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# Concrete Admixture

Innovation in Laboratory  
Service for Global Clients



**CNBM**

**CNBM International Corporation**





## About CNBM



### China National Building Materials Group Corporation

is the full name of CNBM, which is one of the largest state-owned group and manufacturer of all building materials and concrete admixture in China. In 2012, the total turnover volume of CNBM exceeds US\$35 billion dollars with a total staff of 130,000. CNBM is listed in the FORTUNE 500 Enterprises!

For concrete admixture, CHINA BUILDING MATERIALS ACADEMY, is working as the powerful technical support and production equipments supply base, and as a state-owned leading R&D institute, and as the national R&D platform for key projects in

building materials and new materials industry, R&D platform for advanced key technologies in building materials industry, supporting platform for technical innovations for CNBM enterprises.

We combine economic success, social responsibility and environmental protection. Through science and innovation we enable our customers in almost all industries to meet the current and future needs of society.

Persist pursuit of excellence

### CNBM Oversea Branches:

U.A.E BRANCH OF CNBM INTERNATIONAL CORPORATION

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## Manufacture



## Laboratory





## Polycarboxylate Superplasticizer ( Liquid )



### Description

Polycarboxylate Superplasticizer(Liquid)---Third generation of concrete admixtures, fine comprehensive performance and green environmental protective products, it complies with ASTM C 494.

### Application

As a new generation of environmental friendly concrete admixture, Z-100 and TM-300 can be applied in hydraulic, electricity, port, bridge, railway, tunnels and highway projects



### Properties

Items	Specification	
	Z-100 ( 40% )	TM-300 ( 45% )
Visual Appearance	Brown transparent liquid	Light yellow transparent liquid
Solid Content(%)	40.0 ± 1.0	45.0 ± 1.0
Density(23℃)(g/cm <sup>3</sup> )	1.09 ± 0.02	1.09 ± 0.02
pH	5~7	5~7
Chloride Content(%)	≤ 0.02	≤ 0.02
Na <sub>2</sub> O+0.658K <sub>2</sub> O (%)	≤ 2	≤ 2
The formaldehyde content (according to solid content exchanging) (%)	≤ 0.02	≤ 0.02
The fluidity of cement paste(mm)	≥ 250	≥ 250

### Features and Benefits

1. Excellent compatibility with various types of cements.
2. High water reducing rate, low dosage, and low slump loss.
3. Low chloride and alkali content, no corrosion to steel-bar
4. High stability: no precipitation at low temperature.
5. Environmental friendly and nontoxic



### Dosage and usage

- 1, This product recommended content is 0.25% -0.85% of the total weight of cementitious material, actually content should be experimentally determined.
- 2, Due to the adaptive differences between different types of the cement and admixtures, The adaptive test of cement and admixture should be done before using or changing the cement type.
- 3, In order to achieve better water-reducing effect, and ensure the quality of concrete, the mixing time is recommended at least 120 second before the concrete mixing test.



### Packaging, transport and storage

- (1) It is packed in 1000Liter per IBC Tank, Other special package can also be available according to prior consultation.
- (2) Special measures should be taken to ensure entire package. Keep waterproof during transportation.
- (3) Dry and well ventilated warehouse is needed for storage. Quality guarantee of Polycarboxylate Superplasticizer is 12 months under normal conditions. If storage has surpassed the time, test must be done to confirm the validity.

### Health and safety

- (1) Once splashed into eyes and skin, wash immediately with plenty of water and seek medical treatment.
- (2) Inedible. When eating by mistake, drink sufficient water to urge to vomiting, and then go to hospital.
- (3) No littering. Caution should be taken to protect environment.

## Polycarboxylate Superplasticizer ( Power )

### Applications

- 1.NZY-P is used in concrete in industrial and civil buildings, hydraulic engineering, transport system, port engineering, and municipal engineering.
- 2.NZY-P is used in ready mix plants, precast and concrete plants.
- 3.NZY-P is suit for ordinary concrete, high strength concrete, self-compaction concrete and as-cast-finish concrete.







## Features and Benefits

1. Excellent water-reducing ability. NZY-P can significantly reduce 40% mixing water in high strength concrete.
2. Enhance physical and mechanical properties of concrete.
3. Enhance durability of concrete.
4. Enhance volumetric stability of concrete.
5. Excellent compatibility with Portland cement.
6. High water retention capacity.

