

Concrete Admixtures

Know-how Transfer

Polycarboxylate Superplasticizer (PCE)

Description

Polycarboxylate-based(PC) is a kind of superplasticizer emerging in the early 80' s. It is mainly used in cement concrete. PC is also a superplasticizer for high performance concrete, high strength concrete, high volume fly ash/slag concrete and grouting/self-leveling screed/mortar. It complies with ASTM C 494, Type F specification.

Grades

PC has two grades in terms of their solid content:

- PC-L(40%): Solid content 40%
- 2PC-P(Pwd): Solid content 98%.



Properties

Items	Specification	
	PC-L (40%)	PC-P(Pwd)
Visual Appearance	Pale Brown Viscous Liquid	Light Yellow Powder
Solid Content (%)	40.0±2.0	98.0±1.0
Density (23°C) (g/cm ³)	1.12±0.02	510±10
Chloride Content (%)	≤0.10	≤0.10
Na ₂ SO ₄ Content (%)	≤4.0	≤4.0
Na ₂ O+0.658K ₂ O (%)	≤5.0	≤5.0
Solubility	Very Soluble	
Performance	Dosages for Standard Cement: (wt% of cement)	
	0.5±0.05	0.2±0.02
Cement Paste Flow(mm)	≥240	≥240
Water Reducing of Mortar	≥20	≥20
Addition Rate(wt. % of cement)	0.4-1.5	0.2-0.3

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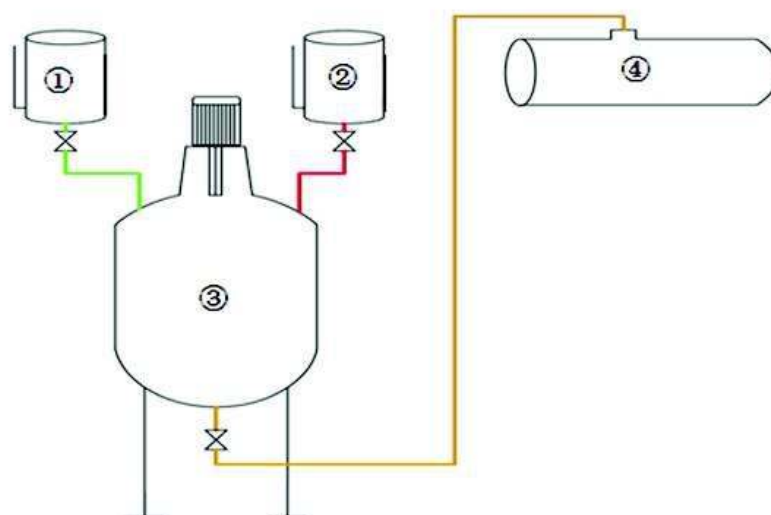
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Test Data Sheet

Test Items		Specification
Water Reducing Rate, %		≥ 25
Compressive Strength Ratio, %	1 day	≥ 170
	3 day	≥ 160
	7 day	≥ 150
	28 day	≥ 130
Air Content, %		≤ 2.0
Bleeding Ratio, %		≤ 60
Shrinkage (28 day), %		≤ 100
Setting Time Diff., min.	Ini.	-90~+120
	Fin.	
Chloride Penetration, coulomb		≤ 2000
F/T Cycles, Time		≥ 200
Slump Retention (60min), mm		≥ 150

Production process

According to different production capacity, the composing cycles of this product can be calculated as around eight hours per each reactor under normal pressure, reaction temperature in 60-110 degree centigrade.



- ① hot water ② formaldehyde
③ reactor ④ storage tank for finished products

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Economic Benefit Analysis

■ Costs

Prices of raw material :560-635USD per ton(20% liquid)

Utility consumption: 20-22USD per ton(including labor, water, electricity, and gas)

Total: 580-655USD per ton

■ Economic estimate

To establish a production line with annual capacity of 10,000tons (liquid 20%):

raw material : 560-635USD per ton,

After utility, equipment maintenance, and tax: 665USD per ton.

Average selling price in China 960 -1105USD per ton

Gross profit 295-441USD per ton,

annual gross revenue: nearly 3-4.4 million USD.

Although there may be fluctuation of raw material cost, the overall revenue is still very appealing.

Project Investment

■ Estimate equipment cost: 195,000USD.

■ Producing workshop, warehouse and office occupancy: 1000m².

■ Manufacturing know-how transfer: 68,500USD.

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