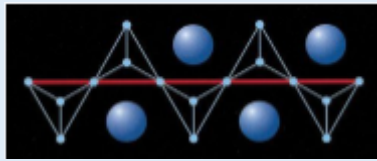


# kelso coatings



**CN2000® USED IN THE 2008 BEIJING OLYMPIC  
NATIONAL AQUATICS CENTRE “WATER CUBE”**

## **CN2000® Products:**

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## **CN2000® a Revolutionary Concrete Solution**

Certified ISO 9001-2000 / GB/T 19001-2000



## KELSO COATINGS INTRODUCES CN2000® - A SUPERIOR, TESTED, NON-TOXIC, CONCRETE WATERPROOFING SOLUTION - CHOSEN BY PROJECT ENGINEERS OVER 26 OTHER TYPES OF WATERPROOFING PRODUCTS FOR THIS LANDMARK PROJECT

### The Building

The Beijing National Aquatics Centre, also known as the Water Cube, is one of 28 new competition gymnasiums and stadiums built for the **2008 Beijing Olympic Games**. It is one of the most dramatic and exciting venues featuring sporting events for the Beijing Olympics in 2008.

This landmark building uses state-of-the-art technology and material to create a structure that is visually striking, energy efficient and ecologically friendly. Olympic competitions for swimming, diving and synchronized swimming will be hosted in the Water Cube. The Water Cube cost \$10.6 million USD to build and is sponsored by Hong Kong, Macao and Taiwan compatriots. Construction of the Water Cube started in December, 2003 and was substantially completed by November, 2006. The entire project was completed in October, 2007.



Figure 1 - "Water Cube" with blue overcoat

**"A project of vital, lasting importance and quality first"** is the slogan of its construction.

The Water Cube was designed collaboratively by the Association of the China State Construction Engineering Corporation, PTW Architects (Australia) and ARUP Corporation Ltd. (U.K.). In July 2003, out of submissions from 10 international consortia, they won the international design competition for the National Aquatics Centre for the 2008 Beijing Olympics. The competition, which was judged by a panel of international architects, engineers and pre-eminent Chinese academics, also involved a public exhibition and vote. The contour of the Water Cube is a large cube with side length of 176 metres by 176 meters and stands 31 metres high. The total building area is approximately 80,000 square metres. The periphery of the cube is steel structure stands accommodating 17,000 seats for spectators (6,000 permanent seats and 11,000 temporary seats to accommodate the Games). In the middle is the swimming pool, there is a plunge pool and playing pool. There are more than 3,000 blue ETFE air charging pneumatic die cushions with a total area 120,000 square metres.

### Use of CN2000® - the Pile-head Waterproof Structure

The total waterproof area of the Water Cube is 60,000 square metres, with an unprecedented high standard waterproofing requirement. The waterproof grade meets the first grade requirements of setting up the defense for waterproof/anti-corrosion of the pile heads.

The waterproof/anti-corrosion stringent-specific standards for the Olympic Games Swimming Complex project reached the advanced international level and beyond. For the key position - pile-heads, their waterproof and anti-corrosion adopt the Cementitious Capillary Crystalline Waterproof ("CCCW") material with Eka-molecular sieve construction, which is manufactured by ZHONGHE Waterproof Material Co., Ltd.

The Water Cube project has 2 floors of underground construction. The foundation back plane is supported on 4,371 piles with a diameter of 400 mm. A project with so many underground piles has only been seen in a very few engineering projects, up to now.

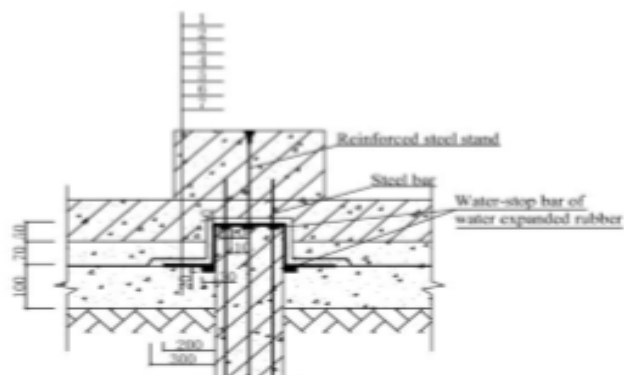
The waterproof project is the fundamental guarantee of the quality of the entire construction-engineering project.

The waterproofing/anti-corrosion of the piles, become a vital components to the waterproof/anti-corrosion construction. Setting up the defense of waterproofing of the pile heads, **CN2000®B** has met the advanced international level of **Cementitious Capillary Crystalline Waterproof (CCCW)**. The test conducted, provided relative data which indicated that **CN2000®** was the material of choice for the project engineers.

