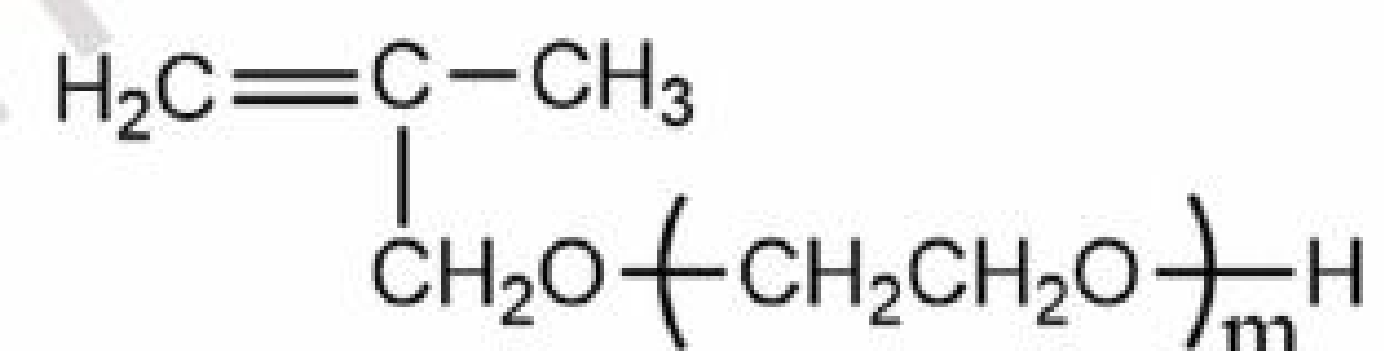
## FOUR-CARBON POLYCARBOXYLATE MONOMER (HPEG/SPEG/C4 MONOMER)

METHYL ALLYL ALCOHOL POLYOXYETHYLENE ETHER



**HPEG/SPEG/C4 Monomer** is the main raw material for the production of polycarboxylic acid superplasticizer, which is prepared by the reaction of methyl allyl alcohol and ethylene oxide. In the production process of PCE, it is generally used to produce water-reducing type water reducer, and the effect of it is not as good as that of TPEG/VPEG/IPEG. Polycarboxylate superplasticizer can be produced by free radical polymerization by heating method or oxidation - reduction method at room temperature.

MOLECULAR STRUCTURE:



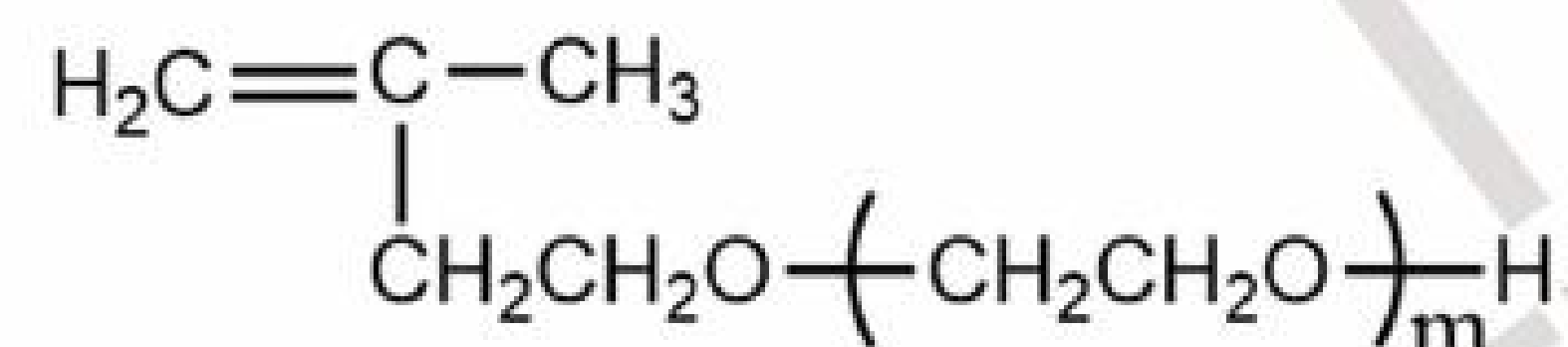
## FIVE-CARBON POLYCARBOXYLATE MONOMER (TPEG/VPEG/IPEG/C5 MONOMER)

ISOPENTENOL POLYOXYETHYLENE ETHER



**TPEG/VPEG/IPEG/C5 Monomer** is the main raw material for the production of polycarboxylic acid superplasticizer, which is prepared by the reaction of isopentenol and ethylene oxide. In the production process of PCE, it is generally used to produce water-reducing type, comprehensive type, slow release type and slump retaining type water reducer. TPEG is better than HPEG as a slump retaining agent. Polycarboxylate superplasticizer can be produced by free radical polymerization by heating method or oxidation - reduction method at room temperature.

MOLECULAR STRUCTURE:



## SIX-CARBON POLYCARBOXYLATE MONOMER (EPEG/GPEG/C6 MONOMER)

VINYL DIETHYLENE GLYCOL POLYOXYETHYLENE ETHER



**EPEG/GPEG/C6 Monomer** is the latest main raw material for the production of polycarboxylic acid superplasticizer, which is prepared by the reaction of vinyl diethylene glycol and ethylene oxide. In the production process of PCE, it is generally used to produce water-reducing type, comprehensive type, slow release type and slump retaining type water reducer. As long as we master the production and use technology of C6 monomer, we can produce a full range of water reducing agents with better effects than HPEG/TPEG. Polycarboxylate superplasticizer can be produced by free radical polymerization by refrigeration method or oxidation-reduction method at room temperature.

MOLECULAR STRUCTURE:  $\text{H}_2\text{C}=\text{CH}-\text{O}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{O}-(\text{CH}_2-\text{CH}_2-\text{O})_n\text{H}$



If you need to use **Monomer** to produce PCE water-reducing type, comprehensive type, slow release type and slump retaining type, please contact our company, our company can provide a full set of production technology and process formula.

PCE production synthesis technology, concrete technology, concrete admixture technology Welcome consultation.

# PCE LIQUID & POWDER



## FRPC-02

polycarboxylates high performance water-reducing admixture

FRPC-02 is a high-performance polycarboxylate superplasticizer produced by C6 technology. It is designed based on special ionic functional groups and molecular conformation. With steric hindrance and strong electrostatic repulsion, FRPC-02 can effectively improve the adsorption and dispersion ability of superplasticizer and its adaptability to concrete raw materials, and has the advantages of high water reduction rate, excellent slump retention and high reinforcement. The water reduction rate of concrete is  $\geq 25\%$ , and the water reduction rate can be as high as 35% in different mix applications. It is widely used in hydropower, nuclear power, railway, highway, port, bridge, tunnel, house, workshop floor, underground structure construction and other concrete projects. The technology is very mature and the product quality is stable. You are welcome to compare its performance with the product you are using.



## FRPD-02

polycarboxylates high performance water-reducing admixture powder

FRPD-02 is a powder product of polycarboxylic acid high performance water reducing agent produced by C6 technology. Unlike traditional polycarboxylic acid powder water reducing agent, there is no spacer in the product and it can be completely dissolved in water. FRPD-02 is designed based on special ionic functional groups and molecular conformation. With steric hindrance and strong electrostatic repulsion, FRPD-02 can effectively improve the adsorption and dispersion ability of water reducer and the adaptability to concrete raw materials, and has the characteristics of high water reduction rate, excellent plastic retention and high reinforcement. The water reduction rate of concrete is  $\geq 25\%$ , and the water reduction rate can be as high as 35% in different mix applications. It is widely used in hydropower, nuclear power, railway, highway, port, bridge, tunnel, house, workshop floor, underground structure construction and other concrete projects. FRPD-02 can be directly added to cement and gypsum based mortar products that require powder water-reducing agents, such as self-leveling cement, self-leveling gypsum, grouting material, grouting material, pavement repair material, steel fiber grouting material, etc. In these powder building materials that need to use high water reducing properties of water reducing agents, this product can replace the original powder products, and will reduce the amount, because you originally used polycarboxylic acid powder has 10% of the ineffective ingredients. The technology is very mature and the product quality is stable. You are welcome to compare its performance with the product you are using.

# PRODUCT TYPE

| The contents of the products available |               |     |     |
|----------------------------------------|---------------|-----|-----|
| Name                                   | Solid content |     |     |
| Liquid products (FRPC-02)              | 40%           | 50% | 55% |
| Powder product (FRPD-02)               | 98%           |     |     |

# FORMULA

Taking the temperature of 30°C and 1.0kg(L)/100kg cement as an example, the following formula test can be used when the slump of concrete is required to be maintained at 220mm for 1 hour:

| Materials               | Dosage (kg)         |           | Notes                                                                      |
|-------------------------|---------------------|-----------|----------------------------------------------------------------------------|
|                         | Formula 1           | Formula 2 |                                                                            |
| FRPD-02 (98%)           | /                   | 123-183   | The specific dosage was determined by concrete mix ratio test.             |
| FRPC-02 (40%)           | 300-450             | /         |                                                                            |
| Sodium gluconate        | 20-40               | 20-40     | It depends on the temperature and setting time.                            |
| Sucrose                 | 5-10                | 5-10      | It depends on the temperature and setting time.                            |
| Other special materials | ?                   | ?         | It depends on the circumstances.                                           |
| Air entraining agent    | 1.2-1.8             | 1.2-1.8   | If there is no requirement for gas content, the lowest value can be taken. |
| Deodorant               | 0.3                 | 0.3       | You can use it in two days and you don't have to add it.                   |
| Water                   | Add water to 1000kg |           | Clean water                                                                |

The data is for reference only, and the specific formula should be determined by test.



# PCE LIQUID & POWDER



## FRPC-09

comprehensive properties polycarboxylate superplasticizer

FRPC-09 is a high-performance polycarboxylic acid superplasticizer produced by C6 technology. It is designed based on special ionic functional groups and molecular conformation. With steric hindrance and strong electrostatic repulsion, FRPC-09 can effectively improve the adsorption and dispersion ability of superplasticizer and its adaptability to concrete raw materials, and has the advantages of moderate water reduction rate, excellent plastic retention and small slump loss. The water reduction rate of concrete is  $\geq 25\%$ , and the highest water reduction rate in concrete is 80% of FRPC-02. If the concrete with a slump of 180mm is required to be maintained for one hour, this product can be mainly used to achieve this purpose through formula adjustment. It is widely used in hydropower, nuclear power, railway, highway, port, bridge, tunnel, house, workshop floor, underground structure construction and other concrete projects. The technology is very mature and the product quality is stable. You are welcome to compare its performance with the product you are using.



## FRPD-09

comprehensive properties polycarboxylate superplasticizer powder

FRPD-09 is a high-performance polycarboxylate superplasticizer produced by C6 technology. It is designed based on special ionic functional groups and molecular conformation. With steric hindrance and strong electrostatic repulsion, FRPC-09 can effectively improve the adsorption and dispersion ability of superplasticizer and its adaptability to concrete raw materials, and has the advantages of moderate water reduction rate, excellent plastic retention and small slump loss. The water reduction rate of concrete is  $\geq 25\%$ , and the highest water reduction rate in concrete is 80% of FRPD-02. If the concrete with a slump of 180mm is required to be maintained for one hour, this product can be mainly used to achieve this purpose through formula adjustment. It is widely used in hydropower, nuclear power, railway, highway, port, bridge, tunnel, house, workshop floor, underground structure construction and other concrete projects. FRPD-09 can also be directly added to cement-based and gypsum based mortar products that require powder water-reducing agents, especially in special products that require a long fluidity maintenance time, and FRPD-02 can be used together, such as self-leveling cement, self-leveling gypsum, sizing material, grouting material, pavement repair material, steel fiber grouting material, etc.



