

DENKA CLIUP

Dust-reducing Agent for Shotcrete

Description

DENKA CLIUP is a dust-reduction (or dust-suppression) agent for shotcrete that can effectively control and restrict dust emissions when used in sprayed concrete; improving the work environment of construction sites.

Features

- Dust reduction
- Compatible with natural sand (from rivers, seas, mountains etc.)

Applications

- General-purpose shotcrete (wet/dry concrete spray)

Packaging

- 10kg paper bags

Shelf Life

- 12 months from production date
- Determine the production date by reference to the lot number. A lot number of "1AXXX" corresponds to production in Jan 2001; "2BXXX" to Feb 2002 and so on.

Technical Information (Physical Properties)

Primary Ingredient	Water-soluble polymers
Appearance	White powder
Bulk density (20°C, g/cm ³)	1.50–1.90
pH (0.1% aqueous solution)	7.0-9.0

Standard Mix Proportions and Usage Instructions

- 0.05~0.15 by cement wt (%)
- Feed a predetermined amount of **DENKA CLIUP** into a scale hopper or belt conveyer when weighing out aggregates in concrete plants. The use of **DENKA CLIUP** is applicable for both dry and wet construction methods.

Technical Data (Arbitrary Values)

- Physical Properties of Mortar with DENKA CLIUP added

Typical compressive strength values when varying amounts of **DENKA CLIUP** are added are shown below.

Amount of DENKA CLIUP added (C×%)	Mortar Flow (mm)	Compressive Strength of Mortar Added with Quick Setting Agent (N/mm ²)			
		Day 1	Day 3	Day 7	Day 28
Nil	200×200	9.2	19.4	30.0	31.5
0.05	200×200	9.2	19.2	29.8	31.2
0.1	200×200	9.1	19.1	29.5	31.3
0.15	200×200	9.0	19.0	29.3	30.9

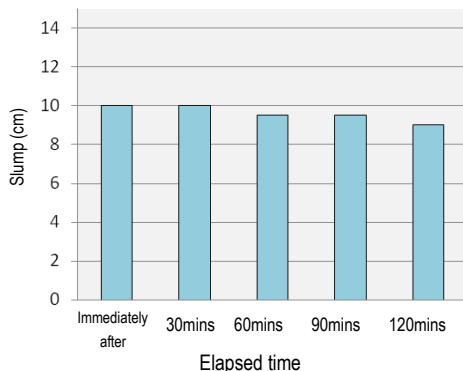
*Mixing ratio for mortar [C/S=1/3, W/C=60%, Quick setting agent : DENKA NATMIC TYPE-5 C×7%, Use of river sand as fine aggregate]

- Physical Properties of Concrete with DENKA CLIUP added

Concrete mix ratio with **DENKA CLIUP** added (arbitrary mix)

W/C (%)	s/a (%)	Material Quantity per Unit Volume of Concrete (kg/m ³)				CLIUP (C×%)
		W	C	S	G	
60	60	216	360	1053	716	0.1

- Change in concrete slump over time during agitation (fresh concrete)



[Testing Conditions]

- ◇ Indoor testing
- ◇ Concrete mix ratio as above was applied
- ◇ River sand was used as fine aggregate
- ◇ Mixing time : 60 seconds
- ◇ Time-dependent slump test : 2 rpm (tilting mixer)

- Physical Properties of Mortar with DENKA CLIUP added

Shotcrete dust concentration measurements are as shown below.

Location where spraying was carried out	Cross section of the tunnel (m ²)	Spraying System	Mixing Ratio for Shotcrete		CLIUP (C×%)	Slump (cm)	Dust Concentration (mg/m ³)
			W/C (%)	s/a (%)			
Our company's simulated tunnel	20	Pump system	60	60	No addition	10.5	5.3
					0.1	10.0	3.4

*Dust concentration was measured 5 meters behind the spraying position using a digital dust monitor (P-5L K0.04).

*Spraying condition : Concrete discharge rate = 10m³/h, Spraying volume = 2 m³, Quantity of quick-setting agent = (NATMIC T-5) C×7%

Handling Precautions

- Refer to the Safety Data Sheet (SDS) before use.
- Use DENKA CLIUP within recommended amounts. If DENKA CLIUP is used at amounts exceeding standards, the concrete pumpability, bonding behavior and strength development characteristics during concrete spraying may be adversely affected.
- Wear protective gear (goggles, mask, gloves, and rubber boots) while handling the product. Do not dispose of the product in drains.
- If DENKA CLIUP inadvertently gets in your eye, rinse well with a clean flow of water for more than 15 minutes and seek medical attention from a specialist.
- Once opened, the product should be used up completely. Otherwise, reseal for storage.
- The product should be stored in a dry area, indoors, and out of direct sunlight.
- Foaming can be seen when agitator trucks are washed. Take appropriate counteractions (such as the use of defoaming agents).
- Viscosity of concrete in which water-reducing are used may increase if DENKA CLIUP is added. Please consult DENKA before use if necessary.
- For further information, please contact DENKA.

Limitation of Liability

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