## Properties

Items	Results	Item	Results
Appearance	white powder	Classification	High performance water-reducing admixture
Chloride Ion	—	PH Value	6–8
Cement Paste Fluidity	≥220mm	Moisture content (%)	< 8%

## Concrete performance with 0.2% NZY-P by binder weight

Test item		Quality index			Results
		Hardening	Standard	Set Retarding	
Water reducing rate (%), ≥		25	25	25	26.0
Ratio of bleeding rate (%), ≤		50	60	70	0
Air content (%), ≤		6.0	6.0	6.0	2.5
Difference in setting time ( min )	Initial setting	-90 ~ +90	-90 ~ +120	> +90	+55
	Final setting			—	+40
1h change	Slump(cm)	—	< 80	< 60	35
Ratio of compressive strength (%), ≥	1d	180	170	—	240
	3d	170	160	—	210
	7d	145	150	140	178
	28d	130	140	130	152
Ratio of shrinkage ( % ) ,≤	28d	135			102

Conclusion: the project is in line with "high performance water reducer" index of GB8076–2008.

## Dosage and usage

1. For powder NZY-P, the dosage is typically 0.2%–0.6%, 0.8% for high strength concrete.
2. The amount of NZY-P used in concrete will be slightly adjusted depending upon job requirements, such as concrete strength, variations in cement, aggregate and other job site conditions. Experiments for appropriate dosage must be carried out when changing concrete mix proportion or materials.
3. NZY-P can be added in concrete with other raw materials directly, and it is much better to dilute as solution which contains solid before using it.
4. NZY-P cannot be used with naphthalene based water reducing admixture.
5. Experiment must be done when NZY-P is used together with other admixtures.



## Packaging, Transport and Storage

1. Powder NZY-P is available in 25kg film-lined bags. Other special package can also be available according to prior consultation.
2. Special measures should be taken to ensure entire package.
3. Dry and well ventilated warehouse is needed for storage. Quality guarantee of NZY-P is one year under normal conditions. If storage has surpassed the time, test must be done to confirm the validity.

## NZY-FN1 High Performance Water Reducer (High concentration of type)



### Description

NZY-FN1, a high performance water reducer (high concentration type) is produced by the processing and purification of naphthalene high performance water reducer, the - naphthalene sulfonic acid salt formaldehyde condensates content is high, sodium sulfate content is low ( ≤5%). It conforms to the requirements of chemical admixture specifications for concrete: ASTM C494, Type F; ASTM C1017

## Applications

1. NZY-FN1 is suitable to make high flowing concrete, commercial concrete, pumping concrete, prestressed and reinforced concrete.
2. NZY-FN1 can be used to make C10-C60 concrete with slump loss between 50mm and 70mm, or C60 concrete with slump between 180mm and 220mm
3. NZY-FN1 can be used as raw material to compound accelerator, retarder, anti-freezing agent and pumping aid to satisfy requirements from different construction projects, techniques, materials and environmental temperatures.
4. NZY-FN1 is compatible with Portland Cement, Portland Slag cement, Fly-ash Cement, Portland Pozzolanic Cement.etc



## Properties

Items	Specifications
Visual Appearance	Sepia Power
Fineness(0.315mm remains),%	8.0 max
pH value	8-9
Sodium Sulfate Content,%	5.0 max
Chloride Content,%	0.6 max
Cement Paste Flow	230mm min
Water Reducing Rate	Min 18%
Steel-bar Corrosion	None



### Features and Benefits

Non-toxic, non-irritating and no corrosion to steel bars  
 High water reducing rate: up to 30%  
 Strengthening ability  
 Improving concrete durability  
 Improving concrete durability and impermeability  
 Appropriate setting time  
 No crystallization in winter  
 Good compatibility with various types of cement

### Dosage and usage

1. The dosage is about 0.5 ~ 1.3% of cementitious materials, actual usage needs to be confirmed by the test.
2. Due to the adaptive differences between different types of the cement and admixtures. The adaptive test of cement and admixture should be done before using or changing the cement ty

## NZY-FN2 High Performance Water Reducer (Low Concentration Type)



### Description

NZY-FN2, a high performance water reducer (low concentration type) is produced by the processing and purification of naphthalene high performance water reducer, the  $\beta$  - naphthalene sulfonic acid salt formaldehyde condensates content is high, sodium sulfate content is low ( $\leq 10\%$ ). It conforms to the requirements of chemical admixture specifications for concrete: ASTM C494, Type F; ASTM C1017