## PRODUCT TYPE

| The contents of the products available |               |     |     |
|----------------------------------------|---------------|-----|-----|
| Name                                   | Solid content |     |     |
| Liquid products (FRPC-09)              | 40%           | 50% | 55% |
| Powder product (FRPD-09)               | 98%           |     |     |

## FORMULA

Taking the temperature of 30°C and 1.0kg(L)/100kg cement as an example, the following formula test can be used when the slump of concrete is required to be maintained at 160-180mm for 1 hour:

| Materials               | Dosage (kg)         |           |           |           | Notes                                                                                      |
|-------------------------|---------------------|-----------|-----------|-----------|--------------------------------------------------------------------------------------------|
|                         | Formula 1           | Formula 2 | Formula 3 | Formula 4 |                                                                                            |
| FRPC-02 (40%)           | /                   | 100       | /         | /         | Determine whether to add FRPC-02 (40%) according to the water consumption of the concrete. |
| FRPC-09 (40%)           | 350-500             | 280-350   | /         | /         | The specific dosage was determined by concrete mix ratio test.                             |
| FRPD-02 (98%)           | /                   | /         | /         | 41        | Determine whether to add FRPD-02 (98%) according to the water consumption of the concrete. |
| FRPD-09 (98%)           | /                   | /         | 143-204   | 114-143   | The specific dosage was determined by concrete mix ratio test.                             |
| Other special materials | ?                   | ?         | ?         | ?         | It depends on the circumstances.                                                           |
| Sodium gluconate        | 20-40               | 20-40     | 20-40     | 20-40     | It depends on the temperature and setting time.                                            |
| Sucrose                 | 5-10                | 5-10      | 5-10      | 5-10      | It depends on the temperature and setting time.                                            |
| Air entraining agent    | 1.2-1.8             | 1.2-1.8   | 1.2-1.8   | 1.2-1.8   | If there is no requirement for gas content, the lowest value can be taken.                 |
| Deodorant               | 0.3                 | 0.3       | 0.3       | 0.3       | You can use it in two days and you don't have to add it.                                   |
| Water                   | Add water to 1000kg |           |           |           | Clean water                                                                                |

The data is for reference only, and the specific formula should be determined by test.

# PCE LIQUID & POWDER



## FRPC-18

high-performance polycarboxylate slump retention agent

FRPC-18 is a high-performance polycarboxylate superplasticizer produced by C6 technology. It is designed based on special ionic functional groups and molecular conformation. With steric hindrance and strong electrostatic repulsion, FRPC-18 can effectively improve the adsorption and dispersion ability of superplasticizer and its adaptability to concrete raw materials. and has the advantages of moderate water reduction rate, excellent plastic retention and small slump loss. At the same time, with the continuous hydration of cement, more carboxyl groups can be released to disperse cement particles continuously, and the concrete has the advantages of excellent plastic retention and small slump loss. The water reduction rate of concrete is  $\geq 25\%$ , and the highest water reduction rate in concrete is 50% of FRPC-02. If a concrete with a slump of 130mm is required to be held for 1 hour to 3 hours, a concrete with a slump of 160-180mm is held for 1 hour to 3 hours, and a concrete with a slump of 220mm is held for 1 hour to 4 hours, the technical specifications can be reached by adjusting the formula using FRPC-18. It is widely used in hydropower, nuclear power, railway, highway, port, bridge, tunnel, house, workshop floor, underground structure construction and other concrete projects. The technology is very mature and the product quality is stable. You are welcome to compare its performance with the product you are using.



## FRPD-18

high-performance polycarboxylate slump retention agent powder

FRPD-18 is a high-performance polycarboxylate superplasticizer produced by C6 technology. It is designed based on special ionic functional groups and molecular conformation. With steric hindrance and strong electrostatic repulsion, FRPD-18 can effectively improve the adsorption and dispersion ability of superplasticizer and its adaptability to concrete raw materials. and has the advantages of moderate water reduction rate, excellent plastic retention and small slump loss. At the same time, with the continuous hydration of cement, more carboxyl groups can be released to disperse cement particles continuously, and the concrete has the advantages of excellent plastic retention and small slump loss. The water reduction rate of concrete is  $\geq 25\%$ , and the highest water reduction rate in concrete is 50% of FRPD-02. If a concrete with a slump of 130mm is required to be held for 1 hour to 3 hours, a concrete with a slump of 160-180mm is held for 1 hour to 3 hours, and a concrete with a slump of 220mm is held for 1 hour to 4 hours, the technical specifications can be reached by adjusting the formula using FRPD-18. It is widely used in hydropower, nuclear power, railway, highway, port, bridge, tunnel, house, workshop floor, underground structure construction and other concrete projects. FRPD-18 can be used with FRPD-02 and FRPD-09 in special products that require a long liquidity retention time. Self-leveling cement, self-leveling

gypsum, grouting material, grouting material, pavement repair material, steel fiber grouting material and other powder building materials using high water-reducing performance water-reducing agent can replace the original powder products, and will reduce the amount, because you used the original polycarboxylic acid powder has 10% of the ineffective components. The technology is very mature and the product quality is stable. You are welcome to compare its performance with the product you are using.

## PRODUCT TYPE

| The contents of the products available |               |     |     |
|----------------------------------------|---------------|-----|-----|
| Name                                   | Solid content |     |     |
| Liquid products (FRPC-18)              | 40%           | 50% | 55% |
| Powder product (FRPD-18)               | 98%           |     |     |



## FORMULA

| Taking the temperature of 30°C and 1.0kg(L)/100kg cement as an example, the following formula test can be used when the slump of concrete is required to be maintained at 220mm for 3 hours: |                     |           |           |           |                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------|-----------|-----------|------------------------------------------------------------------------------------------------------------------------------------|
| Materials                                                                                                                                                                                    | Dosage (kg)         |           |           |           | Notes                                                                                                                              |
|                                                                                                                                                                                              | Formula 1           | Formula 2 | Formula 3 | Formula 4 |                                                                                                                                    |
| FRPC-02 (40%)                                                                                                                                                                                | 300-400             | 100       | /         | /         | There are clear ways to use different amounts of PCE in these formulations. Please contact our company for detailed communication. |
| FRPC-09 (40%)                                                                                                                                                                                | 150-80              | 180-300   | /         | /         |                                                                                                                                    |
| FRPC-18 (40%)                                                                                                                                                                                | 150-100             | 200-150   | /         | /         |                                                                                                                                    |
| FRPD-02 (98%)                                                                                                                                                                                | /                   | /         | 125-163   | 41        |                                                                                                                                    |
| FRPD-09 (98%)                                                                                                                                                                                | /                   | /         | 61-33     | 73-123    |                                                                                                                                    |
| FRPD-18 (98%)                                                                                                                                                                                | /                   | /         | 61-41     | 82-61     |                                                                                                                                    |
| Sodium gluconate                                                                                                                                                                             | 20-40               | 20-40     | 20-40     | 20-40     | It depends on the temperature and setting time.                                                                                    |
| Sucrose                                                                                                                                                                                      | 5-10                | 5-10      | 5-10      | 5-10      | It depends on the temperature and setting time.                                                                                    |
| Other special materials                                                                                                                                                                      | ?                   | ?         | ?         | ?         | It depends on the circumstances.                                                                                                   |
| Air entraining agent                                                                                                                                                                         | 1.2-1.8             | 1.2-1.8   | 1.2-1.8   | 1.2-1.8   | If there is no requirement for gas content, the lowest value can be taken.                                                         |
| Deodorant                                                                                                                                                                                    | 0.3                 | 0.3       | 0.3       | 0.3       | You can use it in two days and you don't have to add it.                                                                           |
| Water                                                                                                                                                                                        | Add water to 1000kg |           |           |           | Clean water                                                                                                                        |
| The data is for reference only, and the specific formula should be determined by test.                                                                                                       |                     |           |           |           |                                                                                                                                    |

# SNF/NSF/PNS/UNF/FDN



## SODIUM LIGNOSULFONATE WATER REDUCER (MN-12)



The characteristics of sodium lignosulfonate water reducer is that the water reduction rate is not higher than that of PCE series, and the water reduction rate is lower than that of SNF water reducer, the general water reduction rate is less than or equal to 8%, and it has the effect of water reduction, retarding and air entraining. At present, sodium lignosulfonate water reducer is rarely used alone in China, and is generally used in combination with SNF water reducer or PCE water reducer. In China, sodium lignosulfonate water reducer belongs to the mainstream product 30 years ago, but if you have special needs, we can also provide you with this product. There is only one product specification of lignosulfonate water reducer. It is difficult to use lignosulfonate products to produce concrete with a 28-day strength grade of C40 or higher. It can only be used in combination with mainstream water reducing agents, and it is better to keep the amount of sodium lignosulfonate water reducing agent not more than 0.25Kg/100Kg cement when using.

## NAPHTHALENE SULFONATE FORMALDEHYDE CONDENSATES (SNF/NSF/PNS/UNF/FDN)



The main raw materials of naphthalene superplasticizer are industrial naphthalene, sulfuric acid, formaldehyde and sodium hydroxide. Naphthalene series water-reducing agent products are characterized by the water reduction rate is not as high as PCE series, the general water reduction rate is less than or equal to 16%, and it is impossible to produce products with an added amount of 1.0kg (L) /100kg cement. SNF was the mainstream product in China 20 years ago, but if you have special needs, we can also provide you with two specifications of SNF.

| Name                                                                 | Sodium sulfate content | Solid content |
|----------------------------------------------------------------------|------------------------|---------------|
| SNF-5<br>(High concentration naphthalene sulfonate water reducer)    | ≤5%                    | ≥91%          |
| SNF-18<br>(Medium concentration naphthalene sulfonate water reducer) | ≤18%                   | ≥91%          |

The minimum content of liquid products produced by naphthalene powder water-reducing agent is 1.5kg(L)/100kg cement, and the admixture with slump retention time exceeding 1.5 hours cannot be produced. If it is necessary to maintain concrete with a slump of 160mm for more than 2 hours, naphthalene water reducer is difficult to do, if it is barely done, then the setting time of concrete will be extended, and there will be a great safety risk. Moreover, naphthalene sulfonate superplasticizer is difficult to produce pumped high-strength concrete above C60. If you produce C100 concrete, you can only use PCE series products, especially FRPC-02. Concrete with slump retention of more than 3 hours can only be achieved by using PCE.

