

Concrete Admixtures

Know-how Transfer

Naphthalene-based Superplasticizer (PNS)

Description

Naphthalene superplasticizer mainly consists of β naphthalene sulfonate formaldehyde condensate. It is a high range water reducer, commonly referred to as superplasticizer or SNF/PNS.

MUHU product meets the requirements of chemical admixture specifications for concrete: ASTM C 494, Type F; ASTM C 1017.

Grades

Naphthalene superplasticizer has two grades in terms of their Sodium sulfate content.

- UNF-5: sodium sulfonate content ($\leq 18\%$)
- FDN: sodium sulfonate content ($\leq 5\%$)



Specification (UNF-5&FDN)

Items	SNF Type	Criteria	Actual Results
Solid Content, %	UNF-5	92 min.	93.41
	FDN	92 min.	93.38
Moisture, %	UNF-5/FDN	8.0 max	7.1
Fineness (0.315mm remains), %	UNF-5	15.0max	9
	FDN	15.0max	8
pH Value	UNF-5	7-9	7.8
	FDN	7-9	8.62
Sodium Sulfate Content, %	UNF-5	18.0 max	16.71
	FDN	5.0 max	3.6
Chloride Content, %	UNF-5	1.0 max	0.21
	FDN	1.0 max	0.11
Surface Tension	UNF-5	68-72Mn/m	70
	FDN	68-72Mn/m	71
Cement Paste Flow	UNF-5	210mm min.	220mm
	FDN	210mm min.	238mm
Water Reducing Rate	UNF-5	18% min.	20%
	FDN	20% min.	21.5%
Steel-bar Corrosion	UNF-5/FDN	None	None

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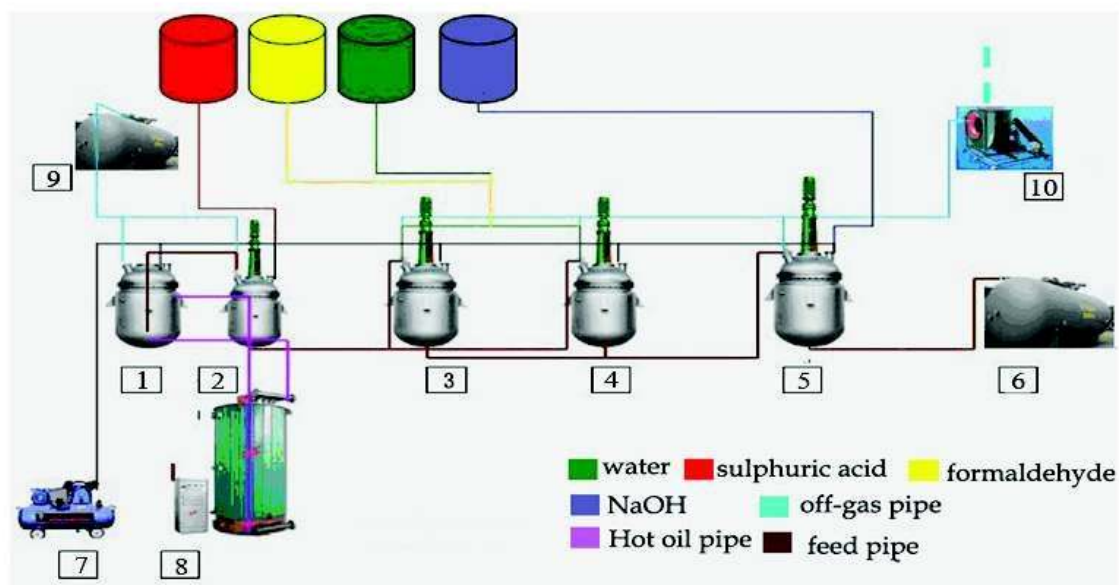
Application and Addition rate

SNF can be added directly in powder form or added after liquidified. It can be added during mixing and after mixing. The afterward approach can achieve better result. The suggested addition rate is 0.75% of cement quantity.

Package, Delivery and Storage

- For powder: Woven fabric bag with plastic liner. Net weight: 40kg±0.25kg;
For liquid: bulk package in metal drum. Net weight: 200kg. It must be sealed in case of leakage or water evaporation. Tank transportation is allowed.
- Cautions should be taken to prevent package from rain or high-humidity or moisture, also prevent package from being torn by sharp-ended objects. If the powder has been affected by damp, mixing it into solution is allowed.
- The product should be stored in a dedicated warehouse that is well-ventilated and dry. It remains effective in one year. After the expiration date, it still can be used only if testing results fall within the established range. If it is agglomerated due to damp and the properties keep the same, it can be applied only if the agglomerate of the powder be grinded into specified fineness or dissolved into solution.