### Applications

1. NZY-FN2 is suitable to make prestressed concrete, reinforced concrete, high performance concrete, high- flowing concrete and self-compacting concrete, various types of concrete.  
 NZY-FN2 is applicable in areas with the daily lowest temperature of 0 and for making concrete which requires high fluidity, high strength or steam curing.
2. NZY-FN2 can be used to make C10-C60 concrete with slump loss between 50mm and 70mm, or C60 concrete with slump between 180mm and 220mm.
3. Mixed with the recommended dosage of this product in concrete, under the condition of same cement content and slump value , it can reduce the mixing water consumption from 18% to 30%, and enhance the early strength and strength obviously.
4. With the same conditions of strength and slump of the concrete, it can save the using amount of cement from 15% to 20%.
5. NZY-FN2 can be used as raw material to compound accelerator, retarder, anti-freezing agent and pumping aid to satisfy requirements from different construction projects, techniques, materials and environmental temperatures.



6. NZY-FN2 is compatible with Portland Cement, Portland Slag cement, Fly-ash Cement, Portland Pozzolan Cement.etc



### Properties

Items	Specifications
Visual Appearance	Light Brown Power
Fineness(0.315mm remains),%	8.0 max
pH value	8-10
Sodium Sulfate Content, %	10.0 max
Chloride Content, %	0.6 max
Cement Paste Flow	230mm min
Water Reducing Rate	18% min
Steel-bar Corrosion	None

### Features and Benefits

1. High water reducing rate: up to 30%
2. Saving cement without sacrificing slump retention and strength
3. Good flowability
4. Early and post strengthening ability
5. Great compatibility with various types of cement
6. Improved Compactness: it develops a better pore structure and makes the concrete more compact. It produces high durable concrete of which the anti-infiltrating index is beyond P18

### Dosages

It can be added during mix or after mix, while the afterward approach is preferential  
 Dosage normally ranges from 0.5% to 1.5% by weight of cementitious material, while the recommended dosage is 0.75~1.1%





### Packaging, transport and storage

1. The powder product is packed with  $25 \pm 0.25$ kg laminating woven bag. Packaging specifications should meet the user requirements.
2. Powder product is easy to soluble in water, liquid dilution will affect the effective concentration of the product, transport and storage should be noted that the anti-leaching, avoid moisture, direct sunlight, kept under seal and away from open flame at the room temperature or during the transport.
3. In the case of good storage conditions, valid period is 6 months. If it is more than 6 months or moldy or smelly, rechecking is needed for using continually. Please use out them within a week once opening.



### Pumping Aid NZY-HP (High-effective Pumping Agent )

#### Description

NZY-HP has components of -naphthalene sulfonate formaldehyde high polycondensate as fluidization, air entraining, retarding, and intensifying. It has good adaptability to cement variety, less air entraining, remarkable water-reducing and intensifying effect. It can prevent concrete from being isolated or blocked in the pumping pipeline, thus improving its pumping performance. This product complies with the national standard of first-class concrete pumping agent in building material industry

#### Technical Data Sheet

Items	Criteria	Actual Results	Items	Criteria	Actual Results
Slump increased,%	$\geq 100$	122	Water bleeding rate,%	$\leq 90$	78
Slump retention value (mm)	30min	$\geq 150$	Corrosiveness	None	None
	60min	$\geq 120$		3 days	$\geq 90$
Difference in setting time (min)	Initial setting time	+235		7 days	$\geq 90$
	Final Setting time	+240		28 days	$\geq 90$
	Air content,%	$\leq 4.5$	Shrinkage,%	28 days	$\leq 135$

Note: Standard addition rate is 0.75% of cement quantity



### Anti-freezing Admixture



#### Description

NZY-AF is a non-corrosive ,non-chloride admixture for concrete with 3C certification. NZY-AF is specially formulated to increase concrete early strength while short concrete setting time under temperature range from  $-10^{\circ}\text{C}$  to  $-20^{\circ}\text{C}$

#### Technical Data Sheet

Items	Criteria	Actual Results
Water Reducing Rate(%)	$\geq 10$	19.7
Air content,%	$\geq 2.5$	2.0
Compressive strength Ratio,%	7 days	$\geq 20$
	+28 days	$\geq 100$
	-7 dyas+28 days	$\geq 95$
Content of amino acids,%	$\leq 0.1$	0.01

### Air Entraining Admixture

#### Description

Air entraining admixture which generates a highly stable air void system to prevent damage from freezing and thawing, severe weathering, or deicer chemicals.Based ob a high-grade saponified formulation,it is chemically similar to vinsolbased products, but with increased purity and supply dependability.