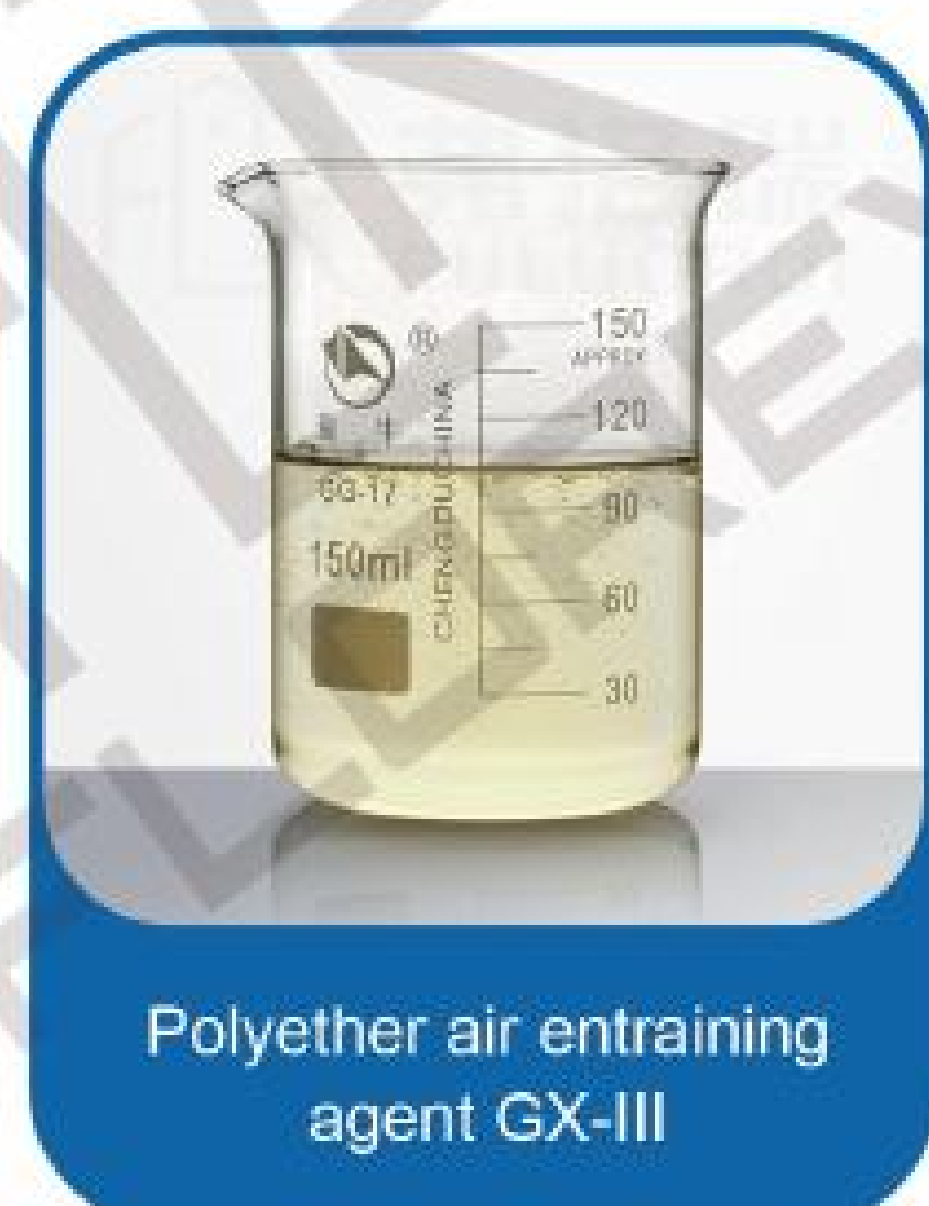
Taking the temperature of 30°C and 2.0kg(L)/100kg cement as an example, the following formula test can be used when the slump of concrete is required to be maintained at 220mm for 1 hour:

| Materials                                                                              | Dosage (kg)         |           | Notes                                                                      |
|----------------------------------------------------------------------------------------|---------------------|-----------|----------------------------------------------------------------------------|
|                                                                                        | Formula 1           | Formula 2 |                                                                            |
| SNF-5                                                                                  | /                   | 260-360   | The specific dosage was determined by concrete mix ratio test.             |
| SNF-18                                                                                 | 300-420             | /         |                                                                            |
| Sodium gluconate                                                                       | 15-30               | 15-30     | It depends on the temperature and setting time.                            |
| Sucrose                                                                                | 5-10                | 5-10      | It depends on the temperature and setting time.                            |
| Other special materials                                                                | ?                   | ?         | It depends on the circumstances.                                           |
| Air entraining agent                                                                   | 0.6-1.0             | 0.6-1.0   | If there is no requirement for gas content, the lowest value can be taken. |
| Water                                                                                  | Add water to 1000kg |           | Clean water                                                                |
| The data is for reference only, and the specific formula should be determined by test. |                     |           |                                                                            |

# PRODUCT INTRODUCTION

## AIR ENTRAINING AGENT

The use of air entrainment agent in concrete can improve the impermeability and crack resistance of concrete, at the same time provide help to the workability of concrete, is conducive to the pumping construction of concrete, and increase the life of concrete. The gas content of ordinary concrete is controlled at 3.0%. Air entraining agents are needed in coastal defense projects, underground projects, and places where there are more freezing and thawing cycles of ice and snow. We have three kinds of air entraining agents for you to choose from:



Polyether air entraining agent GX-III



Modified rosin air entraining agent SEV



Triterpenoid saponin plant extract entraining agent STPD

These three air entraining agents can be used in all water reducing agent products, and the performance of concrete has been improved significantly. The amount of air entraining agent in the concrete admixture of 1.0kg(L)/100kg cement is generally 1-2 kg. The dosage of 5% gas content and other special cases should be determined by test. If you have relevant use problems, you can contact our technical staff to give you enough support.

## DEFOAMER



There are two types of defoamer, liquid and solid, and liquid products are generally used in places where there is more foam, such as sewage treatment plants. The use of defoamer in liquid water reducer can reduce the foam of liquid products when loading and unloading trucks. If there are very small bubbles on the surface of the formwork concrete after the concrete is removed after the concrete is formed, 0.6 kg -2 kg of liquid defoamer can be added to the liquid water reducer per ton for improvement.

Powder products are generally used in cement/gypsum based mortar systems to eliminate a large number of bubbles on the surface, such as self-leveling cement/gypsum, sizing, grouting, UHPC, road patching materials, road patching mortar, etc.

Here is a comparison of the images



Products without defoamer



Products with defoamer

## DEODORANT



Polycarboxylic acid superplasticizer is an environmentally friendly product for human body and environment. When PCE is adjusted into the finished product of concrete water reducing agent, it is necessary to mix certain retarding ingredients, such as sodium gluconate, white granulated sugar, maltodextrin, etc. The water we use in the production process may not be sterilized, so the microorganisms will slowly consume sodium gluconate as a nutrient, and PCE may also be consumed. At this time, the finished concrete water reducer will turn sour, grow hair, and become smelly. In particular, the storage time of the superplasticizer is too long, and the temperature is higher than 20 degrees, the superplasticizer will soon deteriorate. In order to prevent the color and odor of the product from producing unpleasant phenomena, deodorant 0.3-0.8Kg/ ton can be added, so that the water reducer can be stored for more than 6 months.

Here is a comparison of the images



Products without deodorant



Products with deodorant

# PCE OTHER RAW MATERIALS

## ACRYLIC ACID (CAS NO. 79-10-7)



Acrylic acid is the second major raw material in the production of PCE water reducer. We have a hazardous chemicals export company that can provide you with standard acrylic acid supply services. We can supply acrylic acid in 200kg or 1000kg tank packages.

## 2-HYDROXYETHYL ACRYLATE (CAS NO. 818-61-1)



2-Hydroxyethyl acrylate is one of the main raw materials used in the production of PCE slump retaining agent. We have a hazardous chemicals export company that can provide you with standard 2-Hydroxyethyl acrylate supply services. We can supply 2-Hydroxyethyl acrylate in 200kg or 1000kg tank packages.

## 3-MERCAPTOPROPIONIC ACID (CAS NO. 107-96-0)



3-Mercaptopropionic acid is a raw material that plays a chain transfer role in the production of PCE. We have rich experience in how to use mercaptopropionic acid in the PCE production process. We have a hazardous chemicals export company that can provide you with standard mercaptopropionic acid supply services. We can supply mercaptopropionic acid in 250kg or 1200kg tank packages.

## 2-MERCAPTOETHANOL (CAS NO. 60-24-2)



2-Mercaptoethanol is a raw material that plays a chain transfer role in the production of PCE. We have rich experience in how to use 2-Mercaptoethanol in the PCE production process. We have a hazardous chemicals export company that can provide you with standard 2-Mercaptoethanol supply services. We can supply mercaptopropionic acid in 250Kg or 1200Kg tank packages.

## VITAMIN C / ASCORBIC ACID (CAS NO.50-81-7)



Ascorbic acid is one of the reducing agent raw materials used in PCE production. The amount of ascorbic acid is small in PCE production process, and we have rich experience in how to use it. We can provide you with pharmaceutical or food grade ascorbic acid supply to meet the standard. We can supply ascorbic acid in 25Kg bag packages.

## REDUCING AGENT



Reducing agent is a special reductant developed by our company for the production of PCE water reducing agent. The performance of the water reducing agent obtained by using this product is generally better than that by using ascorbic acid. This is also one of the main reasons for the outstanding performance of the water reducing agent products produced by our company. The amount of reducing agent is very small in PCE production process, and we have rich experience in how to use it. We can supply ascorbic acid in 25Kg bag packages.

## SODIUM HYPOPHOSPHITE (CAS NO. 7681-53-0)



Sodium hypophosphite is a raw material in PCE production process. We have rich experience in how to use it. Our company can provide quality technical supports service to our clients. We can supply sodium hypophosphite in 25Kg bag packages.

## SODIUM GLUCONATE (CAS NO. 527-07-1)



Sodium gluconate is the most widely used material for retarding coagulation in concrete admixtures at present. Materials such as sodium tripolyphosphate, citric acid, and even granulated sugar may also be used. Depending on the temperature, the amount of sodium gluconate needs to be adjusted by observing the setting time. We have rich experience and technical ability in the process of blending PCE mother liquor or PCE powder into concrete admixtures. Our company can provide quality technical supports service to our clients. We can supply sodium gluconate in 25Kg bag packages.

# FIBER PRODUCTS

## ► POLYPROPYLENE FIBER



### Product introduction

Polypropylene fibers, also known as polypropylene short fibers, concrete crack resistant fibers, PP crack resistant fibers, Dura fibers, and synthetic fibers. Polypropylene fibers can effectively improve the crack resistance, impermeability, impact wear resistance, frost resistance, blast resistance, and workability of mortar/concrete, preventing shrinkage cracks in mortar/concrete; Improve the denaturation and toughness of concrete. Tens of millions of fibers are evenly distributed in mortar/concrete, playing a good role in micro reinforcement, which maintains the integrity of the structure, avoids scattering into many fragments when the structure is damaged by impact, prevents corrosion of steel bars in the structure, greatly extends the service life of the project, and reduces maintenance costs.

### Technical specifications

Executive standard GB/T21120-2018 Synthetic fibers for cement concrete and mortar

|                     |                     |                               |                                                              |
|---------------------|---------------------|-------------------------------|--------------------------------------------------------------|
| Texture of material | Polypropylene       | Fiber type                    | Monofilamentous                                              |
| Density             | 0.91g/cm³           | Tensile strength              | ≥450Mpa                                                      |
| Fiber diameter      | 18-48µm             | Elastic modulus               | ≥3.5Gpa                                                      |
| Melting point       | >165℃               | Water absorption              | Not absorbing water                                          |
| Security            | Non toxic materials | Elongation at break           | <30%                                                         |
| Length              | 3.6.9.12.19mm       | Alkali resistance performance | Ultimate tensile retention rate greater than or equal to 98% |

### Application area

1. Cement mortar interior (exterior) wall plastering, aerated concrete plastering, indoor decorative putty, and insulation mortar.
2. Anti explosion, fire-resistant engineering, civil defense and military engineering, oil platforms, chimneys, refractory materials, etc.
3. Shotcrete tunnels, culvert linings, thin-walled structures, slope reinforcement, etc.
4. Concrete rigid self waterproofing structure: basement bottom plate, side walls, top plate, roof cast-in-place floor slab, reservoir, etc. Cracking resistance, impact resistance, wear resistance, high demand engineering, hydraulic engineering, subway, airport runway, port terminal, overpass elevated bridge deck, piers, ultra long structures, etc.