Production Flow Chart



Note:

1. reactor for naphthalene liquidification ; 2. 5000L reactor ; 3. 10000L reactor
- 4.10000L reactor ; 5. 200000L reactor ; 6. tank for finished products ;
7. air compressor ; 8. heating furnace ; 9. naphthalene recovery device ;
- 10.waste gas treatment ;

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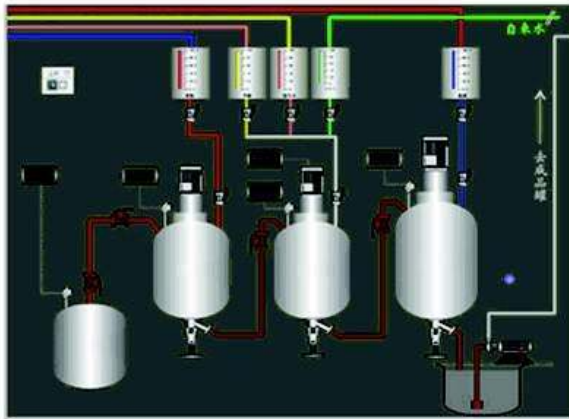
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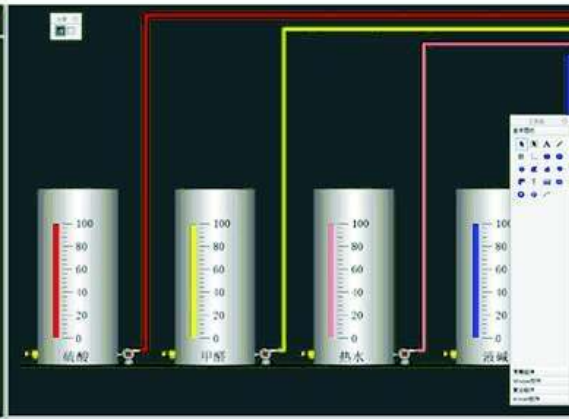
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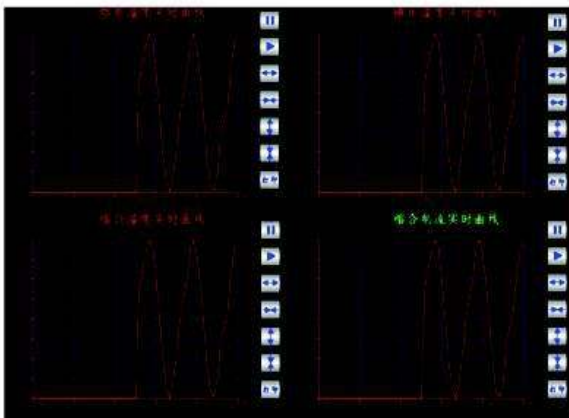
Basic equipments for manufacturing (liquid) (60 Tons per day)



Real-time monitoring of production



Real-time monitoring of raw material storage



Real-time production process curved line

A computer interface displaying a table of historical data. The table has multiple columns and rows, with a header row in blue. The data is organized into a grid, and the interface includes a search bar and various control buttons.

Historical data search

- Reactor of 5000 liter 1set Naphthalene Liquidification;
- Reactor of 5000 liter 1set Sulfonation;
- Reactor of 10000 liter 2sets Condensation;
- Reactor of 20000 liter 1set Neutralization.
- Raw material storage tanks, 3 sets, 30 tons capacity for each set
- Pipeline: Phenolic resin pipeline and steel pipeline
- Heating system: streaming boiler 0.5 t, oil-fuel 300000kcal./h
- Environmental protection equipments: Corrosion-resistant draught fan, spray pump, Naphthalene recollection room, etc..
- Additional equipment: including power terminal, electrical cabinet, pipeline pump, air compressor, operation platform, etc..
- Automatic production monitored by a computer system and data collection devices

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Raw material for production

- Crude Naphthalene (98%)
- Sulphuric Acid (concentration 98%)
- Formaldehyde (concentration 36%)
- NaOH(40-60%)

Project Investment

- Equipments: 163,000USD to 200,000USD
- Plant, warehouse and office occupancy: 500-1000m²
- Clear height of plant workshop: 6-8m
(The workshop: 100USD /m², total amount: 37,000USD to 74,000USD)
- Circulating cash: 75,000USD to 150,000 USD
- The other costs: 15,000USD to 23,000USD
- Total equipment, facilities, and civil construction cost: 290,000USD to 447,000 USD
- Chemical Synthetic know-how 60,000USD
- Drying Know-how 45,000USD

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