

CN2000®C and CN2000®D – Application Manual

1. Characteristics of the waterproof material

This product is an organic and inorganic composite type of coating. It has the dual function of both, volatilization and reaction setting.

After, you put the specified ratio of **CN2000®C** (liquid latex material) into the mixing container, while mixing using a mechanical agitator you will slowly add the specified amount of **CN2000®D** (dry powder). During this process the **CN2000®C** activates the dispersing agent in the **CN2000®D** forcing a hydro-reaction, causing a macromolecular polymer, forming a continuous, flexible membrane with a specified strength and elasticity.

This waterproof coating membrane structure can be used in waterproofing of flex joints and deformation joints of construction. The product has excellent strength, elasticity and low-temperature flexible performance, adhesive strength as well as being nontoxic, **environmentally friendly**, resistant to ultra-violet radiation, and aging resistance.

The performances of the present materials in the aspect of physical mechanics are satisfied to the requirements, prescribed in the building materials industry standard JC/T 894-2001 Polymer Modified Cementitious Waterproofing Coating. The main criteria of the present materials are as follows:

Solid content: $\geq 65\%$
 Touch drying time of coating layer: ≤ 4 hours
 Actual drying time of coating layer: ≤ 8 hours

Tensile strength

Without treatment	type I ≥ 1.2 MPa	type II ≥ 1.8 MPa
Maintaining ratio after heating treatment	type I $\geq 80\%$	type II $\geq 80\%$
Maintaining ratio after alkali treatment	type I $\geq 7\%$	type II $\geq 80\%$
Maintaining ratio after ultraviolet radiation treatment	type I $\geq 80\%$	type II $\geq 80\%$

Elongation ratio at break

Without treatment:	type I $\geq 200\%$	type II $\geq 80\%$
Heat treatment:	type I $\geq 150\%$	type II $\geq 65\%$
Alkali treatment:	type I $\geq 140\%$	type II $\geq 65\%$
Ultraviolet radiation treatment:	type I $\geq 150\%$	type II $\geq 65\%$

Adhesive strength at the damp structure surface

type I ≥ 0.5 MPa
 type II ≥ 1.0 MPa

<u>Impervious strength</u>	type I ≥	type II ≥ 0.6 MPa
Flexibility at low temperature (Φ10 mm rod) found	type I (-10°C) without cracks to be found	type II - impermeability (30 minutes and 0.3 MPa) with no leakage of water to be found

2. Environment Conservation criteria of CN2000® series of waterproof materials

The **Environmental Conservation** criteria of the **CN2000®** series of waterproof materials are controlled lower than the check-out limit, prescribed in the standards of **GB/T 15516-1995, HJBZ 004-1994** and the Method for Monitoring and Analyzing Water and Waste Water (3rd edition). The criteria of these check-out limits are as the follows:

- Hg: 0.05µg/L,
- Pb: 10µg/L,
- Zn: 50µg/L,
- Cd: 0.5µg/L,
- Cu: 10µg/L,
- Formaldehyde: 0.008 mg/m³,
- Volatile organic compound (VOC): 0.01 mg/m³.

Table 1 below summarizes performances of the carrier reinforced materials in the flexible coating layer.

Item	Quality requirement		
	I	II	III
Appearance	Uniform without slug type and leveling-up without fold		
Tensile force (width 50 mm) /N	Longitudinal ≥	150	450
	Transverse ≥	100	35
Percentage of elongation /%	Longitudinal ≥	10	20
	Transverse ≥	20	25

Table 1

Note: the materials of Classification I are polyester non-woven fabric cloth, the materials of Classification II are chemical fiber non-woven fabrics and the materials of Classification III are fiber glass net cloth.

- Ratio of materials (in weight) - **CN2000®C** : **CN2000®D** = 1:1 (1000 ml is equal to 1 kg of weight for **CN2000®C**)
- total use quantity of material = 2 kg/ m²
- total coating thickness = 1 - 1.2 mm

3. Treatment for substrate surface

- Substrate surface must be whole, solid and clean - seepage, dust, oil stains and any dirt should be cleared and removed;
- Allow at least 7 days or more curing of the concrete of last pour before the waterproof work can be carried out; and
- Loose honeycomb-type concretes, hollowing, joint seams and holes left over by pull rods and scaffolds must be eliminated or filled beforehand, in order to obtain the best results in the **CN2000®C+D** application.