### Construction suggestions

- General crack control (slabs, floors, walls): 0.6–0.9 kg/m³, commonly 0.9 kg/m³, used to suppress early-age plastic shrinkage cracking.
- Medium to high crack resistance / impermeability (basements, water tanks, pavements): 1.0–1.2 kg/m³, balancing crack control and workability.
- High impact resistance / abrasion resistance (airport runways, hydraulic spillways): 1.5–1.8 kg/m³; high-strength grades can reach up to 2.0 kg/m³.
- Shotcrete / special ECC applications: 2.0–4.0 kg/m³; requires compatible admixtures and proper mixing procedures to prevent fiber balling.

## ► POLYVINYL ALCOHOL FIBER



### Product introduction

Polyvinyl alcohol fiber is mainly used in ultra-high performance concrete and high ductility concrete. Its main characteristics are high strength, high modulus, low elongation, wear resistance, acid and alkali resistance, good weather resistance, good affinity and bonding with substrates such as cement and gypsum. It is non-toxic, pollution-free, non damaging to human skin, and harmless to the human body. It is one of the new generation of high-tech green building materials.

### Technical specifications

Executive standard GB/T21120-2018 Synthetic fibers for cement concrete and mortar

|                     |                        |                             |                                                 |
|---------------------|------------------------|-----------------------------|-------------------------------------------------|
| Texture of material | Polyvinyl alcohol(PVA) | Security                    | Non-toxic                                       |
| Fiber diameter      | 10-15µm                | Elastic modulus             | ≥35Gpa                                          |
| Elongation at break | 2.0-8.0%               | Water absorption            | Not absorbing water                             |
| Length              | 6-12mm                 | Acid and lkaline resistance | Retention rate≥95%                              |
| Tensile strength    | ≥1450Mpa               | Dispersibility              | Uniformly dispersed without merging or clumping |

### Application area

1. General concrete structures: Added to ready-mixed and pumped concrete for building slabs, beams, columns, and walls to improve crack resistance and durability.
2. Cement mortar plastering: Incorporated into interior/exterior wall plaster and thermal insulation mortars to reduce hollowing, cracking, and debonding of plaster layers.
3. Tunnel shotcrete: Used in initial support for highway, railway, and metro tunnels to enhance bonding strength and reduce rebound loss.
4. Bridge engineering: Added to bridge deck pavements and crash barrier concrete to improve fatigue resistance and freeze–thaw durability.
- 5.Metro structures: Applied in station base slabs, side walls, and segmental linings to enhance impermeability and crack resistance of underground structures.
6. Water conservancy & municipal works: Incorporated into dam seepage control and municipal pervious concrete to improve erosion resistance and crack control.

### Construction suggestions

- General crack resistance (floors, walls, ordinary structural elements): 0.6–0.8 kg/m³
- High-strength crack resistance / impact resistance (bridges, tunnels, high-rise buildings): 0.9–1.2 kg/m³
- Mass concrete / high-stress structures (C35–C45):
  - Single PVA fiber addition: 1.0–1.5 kg/m³;
  - When combined with PP fiber or others: PVA fiber is typically 0.6–0.9 kg/m³ (total fiber content 1.2–1.5 kg/m³).
- Ultra-high toughness / special applications (e.g. ECC): Up to 2.0–10.0 kg/m³ (volume fraction 0.2%–0.8%), requiring matched mix design and construction procedures.

► POLYPROPYLENE MESH FIBER



Product introduction

Polypropylene mesh fiber is a type of fiber made by special processing and treatment of polypropylene particles as raw materials, interweaving bundles into a mesh. After being added to the concrete base material and mixed, a fiber monofilament or mesh structure is fully opened, forming a disorderly support system inside the concrete. It can effectively control the early plastic shrinkage and settlement cracks of concrete and cement mortar. Greatly improving the impermeability, crushing resistance, and impact resistance of concrete, enhancing its toughness and wear resistance, thereby greatly extending the service life of buildings and greatly reducing engineering maintenance costs.

Technical specifications

Executive standard GB/T21120-2018 Synthetic fibers for cement concrete and mortar

|                     |                     |                               |                                                              |
|---------------------|---------------------|-------------------------------|--------------------------------------------------------------|
| Texture of material | Polypropylene       | Fiber type                    | Monofilamentous                                              |
| Density             | 0.91g/cm³           | Tensile strength              | ≥450Mpa                                                      |
| Fiber diameter      | 18-48μm             | Elastic modulus               | ≥3.5Gpa                                                      |
| Melting point       | >165℃               | Water absorption              | Not absorbing water                                          |
| Security            | Non toxic materials | Elongation at break           | <30%                                                         |
| Length              | 19mm                | Alkali resistance performance | Ultimate tensile retention rate greater than or equal to 98% |

Application area

1. Projects with high crack resistance requirements, such as concrete pavement, bridge deck, airport runway, and factory floor.
2. Projects that use special construction methods for walls, roofs, reservoirs, and other structures in tunnels and mines.
3. Rivers, dams, and other engineering projects; Military protection engineering, dock revetment, bridge piers, etc.

Construction suggestions

- General crack control (slabs, floors, walls, ordinary structural members): 0.9 kg/m³ (preferred dosage), used to suppress early-age plastic shrinkage cracking; suitable for 19 mm fibers.
- Medium to high crack resistance / impermeability (basements, water tanks, roofs, bridge deck pavements): 1.2–1.5 kg/m³, balancing crack control and workability.
- Shotcrete / impact resistance (tunnels, slope protection, airport pavements): 1.5–1.8 kg/m³; admixtures are required to prevent fiber balling.
- Special requirements (e.g. ultra-high toughness, blast resistance): Up to 2.0–2.7 kg/m³; trial mixes are recommended to verify workability and strength effects.

► POLYPROPYLENE STEEL-IMITATED FIBER



Product introduction

Polypropylene steel-imitated fiber, also known as plastic steel fiber or imitation steel wire fiber, is refined through special production processes using polypropylene and polyethylene as the main raw materials. Its surface is rough, its contour is clear, and it has good dispersibility and adhesion with the cement matrix. The product has both the functions of steel fibers and the advantages of synthetic fibers, mainly used to replace welded metal grids and steel fibers in concrete panel structures. Polypropylene steel-imitated fiber is an iron filled product that fills the gap between steel fibers and polypropylene fibers. Its performance is similar to that of shear steel fibers. The surface of this fiber is rough and uneven, with a diameter of about 0.8mm. It is a new type of reinforcement and toughening material. When the fiber content is high, the fiber has a significant effect on the early crack resistance of concrete, which can replace steel fibers or steel wire mesh, increase the toughness of concrete, improve the ability to resist temperature stress or burst.

Technical specifications

Executive standard GB/T21120-2018 Synthetic fibers for cement concrete and mortar

|                     |                     |                               |            |
|---------------------|---------------------|-------------------------------|------------|
| Fiber material      | 100% Polypropylene  | Density                       | 0.91g/cm³  |
| Fiber type          | Bamboo-shaped, wavy | Melting point                 | 170℃       |
| Tensile strength    | ≥450Mpa             | Initial modulus               | ≥5000Mpa   |
| Elongation at break | 15%-30%             | Length                        | 30.48.55mm |
| Equivalent diameter | 0.9mm               | Alkali resistance performance | ≥95        |
| Standard dosage     | 2-20kg/m³           | General dosage                | 2.5kg/m³   |

Application area

1. Road engineering: Used in pavement and base concrete to improve flexural strength, fatigue resistance, and erosion resistance.
2. Bridge engineering: Incorporated into bridge deck concrete to enhance crack resistance and extend service life.
3. Airport runways: Added to runway concrete to improve impact resistance, abrasion resistance, and freeze–thaw durability.
4. Ports and docks: Used in quay yard and breakwater concrete to enhance resistance to seawater corrosion and heavy loads.
5. Water conservancy projects: Incorporated into dam and sluice concrete to improve impermeability, crack resistance, and scour resistance.
6. Industrial floors: Applied in heavy-duty workshop floor concrete to enhance impact resistance, wear resistance, and crack control.

Construction suggestions

- General crack control (floors, walls, ordinary structural members): 3 kg/m³ (30–36 mm fibers), used to control plastic and drying shrinkage cracking.
- Medium to high crack resistance / impermeability (basements, water tanks, bridge deck pavements): 4.5–6 kg/m³, balancing toughness and workability.
- Impact resistance / abrasion resistance (airport pavements, hydraulic spillways, tunnel shotcrete): 6–9 kg/m³; for shotcrete, fiber length ≤25 mm is recommended to prevent hose blockage.
- Steel fiber replacement (C40+ structural concrete): 6–8 kg/m³, often combined with 0.9 kg/m³ polypropylene monofilament fibers to further enhance crack control.

► POLYPROPYLENE IMITATION STEEL WIRE FIBER



Product introduction

Polypropylene imitation steel wire fibers are made from modified polypropylene, with a diameter of 0.22 mm and lengths selectable from 6, 8, 10, or 12 mm. They can replace copper-coated steel fibers in UHPC. Through a special treatment process, an active interface is formed on the fiber surface, providing strong bonding with the cement matrix.

These fibers feature high tensile strength and elastic modulus, effectively controlling UHPC drying shrinkage and thermal cracking, while enhancing impact resistance and durability. They have excellent dispersibility without agglomeration, are compatible with UHPC fine aggregate systems, and offer alkali resistance, corrosion protection, and safe handling. Overall, they provide a lower-cost solution.

Technical specifications

Executive standard GB/T21120-2018 Synthetic fibers for cement concrete and mortar

|                     |               |                            |                                                 |
|---------------------|---------------|----------------------------|-------------------------------------------------|
| Texture of material | Polypropylene | Security                   | Non-toxic                                       |
| Fiber diameter      | 0.18-0.2mm    | Elastic modulus            | ≥3.5Gpa                                         |
| Elongation at break | 15-30%        | Water absorption           | Not absorbing water                             |
| Length              | 6-12mm        | Acid and alkali resistance | Retention rate ≥95%                             |
| Tensile strength    | ≥450Mpa       | Elongation at break        | Uniformly dispersed without merging or clumping |

Application area

1. UHPC components: Used in UHPC precast slabs and segmental linings, replacing copper-coated steel fibers to improve crack resistance and toughness.
2. High-speed railway RPC components: Suitable for high-speed rail track slabs and RPC cover slabs, enhancing durability and fatigue resistance.
3. Bridge engineering: Incorporated into UHPC bridge deck pavements to improve impact resistance, impermeability, and extend service life.
4. Ports and docks: Used in breakwaters and yard UHPC to resist seawater corrosion and enhance load-bearing and scour resistance.
5. Water conservancy projects: Added to dam and sluice UHPC to improve impermeability, crack resistance, and resistance to water erosion.
6. Industrial floors: Applied in heavy-duty workshop and explosion-proof UHPC floors to enhance impact resistance, wear resistance, and crack control.

Construction suggestions

- UHPC/RPC concrete: Dosage 4–6 kg/m³; replaces copper-coated steel fibers to improve crack resistance and toughness, suitable for precast components and bridge deck pavements.
- Shotcrete / thin-layer concrete: Dosage 3–5 kg/m³; used for tunnel initial support and thin-walled elements to reduce rebound and enhance impermeability and impact resistance.
- Heavy-duty industrial floor concrete: Dosage 3–4 kg/m³; suitable for heavy-load workshops and port yard slabs, improving wear resistance, crack control, and fatigue performance.