#### Technical Data Sheet

Items	Actual Results	Criteria
Water Reducing Rate,%	$\geq 6$	8.1
Water Bleeding Rate,%	$\leq 70$	0
Air content,%	$> 3.0$	5.7
Difference in setting time time(mm)	Initial Setting time	+37
	Final Setting time	+80
Compressive Strength Ratio, %	3 days	$\geq 95$
	7 days	$\geq 95$
	28 days	$\geq 90$
Shrinkage,%	28 days	$\leq 135$



## Cement-based Grouting Material (UGM / ZYG)



### Description

Cement is used as basic material in cement-based Grouting Material, which is dry mixture made by cement together with appropriate natural high-strength aggregate, a variety of concrete admixtures and other components. It has high liquidity, early strength, high-strength and non-shrink characteristics after mixing with water. It is widely used in equipment foundations, steel base, secondary grouting and bolts anchoring works, as well as concrete beams, columns, plates, wall reinforcement, concrete hollow supplemental and irrigation repair, etc.

### Technical Data Sheet

Items		Standards and Technology Indicators	Common type	High strength type	Super early strength type
Grain size	4.75mm square mesh sieve(%)	≤2.0	≤2.0	≤2.0	≤2.0
Setting time	Initial setting time (min)	≥120	≥120	≥120	≥30
Bleeding capacity (%)		≤1.0	≤1.0	≤1.0	≤1.0
Fluidity (mm)	The initial fluidity	≥260	≥280	≥280	≥320
	30min fluidity retain value	≥230	≥240	≥240	≥300
Compressive strength (Mpa)	2 h	—	—	—	≥20
	1d	≥22.0	≥25.0	≥40.0	≥45.0
	3d	≥40.0	≥45.0	≥60.0	≥65.0
	28d	≥70.0	≥70.0	≥80.0	≥85.0
Vertical expansion%	1d	≥0.020	≥0.020	≥0.020	≥0.020
Reinforced Bars (round ) bond strength (MPa)	28d	≥4.0	≥4.0	≥4.0	≥4.0
Corrosion to reinforced bars	Should indicate no corrosion effect on the steel				

### Features and Benefits

1. Good fluidity, no bleeding, it can automatically fill to the required grouting gaps;
2. It has early strength, high-strength performance. It can improve the impact resistance and vibration resistance as equipments operating. Different types of UGM can meet different requirements of projects.
3. It has the characters of high bond strength, no shrinkage and micro-expansion that can ensure the solid combination of anchor bolts and base, as well as the old and new concrete.
4. It has good crack resistance and impermeability, impermeability grade is higher than P20. The excellent no-shrinkage performance to ensure there is no cracks in the large area construction.
5. The type with early strength has performance of anti-corrosion. It has good performance of sulfate resistance and anti-sewage corrosion. Its erosion resistance performance can be used in harbor, sewage treatment plants and other projects.
6. UGM belongs to inorganic grouting material and it has good durability, so it is no aging, no corrosion to steel. Due to its low alkali content, it can effectively prevent harmful alkali-aggregate reaction.
7. The powder bulk density is 2100 to 2400kg / m<sup>3</sup>.

### Applications

1. Foundation bolt and anchor grouting for heavy duty equipments as well as secondary grouting for machinery seats
2. The secondary grouting for the joint of reinforced structure and concrete
3. Speed repairing for equipment foundation, anchors, road, floor, and railway foundation
4. Grouting under low and minus temperatures
5. Concrete repairing and fixing

## Successful case

Tanzania airport



Water Cube Olympic Swimming Pool steel base



Dubai Metro



Taiwan optimal mud enterprise - baseball field



Cement plant equipment foundations



Installation of wind power







### Technical Know-how Transfer

CNBM helps customer not only to design and build a factory to produce following superplasticizers, but also to set up local blending stations.

Naphthalene-based High range water reducer NZY-FN1, NZY-FN2

Amino Sulfonic Acid-based Superplasticizer

High- strength Non-shrink grouting

Polycarboxylate Superplasticizer Z-100, TM-300

Regarding to technical know-how transfer, CNBM provides production formulation, on site production training, lab set-up and lab personnel training



## CNBM Dubai Logistic Center