4. Methods of Application

i. Trowel coating

Before trowel coating flexible material **CN2000®C+D**, the substrate surface must be completely clean and dry. (in some instances reinforcing fiber netting may be called for in specific engineering instances) Stir and evenly mix **CN2000®D** to **CN2000®C** in the proper ratio. Using a trowel, apply coatings to the working surfaces. First apply the corners and sides, and then apply to the level surfaces. The thickness of each coating should be consistent and applied in the same direction. The thickness at each joint must be even. Allow each layer of the coating to dry hard (approximately 3-5 hours depending on the ambient temperature) before applying the next coating. The direction of a successive coatings should be perpendicular to direction of the preceding one. Each coating layer should be thin (less than 0.3mm). Apply 4 or more coatings to reach the required total thickness (minimum 1 to 1.2mm).

NOTE: It should be noted that a higher number of thin coatings to reach the required thickness of 1 to 1.2 mm will produce a more flexible coating with higher elongation properties.

ii. Brush coating

All mixing and application procedures are identical to that described immediately above , however, a brush is used rather than a trowel.

iii. Spray coating

Before spray coating flexible material **CN2000®C+D**, the substrate surface should be completely clean and dry (in some instances reinforcing fiber netting may be called for in specific engineering instances) Using a common industrial paint sprayer, spray evenly mixed waterproof material **CN2000®C+D** to the substrate surfaces from the container. The thickness of each coating should be consistent and applied in the same direction. The thickness at each joint must be even. Allow each layer of the coating to dry hard (approximately 3-5 hours depending on the ambient temperature) before applying the next coating. The direction of a successive coating should be perpendicular to direction of the preceding one. Each coating layer should be thin (less than 0.3mm). Apply 4 or more coatings to reach the required total thickness (minimum 1-1.2mm). (See note above in Trowel Coating)

5. Curing

Let the treated area air dry with ambient air approximately 3-5 hours depending on temperature.

6. Expansion Gaps

We suggest applying only 4 layers (including the layer applied on the foam), remembering that each layer is very thin (less than 0.3 mm). If you find that four layers are not enough, you can apply a fifth one, but be sure to wait until each layer is completely air dry (approximately 3-5 hours depending on ambient temperature).

7. Precautions

The following precautions should be taken when applying **CN2000®C+D** product:

- Do not mix more material than can be applied within 20-30 minutes of mixing.
- The time of mechanical stirring is generally 3 to 5 minutes, and must have a liquid like consistency.
- The best temperature for application is 10°C to 20°C. Avoid application under 5°C and above 35°C.
- For easiest application in the open air, high temperature applications, it is suggested to arrange application in the morning or evening in order to avoid fast dry times which could result in dehydration of the **CN2000®C+D** material which could adversely affect the quality of the application.
- The waterproof materials are not decorative materials. If vehicles and pedestrians pass over them, protective covers are needed to be installed directly on top of finished product such as concrete, pavement, tiles etc.
- The flexible waterproof coating must be completely dry before carrying out the next process in order to avoid destroying the waterproof coating.

8. Standards of quality examination

- All layers should be solid throughout. There should be no gaps or air pockets;
- The coherence between a layer and another layer should be tight. Ensure that joints are staggered;
- Ensure that the coating has no air bubbles, phenomena of return powder and crevices;
- To carry out the water immersion test according to correlative national standards;
- The pursuant standards:
GB50180-2001 technical specifications of underground waterproof project
GB50208-2002 specifications for quality acceptance of underground waterproof project
GB50207-2002 specifications for quality acceptance of roofing project

9. Sealing of Structural Deformation Joint

This is a key point of project design and construction. In order to determine the most appropriate waterproofing method and materials for the structural joint, it is necessary to first identify whether the joint is an active or inactive one.

If it is an active joint, (Subject to reversals of stress) **CN2000®C+D** materials should be used. If it is an inactive (Static) joint, **CN2000®A** or **CN2000®B** should be applied. The inner joint seam should be sealed well during the structure construction. The seal on the outer joint seam should be done during the waterproof project application.

In general, the expansion, settlement, seismic and initiation joints are the active seams.

In addition to sealing these types of joints with a rubber or foam backing rod, water-stop bar or sealing materials at the inner side of the joint, a water-stop strip in a type attached outside should be attached at the outer side of the joint or a flexible coating layer to cover the joint.

As for the deeply structural joint, the plastic joint filler or bentonite waterproof board will be used to fill in the joint.

The construction joints and post-casting joints are the inactive ones. They should be sealed by use of **CN2000®A** or **CN2000®B**.

CN2000® a Revolutionary Concrete Solution