► POLYPROPYLENE BUNDLED HINGED FIBER



Product introduction

Polypropylene bundled hinged fibers, also known as polypropylene threaded fibers, are made from polypropylene as the raw material and processed through special parallel drawing and twisted forming processes and surface treatment. It has the advantages of high fracture strength, good dispersibility in concrete, and strong gripping force, and is used for enhancing the crack resistance of cement concrete.

Technical specifications

Executive standard GB/T21120-2018 Synthetic fibers for cement concrete and mortar

|                                         |                           |                               |            |
|-----------------------------------------|---------------------------|-------------------------------|------------|
| Fiber material                          | 100% Polypropylene        | Density                       | 0.91g/cm³  |
| Fiber type                              | Bundle like strangulation | Melting point                 | 170°C      |
| Tensile strength                        | ≥450Mpa                   | Initial modulus               | ≥5000Mpa   |
| Elongation at break                     | 15%-30%                   | Length                        | 40.50.55mm |
| The diameter of the rear end excitation | 0.3-0.5mm                 | Alkali resistance performance | ≥95        |
| Standard dosage                         | 2-20kg/m³                 | General dosage                | 2.6kg/m³   |

Application area

1. Bridge engineering: Used in box girder and bridge deck concrete to improve crack resistance, fatigue resistance, and impact performance.
2. Industrial flooring: Incorporated into workshop and warehouse floor concrete to enhance wear resistance, heavy-load capacity, and shrinkage crack control.
3. Ports and docks: Added to quay yard and approach bridge concrete to improve chloride ion resistance and scour resistance.
4. Rail transit: Suitable for metro segmental linings and track bed concrete to ensure durability and impermeability.
5. Mining engineering: Used in shotcrete for mine tunnels to reduce rebound and enhance surrounding rock support stability.
6. Precast culverts: Added to reinforced concrete pipes and culverts to improve crack resistance, impermeability, and resistance to external pressure.

Construction suggestions

- Ordinary / pumped concrete (C30–C50): Dosage 0.9–1.2 kg/m³; used in slabs, walls, and beams/columns to control plastic shrinkage and drying shrinkage cracks.
- Shotcrete (tunnel initial support / foundation pit): Dosage 1.2–1.8 kg/m³; reduces rebound, enhances impact resistance and impermeability, suitable for tunnels and slope support.
- High-strength / precast concrete (C60+): Dosage 1.0–1.5 kg/m³; improves crack resistance and toughness, suitable for segments, utility poles, and precast slabs.

## ► POLYACRYLONITRILE FIBER



### Product introduction

Polyacrylonitrile fibers can significantly improve the tensile strength, fatigue strength, and flexural tensile strength of concrete, while polyacrylonitrile fibers can significantly improve the early crack resistance performance of concrete. Polyacrylonitrile fibers can significantly improve adhesion, high-temperature stability, and fatigue durability in asphalt. Moreover, polyacrylonitrile fibers can effectively prevent the occurrence

of low-temperature cracking and reflection cracks, effectively improving tensile, shear, compressive, and impact strength.

Polyacrylonitrile fibers are widely distributed in mortar, cement concrete, and asphalt concrete due to their excellent dispersibility and three-dimensional random distribution. They have outstanding tensile strength, melting and ignition points, and high comprehensive performance.

### Technical specifications

Executive standard TB/T2965-2018 Railway bridge concrete deck waterproof layer

| Texture of material | Polyacrylonitrile     | Security                     | Non-toxic                                       |
|---------------------|-----------------------|------------------------------|-------------------------------------------------|
| Fiber diameter      | 10-15 $\mu$ m         | Elastic modulus              | $\geq 7.0$ Gpa                                  |
| Density             | 1.18kg/m <sup>3</sup> | Elongation at break          | $\geq 20\%$                                     |
| Length              | 6-12mm                | Acid and alkaline resistance | Retention rate of 99%                           |
| Tensile strength    | $\geq 500$ Mpa        | Dispersibility               | Uniformly dispersed without merging or clumping |
| Melting point       | 240°C                 | Water absorption             | Not absorbing water                             |

### Application area

1. Cement mortar / concrete works: Incorporated into plaster mortars and concrete to control drying shrinkage cracks and improve crack resistance and durability.
2. Asphalt pavement engineering: Used in asphalt concrete layers to enhance rutting resistance, fatigue performance, and low-temperature crack resistance.
3. Specialty building materials: Manufactured into fireproof boards and insulation materials to improve strength, fire resistance, and aging durability.

### Construction suggestions

#### Recommended Dosage in Concrete:

- Ordinary concrete (C30–C40): 0.6–0.9 kg/m<sup>3</sup>, meeting basic crack control and impermeability requirements.
- Plaster / masonry mortar: 0.9–1.2 kg/m<sup>3</sup>, controlling drying shrinkage cracks and improving adhesion.
- ECC cement-based composites: 1.8–2.2 kg/m<sup>3</sup>, enhancing flexural toughness and crack resistance.
- UHPC (ultra-high performance concrete): 2.0–2.5 kg/m<sup>3</sup>, suitable for ultra-high strength and high-durability applications.

#### Recommended Dosage in Asphalt Concrete:

- Ordinary highway asphalt pavement: 3.6–4.8 kg/m<sup>3</sup> (equivalent to 1.5–2 kg/ton of mixture), suitable for low to medium traffic volumes.
- High-grade highway asphalt pavement: 4.8–7.2 kg/m<sup>3</sup> (equivalent to 2–3 kg/ton of mixture), suitable for high-traffic areas requiring rutting resistance.
- Bridge deck wearing course: 8.16–8.4 kg/m<sup>3</sup> (equivalent to 3.4–3.5 kg/ton of mixture), suitable for high crack resistance and wear-resistant applications.

## ► ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE FIBER



### Product introduction

Ultra-high molecular weight polyethylene fiber reinforced concrete is a new type of concrete material with broad application prospects. Its application can improve the safety performance and service life of engineering, reduce construction and main tenance costs, and meet the requirements of modern engineering construction.

Polyethylene fiber reinforced concrete is a type of concrete made by adding a certain proportion of polyethylene fibers to the concrete and undergoing processes such as mixing, pouring, and curing. Polyethylene fibers can effectively improve the crack and impact resistance of concrete, while also reducing the shrinkage deformation of concrete. They are mainly used in subway tunnels, large bridges, and highways.

### Technical specifications

Executive standard GB/T 29554-2013

| Fiber type                 | Monofilamentous                            | Linear density           | $> 1.3$                 |
|----------------------------|--------------------------------------------|--------------------------|-------------------------|
| Single filament diameter   | 15 $\pm$ 3 $\mu$ m                         | Tensile strength         | $> 3000$ Mpa            |
| Acid and alkali resistance | Extremely high                             | Dry heat softening point | $> 260^{\circ}\text{C}$ |
| Thermal conductivity       | Extremely low                              | Water absorption         | Nothing                 |
| Elastic modulus            | $\geq 35000$ Mpa                           | Short cut length         | 6mm or 12mm             |
| Safety performance         | Green, environmentally friendly, non-toxic | Self divergence          | Good                    |

### Application area

1. Cement-based reinforcement: Enhances crack resistance of ECC, UHPC, concrete, and mortar; suitable for construction, municipal, and water conservancy projects.
2. Geosynthetic materials: Geotextiles and geogrids for embankment and slope reinforcement; suitable for transportation and municipal applications.
3. Waterproofing and wear-resistant components: Reinforcement for waterproof membranes and aggregate for wear-resistant floors; suitable for building and industrial flooring.
4. Marine / special projects: Offshore platforms and tunnel linings; suitable for marine and underground engineering.

### Construction suggestions

- ECC (high-ductility concrete): 18–22 kg/m<sup>3</sup>, enhances crack resistance and ductility; commonly uses 6–19 mm short fibers.
- UHPC (ultra-high performance concrete): 20–25 kg/m<sup>3</sup>, suitable for ultra-high strength and wear resistance; commonly uses 12–19 mm short fibers.
- Ordinary concrete: 0.8–1.2 kg/m<sup>3</sup>, controls drying shrinkage cracks; commonly uses 6–12 mm short fibers.
- Plaster / masonry mortar: 0.6–0.9 kg/m<sup>3</sup>, improves crack resistance and impermeability; commonly uses 6–9 mm short fibers.

▶ ALKALI RESISTANT GLASS FIBER



Product introduction

Alkali resistant glass fiber is an engineering alkali resistant short cut fiber mainly used in concrete and water setting mortar. According to actual usage, it can also be divided into alkali resistant glass fiber direct yarn, alkali resistant glass fiber spray yarn, alkali resistant glass fiber short cut yarn for repairing mortar and GRC components, alkali resistant glass fiber short cut coarse yarn for spraying, alkali resistant fiber for base mortar, alkali resistant fiber for dry mixed mortar, etc.

Technical specifications

This fiber has a high zirconium content, complies with ASTM C1666/C1666M-07 and EN15422 standards, and is produced according to PCI and GRCA recommendations.

| Fiber Length  | Original filament diameter (ISO 1888:2006) | Loss on ignition LOI (%) (ISO 1887:1995) | Moisture content MOL (%) (ISO 3344:1997) |
|---------------|--------------------------------------------|------------------------------------------|------------------------------------------|
| 3-6-9-12-18mm | 14μm                                       | 0.60                                     | W0.50                                    |

Application area

- 1. Building materials: Reinforcement of GRC components, mortar, and concrete to improve crack resistance and durability.
- 2. Road and transportation: Asphalt pavement reinforcement to enhance rutting resistance and low-temperature crack performance.
- 3. Industrial corrosion protection: Chemical storage tanks and flue linings, improving alkali resistance and corrosion durability.
- 4. New energy applications: Wind turbine blades and photovoltaic components, enhancing strength and weather resistance.

Construction suggestions

- Cement mortar: 1.5–3.0 kg/m³, suitable for crack control and impermeability applications.
- Ordinary concrete: 2.0–4.0 kg/m³, enhancing crack resistance and durability.
- Asphalt mixture: 4.0–6.0 kg/ton (approximately 0.4%–0.6% by mass), improving rutting resistance.
- GRC components: For spray application, 30–50 kg/m³; for premixed application, 20–30 kg/m³.



▶ BASALT FIBER



Product introduction

Basalt fiber is an inorganic fiber material made from pure natural volcanic eruption rock as raw material, which is rapidly drawn and melted at a high temperature of 1450-1500°C. Adding short cut basalt fibers to cement concrete or mortar can reduce early cracks, improve the anti-seepage, crack resistance, impact resistance, corrosion resistance, durability, and reduce the brittleness coefficient of concrete. Moreover, the construction performance is good, and the fibers are easily dispersed when mixed with cement concrete or mortar, with stable volume and good workability. Therefore, short cut basalt fibers have good crack resistance, toughening, and strengthening effects on concrete and mortar.

Technical specifications

Executive standard GB/T 42280-2022 Short cut basalt fibers for road asphalt mixtures

|                                  |              |                     |            |
|----------------------------------|--------------|---------------------|------------|
| Texture of material              | Basalt fiber | Length              | 6-12mm     |
| Fiber diameter                   | 10-20μm      | Oil absorption rate | ≥0.5 times |
| Fracture elongation              | 2.0-3.0%     | Density             | ≥2.6g/cm³  |
| Fracture strength retention rate | ≥85%         | Moisture content    | ≤0.2%      |
| Tensile strength                 | ≥1000Mpa     | /                   | /          |

Application area

- 1. Concrete / mortar modification: Enhances crack resistance, impact resistance, and high-temperature durability.
- 2. Asphalt pavement reinforcement: Improves rutting resistance, aging resistance, and low-temperature crack performance.
- 3. Fireproof and insulation panels: Increases strength while enhancing flame retardancy and thermal insulation.
- 4. Geogrids / geotextiles production: Used for roadbed reinforcement, offering strong corrosion resistance, aging durability, and structural stability.

Construction suggestions

- Ordinary cement mortar: 2.0–3.0 kg/m³, focused on crack control and impermeability.
- Ordinary concrete: 2.5–4.0 kg/m³, enhancing crack resistance and durability.
- Standard asphalt mixture: 3.0–5.0 kg/ton (approximately 0.3%–0.5% by mass), improving rutting resistance.
- Highway heavy-duty asphalt: 4.0–6.0 kg/ton, suitable for rutting and fatigue resistance requirements.



► POLYESTER STAPLE FIBER



Product introduction

Polyester staple fibers are produced by cutting polyester filaments after cooling, drawing, and heat-setting, with lengths ranging from a few millimeters to over ten millimeters.

When added to concrete, the fibers disperse uniformly to form a supporting network, controlling plastic and drying shrinkage cracks, and enhancing impermeability, impact resistance, and structural durability. In asphalt mixtures, they create a three-dimensional network that improves rutting resistance and low-temperature crack resistance, extending pavement service life.

In the building materials sector, polyester staple fibers can also reinforce waterproof membranes, geotextiles, and insulation panels, improving tensile strength, aging resistance, and impermeability, making them a high-quality modification material for engineering applications.

Technical specifications

Executive standard JT/T 534-2004 Polymer fibers for asphalt pavement

|                     |           |                              |                                          |
|---------------------|-----------|------------------------------|------------------------------------------|
| Texture of material | Polyester | Tensile strength             | ≥500Mpa                                  |
| Fiber diameter      | 10-25μm   | Water absorption             | Not absorbing water                      |
| Elongation at break | ≥15%      | Acid and alkaline resistance | Strong                                   |
| Length              | 6-12mm    | Heat resistance              | No change in volume at 210°C for 2 hours |

Application area

1. Concrete / mortar reinforcement: Controls plastic and drying shrinkage cracks, enhancing toughness.
2. Asphalt pavements / bridge deck surfacing: Increases toughness and crack resistance, improving rutting resistance and fatigue performance.
3. Geotextiles / geogrids: Used for embankment and slope reinforcement, providing impermeability, filtration, and aging resistance.
4. Waterproof membranes / insulation panels: Enhances impermeability, strength, and durability.

Construction suggestions

- Ordinary concrete: 0.6–1.5 kg/m³, suitable for crack control and impermeability applications.
- Standard asphalt mixture: 2.0–2.5 kg/ton, meeting conventional road requirements.
- Highway asphalt (heavy traffic): 3.0–4.0 kg/ton, enhancing rutting resistance.
- Bridge deck wearing course asphalt: 3.5 kg/ton, improving fatigue resistance and crack control.



► COPPER-PLATED STEEL FIBER



Product introduction

RPC copper plated microfilament steel fiber is an important component of active powder concrete. RPC is a new material with ultra-high strength, high toughness, high durability, and good volume stability. RPC copper plated micro wire steel fibers are mainly used for high-speed railways, RPC, UHPC ultra high strength concrete, cover plates, and important engineering prefabricated components. The fiber diameter is 0.2mm, the length is 13mm, and the tensile strength is >2850Mpa. It has properties such as high strength, tensile strength, wear resistance, crack resistance, bending resistance, flexural strength, and impact resistance.

Technical specifications

Implement the standard YB/T 151-2017 for steel fibers used in concrete

| Specification and model     | Length  | Diameter   | Aspect ratio | Tensile strength | Bending performance                 |
|-----------------------------|---------|------------|--------------|------------------|-------------------------------------|
| Copper-Plated Microfilament | 12-14mm | 0.18-0.7mm | 60           | ≥2900Mpa         | Cold bending 90°, 9/10 continuously |
| Copper-Plated End-Hooked    | 12-14mm | 0.18-0.7mm | 60           | ≥2900Mpa         | Cold bending 90°, 9/10 continuously |
| Copper-Plated Corrugated    | 12-14mm | 0.18-0.7mm | 60           | ≥2900Mpa         | Cold bending 90°, 9/10 continuously |
| Copper-plated corded        | 12-14mm | 0.18-0.7mm | 60           | ≥2850Mpa         | Cold bending 90°, 9/10 continuously |

Application area

1. RPC components: High-speed rail cover slabs and sleepers, enhancing strength, toughness, and durability.
2. UHPC projects: Bridge barriers and precast elements, improving tensile, flexural, and impact resistance.
3. High-strength concrete: Core columns and heavy-load beams, enhancing crack resistance and fatigue performance.
4. Ballistic-resistant structures: Protective works and shelters, improving penetration and blast resistance.

Construction suggestions

- RPC components: 2%–3% by volume, equivalent to 120–180 kg/m³.
- UHPC projects: 1.5%–2.5% by volume, equivalent to 90–150 kg/m³.
- High-strength concrete: 1%–2% by volume, equivalent to 60–120 kg/m³.
- Ballistic-resistant protective structures: 3%–5% by volume, equivalent to 180–300 kg/m³.

► MONOFILAMENT STEEL FIBER



Product introduction

Monofilament steel fibers are made by cold drawing high-strength steel wires and processed into 0.5-1.0mm steel wires using cold drawing methods. They belong to high-performance steel fibers that can improve the impact resistance and fatigue resistance of concrete and enhance its impermeability. Due to their high tensile strength, good toughness, and low price, they are often used as a substitute for steel reinforcement fibers. By using high-quality steel fibers to reinforce concrete in three dimensions, the performance of the floor is significantly improved. It can improve the impact resistance of concrete flooring systems, absorb energy, and effectively protect the flooring system from damage when subjected to impact.

Technical specifications

Implement the standard YB/T 151-2017 for steel fibers used in concrete

| Specification and model | Length  | Diameter  | Aspect ratio | Tensile strength | Bending performance                 |
|-------------------------|---------|-----------|--------------|------------------|-------------------------------------|
| End-Hooked Monofilament | 20-60mm | 0.5-1.0mm | 40-80        | ≥1100Mpa         | Cold bending 90°, 9/10 continuously |
| Corrugated Monofilament | 25-50mm | 0.5-1.0mm | 40-80        | ≥1100Mpa         | Cold bending 90°, 9/10 continuously |
| Straight Monofilament   | 20-60mm | 0.5-1.0mm | 40-80        | ≥1100Mpa         | Cold bending 90°, 9/10 continuously |

Application area

1. Heavy-duty floors and airport runways: Enhances wear resistance, crack control, and impact resistance.
2. Bridge pavements and pier reinforcement: Improves structural strength and durability.
3. Military shelters casting and pavement repair: Strengthens blast and penetration resistance.

Construction suggestions

- Heavy-duty floors (C30–C40): Hooked/wave fibers 30–50 kg/m³; focused on wear resistance and crack control, suitable for factories and logistics warehouses.
- Airport runways (C40–C50): Hooked fibers 40–60 kg/m³, wave fibers 35–50 kg/m³; enhance impact and fatigue resistance, suitable for main runways and aprons.
- Bridge pavements (C40–C50): Hooked fibers 30–50 kg/m³, wave fibers 30–45 kg/m³; improve shear resistance and durability. Box/T-girders (C50+): Hooked fibers 50–80 kg/m³, wave fibers 45–70 kg/m³; enhance load-bearing capacity and crack resistance.
- Military shelters (C50+ high-strength): Hooked fibers 80–120 kg/m³, wave fibers 70–100 kg/m³; strengthen penetration and blast resistance. Special protection up to 150 kg/m³.
- Pavement / component repair (C30–C40): Hooked fibers 30–40 kg/m³, wave fibers 25–35 kg/m³; for rapid strength gain and crack control.
- High-strength concrete (C50–C60): Hooked fibers 40–60 kg/m³, wave fibers 35–55 kg/m³; suitable for core columns and heavy-load beams, enhancing crack resistance and toughness.
- Floors / pavements (C25–C40): Hooked fibers 20–30 kg/m³, wave fibers 16–20 kg/m³; focused on wear resistance and crack control.

► END-HOOKED COLLATED STEEL FIBER



Product introduction

The hook shaped steel fibers at the end of the row are made of high-strength cold drawn steel wires, which are drawn into 0.5-1.0mm steel wires using the cold drawing method. They are bonded with imported water-soluble glue, ensuring that the fibers are fully mixed in the concrete and effectively dispersed evenly without clumping. It has the characteristics of high tensile strength, good resistance, and crack resistance, which can effectively ensure the quality of concrete. The actual performance of rows of steel fibers is the same as that of hooked steel fibers with the same standard steel wire end, making them easier to mix and package for transportation.

Using steel fiber reinforced concrete for flooring and pavement can replace traditional rebar, offering superior crack resistance compared to conventional reinforced concrete.

Technical specifications

Implement the standard YB/T 151-2017 for steel fibers used in concrete

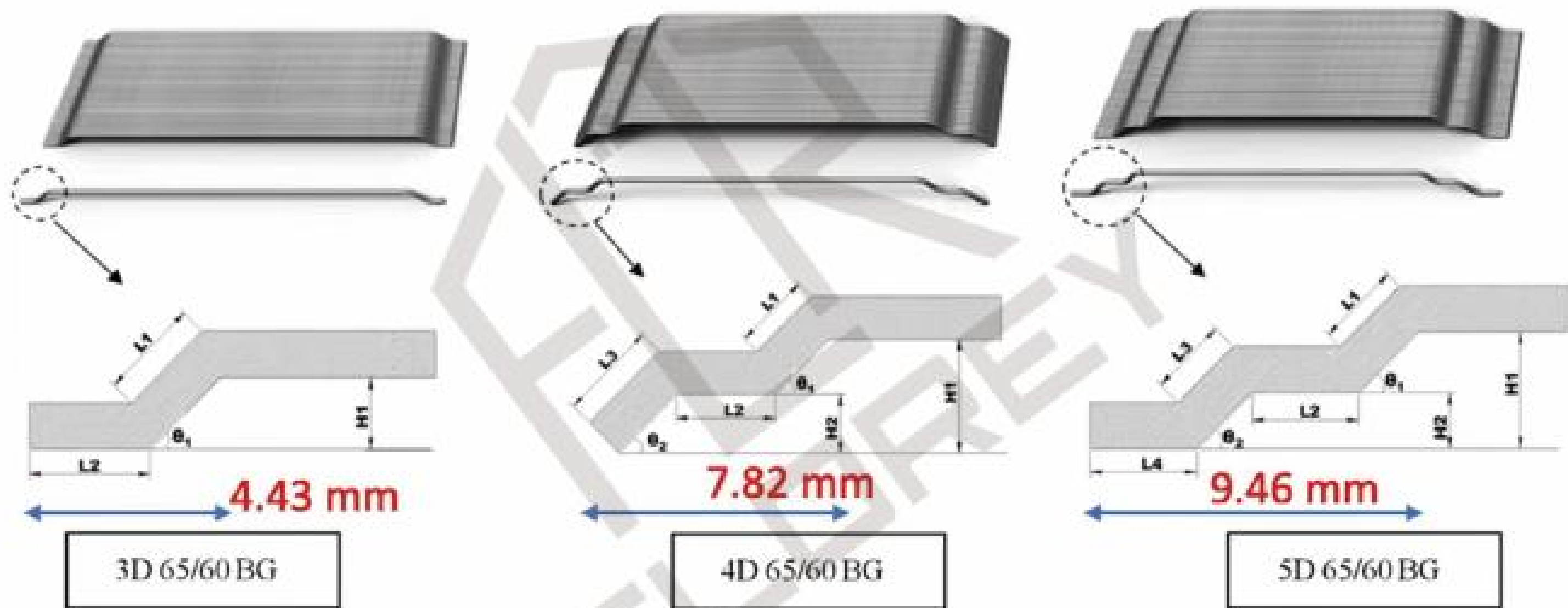
| Specification and model | Length  | Diameter  | Aspect ratio | Tensile strength | Bending performance                 |
|-------------------------|---------|-----------|--------------|------------------|-------------------------------------|
| Row end hook type       | 35-60mm | 0.5-1.0mm | 40-80        | ≥1100Mpa         | Cold bending 90°, 9/10 continuously |

Application area

1. Building materials and heavy-duty floors: Concrete factory and logistics floors, enhancing wear resistance, crack control, and impact resistance.
2. Bridge engineering: Bridge deck pavements and box girder reinforcement, improving shear resistance and durability.
3. Airport runways / military shelters: Concrete main runways and protective structures, strengthening blast and fatigue resistance.

Construction suggestions

- Heavy-duty floors (C30–C40): 30–50 kg/m³; focused on wear resistance and crack control, suitable for factories and logistics warehouses.
- Bridge pavements (C40–C50): 30–50 kg/m³; Box/T-girders (C50+): 50–80 kg/m³; enhances shear resistance and load-bearing capacity.
- Airport runways / aprons (C40–C50): 40–60 kg/m³; strengthens impact and fatigue resistance.
- Military shelters (C50+ high-strength): 80–120 kg/m³; special protection up to 150 kg/m³; improves blast and penetration resistance.



## ► STAINLESS STEEL FIBER



### Product introduction

Stainless steel fiber is a new type of industrial material that not only has high electrical conductivity, high thermal conductivity, high strength, high temperature resistance, corrosion resistance and other properties, but also has the characteristics of synthetic fibers and synthetic fibers; Widely used in industrial fields such as petroleum, chemical, synthetic fiber, electronics, textiles, military, aviation, polymer materials, environmental protection, etc.

Stainless steel fiber is a newly developed industrial material in recent years and an important field of modern science. Stainless steel fibers generally refer to stainless steel made of French silver foil 316L steel as the substrate, which is assembled through composite assembly, multiple bundle drawing, annealing, solution treatment and other special processes, with thousands or tens of thousands of fibers per strand. Stainless steel fibers have a very large surface area, which gives them extraordinary performance in terms of internal structure, magnetism, thermal resistance, and melting point. The diameter of stainless steel fiber can reach 1-2 microns, with an elongation rate greater than 1%. The fiber strength can reach 1600-2100Mpa, even exceeding the tensile strength of the material itself.

### Technical specifications

Implement the standard YB/T 151-2017 for steel fibers used in concrete

| Specification and model    | Length  | Diameter  | Aspect ratio | Tensile strength | Bending performance                 |
|----------------------------|---------|-----------|--------------|------------------|-------------------------------------|
| Stainless Steel End-Hooked | 13-40mm | 0.2-0.7mm | 30-60        | ≥2100Mpa         | Cold bending 90°, 9/10 continuously |
| Stainless Steel Corrugated | 13-40mm | 0.2-0.7mm | 30-60        | ≥2100Mpa         | Cold bending 90°, 9/10 continuously |
| Stainless Steel Straight   | 6-25mm  | 0.2-0.7mm | 30-60        | ≥2100Mpa         | Cold bending 90°, 9/10 continuously |

### Application area

1. Marine / chemical concrete components: Corrosion- and crack-resistant, suitable for docks, wastewater tanks, and anti-corrosion floors.
2. Bridge pavements / tunnel linings: Improves shear and fatigue resistance, suitable for C40–C50 concrete.
3. Metallurgical / power plant high-temperature linings: Enhances refractory concrete performance, suitable for high-temperature conditions.

### Construction suggestions

- General anti-corrosion floors (C30–C40): Waved fibers 25–35 kg/m<sup>3</sup>, hooked fibers 25–35 kg/m<sup>3</sup>, straight fibers 20–30 kg/m<sup>3</sup>; prioritize corrosion and crack resistance.
- Bridge pavements / marine components (C40–C50): Waved fibers 35–50 kg/m<sup>3</sup>, hooked fibers 35–50 kg/m<sup>3</sup>, straight fibers 30–40 kg/m<sup>3</sup>; enhance shear strength and durability.
- Heavy-duty floors / airport runways (C40–C50): Waved fibers 40–60 kg/m<sup>3</sup>, hooked fibers 40–60 kg/m<sup>3</sup>, straight fibers 35–50 kg/m<sup>3</sup>; strengthen impact and fatigue resistance.
- Metallurgical / refractory concrete (high-temperature linings): Waved fibers 50–80 kg/m<sup>3</sup>, hooked fibers 50–90 kg/m<sup>3</sup>, straight fibers 45–70 kg/m<sup>3</sup>; improve thermal shock and erosion resistance.

## ► MILLED STEEL FIBER



### Product introduction

Milled steel fibers have high tensile strength, good toughness and dispersibility, and good adhesion to concrete. The dosage is 30-80kg. Milled steel fiber is a new and high-performance variety of steel fiber. Its aspect ratio is 34.3; The ultimate tensile strength is 808.6Mpa; The bond strength with cement mortar is 3.52Mpa. Milled the rough and clean surface of steel fibers can firmly bond with the cement slurry in concrete, which is the fundamental reason for milled steel fibers to improve various properties of concrete.

### Technical specifications

Implement the standard YB/T 151-2017 for steel fibers used in concrete

| Specification and model | Length  | Diameter  | Aspect ratio | Tensile strength | Bending performance |
|-------------------------|---------|-----------|--------------|------------------|---------------------|
| Milling type            | 32-38mm | 0.7±0.2mm | 30-40        | ≥700Mpa          | ≥3                  |
| Customized milling type | 32mm    | 0.7±0.2mm | 30-40        | ≥700Mpa          | ≥3                  |

## ► SHEARED STEEL FIBER



### Product introduction

Sheared steel fibers are made from cold-rolled strip steel through shearing and indentation processes. The product has the characteristics of high tensile strength, easy dispersion, and good bonding performance with concrete.

### Technical specifications

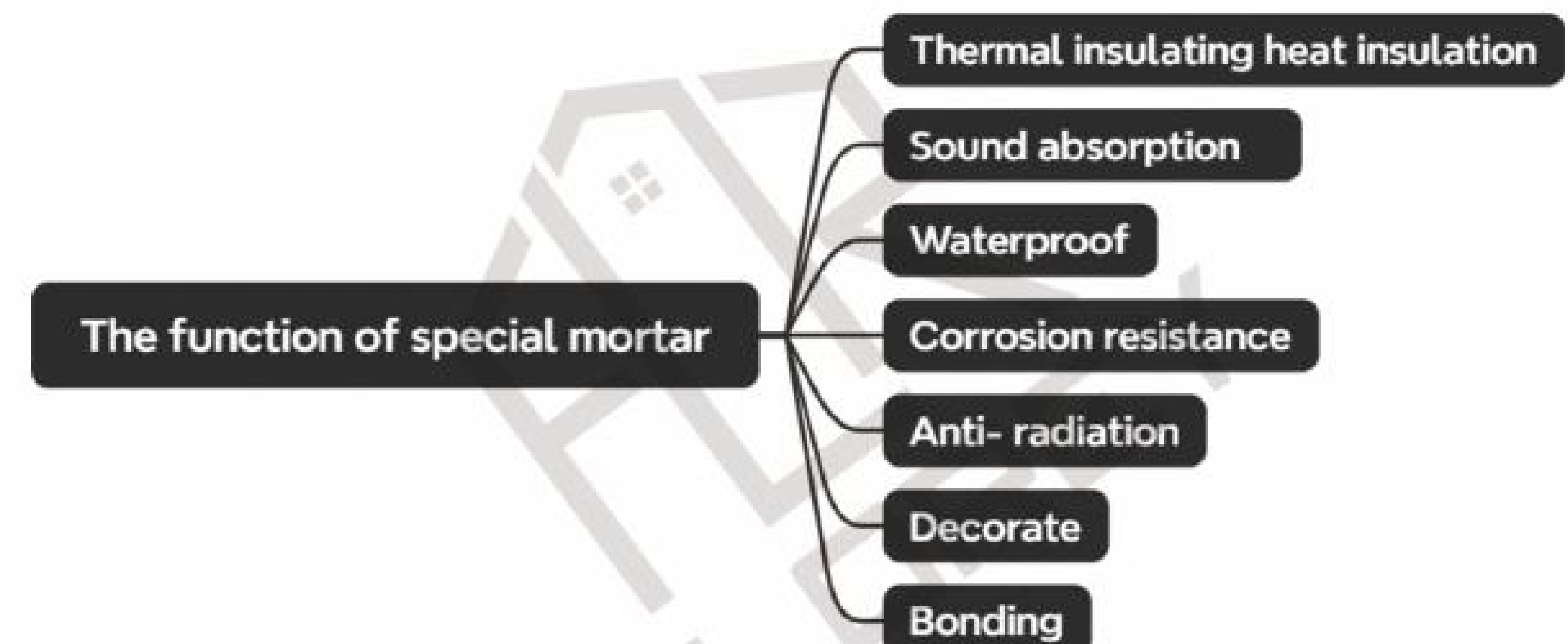
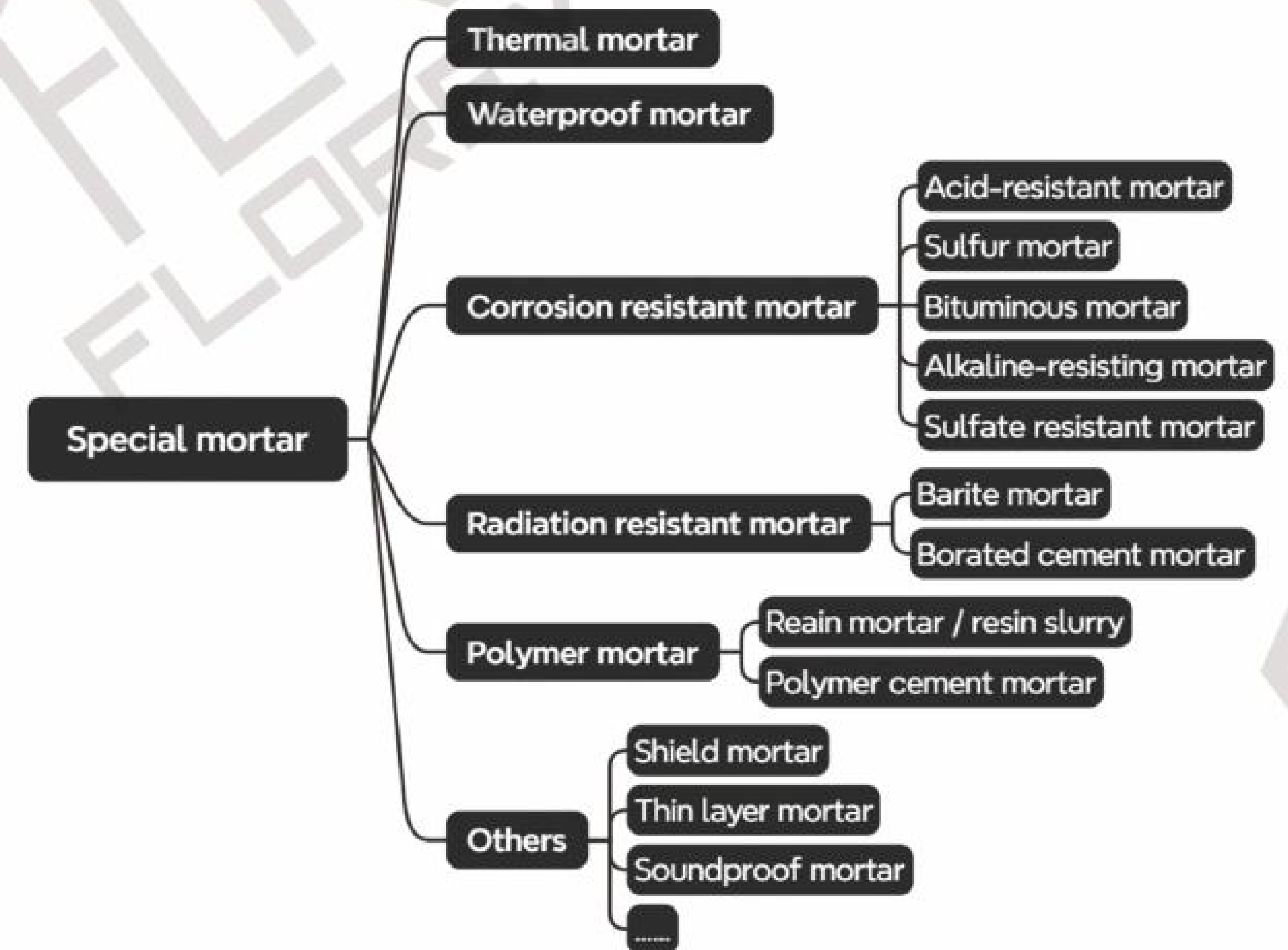
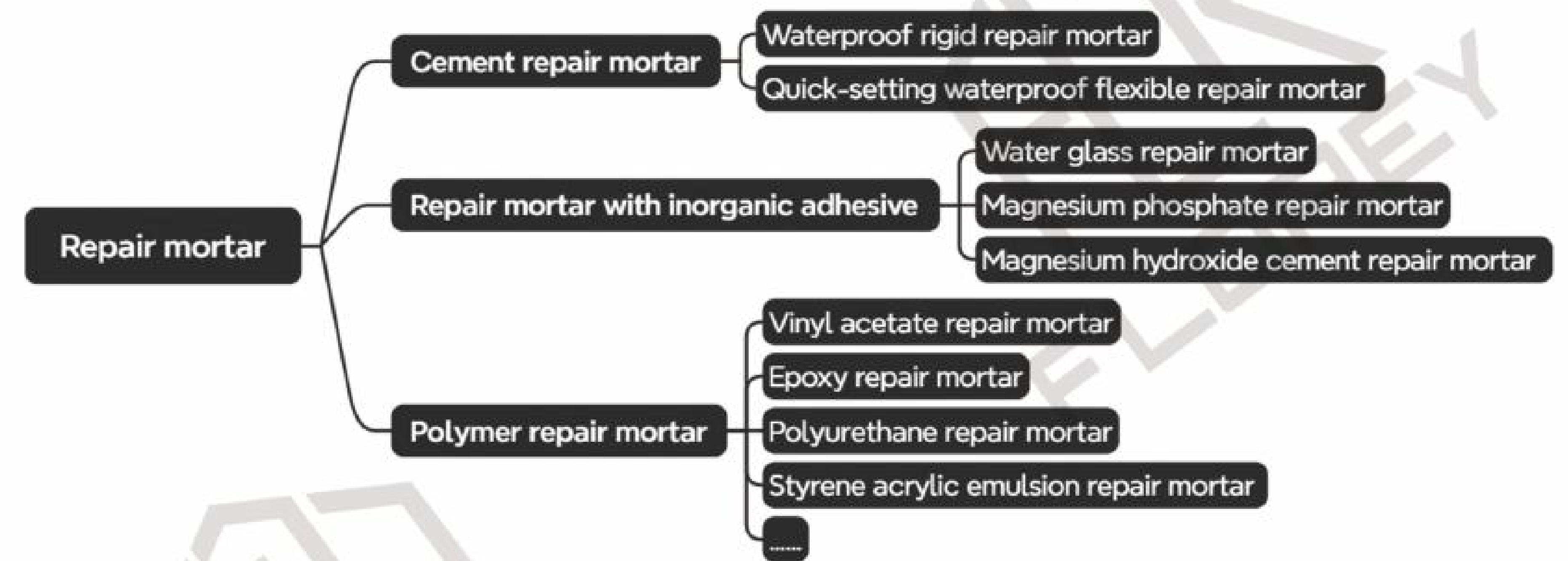
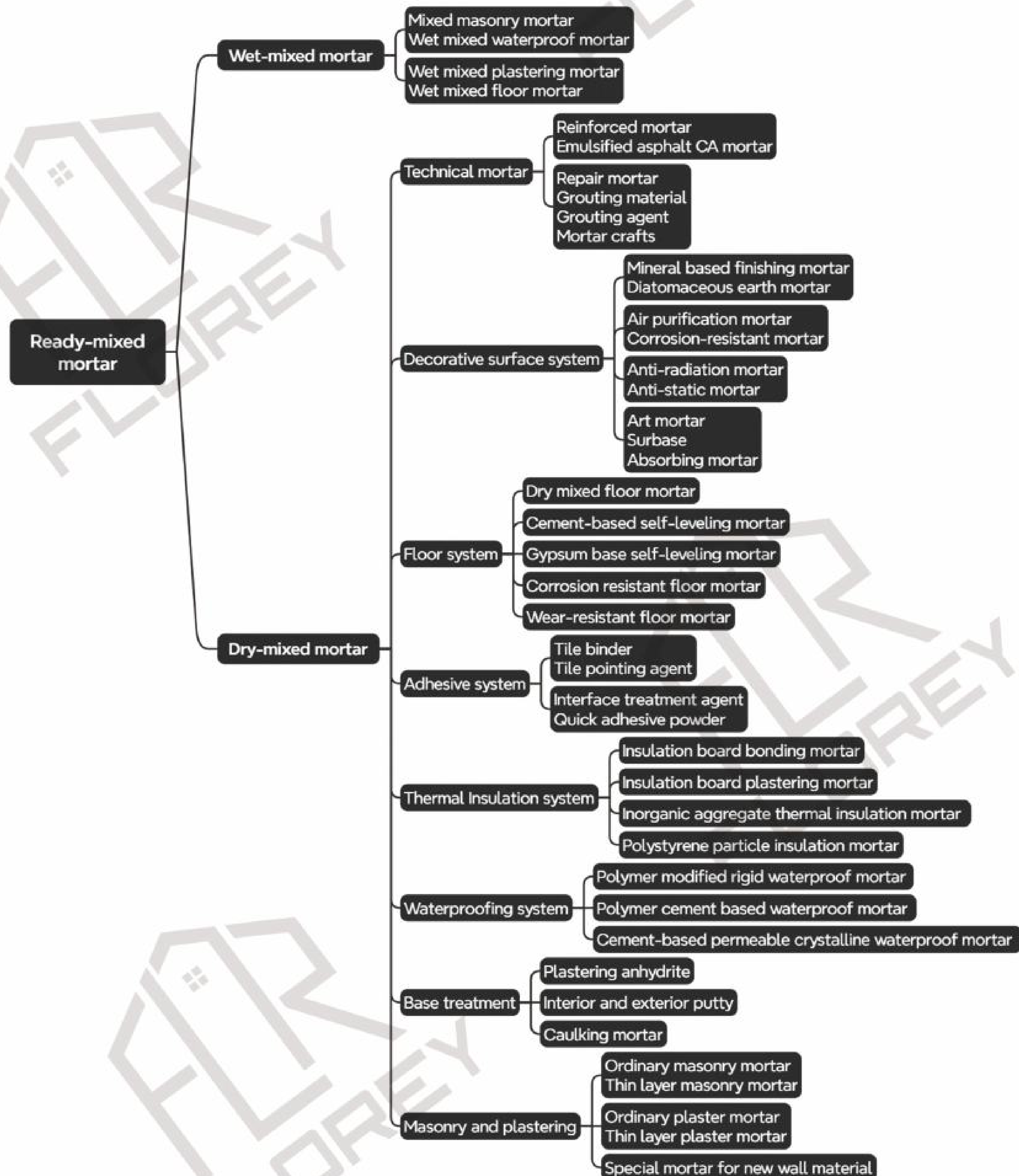
Implement the standard YB/T 151-2017 for steel fibers used in concrete

| Specification and model  | Length  | Diameter  | Aspect ratio | Tensile strength | Bending performance |
|--------------------------|---------|-----------|--------------|------------------|---------------------|
| Sheared corrugated type  | 32-38mm | 0.7±0.2mm | 30-40        | ≥400Mpa          | ≥3                  |
| Sheared multi-point type | 32-38mm | 0.7±0.2mm | 30-40        | ≥600Mpa          | ≥3                  |

### Construction suggestions

- General crack control (C25–C35, slabs, walls, ordinary floors): Fluted fibers 20–35 kg/m<sup>3</sup>; shear fibers 25–35 kg/m<sup>3</sup>; focused on basic crack resistance and workability.
- Heavy-duty floors / pavements (C30–C40, factories, logistics warehouses, municipal roads): Fluted fibers 30–50 kg/m<sup>3</sup>; shear fibers 35–50 kg/m<sup>3</sup>; enhances wear resistance and impact performance.
- Bridge pavements / box girders (C40–C50+): Fluted fibers 40–60 kg/m<sup>3</sup>; shear fibers 45–65 kg/m<sup>3</sup>; improves shear resistance and durability. High-strength elements can use fluted fibers 60–80 kg/m<sup>3</sup> and shear fibers 55–75 kg/m<sup>3</sup>.

# ARCHITECTURAL MORTAR ADDITIVES



# PRODUCTION EQUIPMENT

## PRODUCTION EQUIPMENT OF POLYCARBOXYLATE SUPERPLASTICIZER

According to the design of the capacity, the production equipment of PCE water reducer can be installed and invested according to the following three types of equipment. Below are three models, please tell us the type of plant you are planning to build, and we will provide you with equipment consultation and installation services as well as PCE production formula and technical support services.

**Compounding product equipment**  
*Fast Compounding, Flexible Production*



**PCE Integrated synthesis equipment**  
*Set Up Today, Produce Tomorrow*



**Production line with a certain scale**  
*Intelligent Production, Higher Output*



## PCE Production Technology

If you are looking for technology for the production of concrete and concrete admixtures, you have come to us. We are a team from Luoyang University of Science and Technology in Henan Province, China, specializing in the research, production and application of concrete admixtures. This product is mainly used in your country construction, cement centralized mixing production places are used, you can first investigate the market, and then contact us. We can help you provide production equipment, raw materials, production formula and process, application technology and other comprehensive support.

## PCE Water Reducer & Slump Retainer & Retarder

Our liquid PCE products and solid PCE products are currently produced with the latest C6 technology. If you are engaged in the concrete industry or building materials industry, you can take a good look at the content of our category, you will find that we are different from other companies.



# INTERNATIONAL EXCHANGE



OUR TECHNOLOGY AND EXPERIENCE ARE DEEPLY ROOTED IN THE CONSTRUCTION SITE, NOT JUST IN THE LABORATORY AND FACTORY.



OTHER FACTORIES ONLY SELL PRODUCTS FOR YOU, WE DEDICATE OURSELVES TO TEACHING YOU HOW TO PRODUCE SUPERIOR WATER REDUCERS.



PROFESSIONAL TEAM DOES PROFESSIONAL THINGS ONLY TO CREATE VALUE FOR OUR CUSTOMERS