**Twenty-six different types of waterproofing/anti-corrosion materials were specifically tested to meet international levels of the environmental guidelines, must be non-toxic, must have good corrosion-resistance, durability and permeability, for this landmark project of the pile heads and CN2000® was unanimously declared the superior product.**

The components of the pile heads waterproof structure of the Water Cube can be seen in Figure 2. In addition, installation of the slow-swelling type rubber strips (which expand when in contact with water), were installed on the reinforced steel strands, steel bars and sealing grooves. To pre-coat with **CN2000®** cementitious capillary crystalline waterproof material, the pile heads were cleared thoroughly, chiseled to the matt surface and cleaned with a high pressure washer to saturate the substrate surface.

Figure 2 - Water Cube piles head waterproof structure



- 1 Foundation upstanding beam
- 2 Base slab
- 3 C20 fine stone concrete protection layer with thickness of 60mm
- 4 Coiled waterproof material
- 5 Polymer waterproof mortar with thickness of 10mm
- 6 Cementitious capillary crystalline waterproof materials
- 7 C15 concrete bedding with thickness of 100 mm



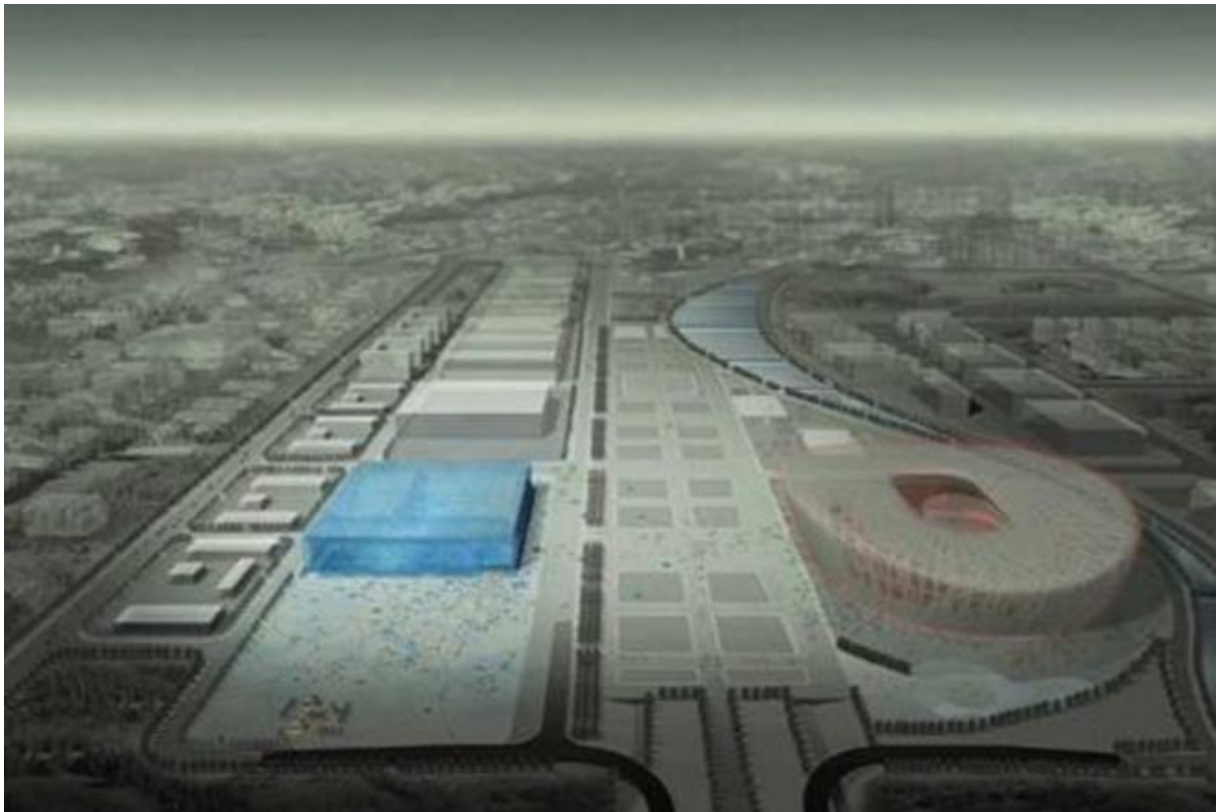
Figure 3 - “Water Cube” pile foundation site

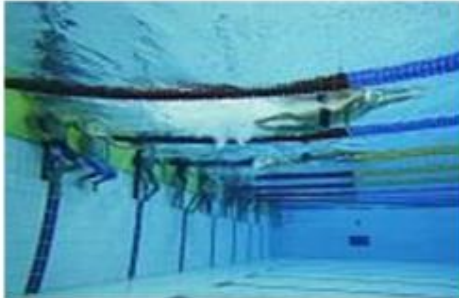
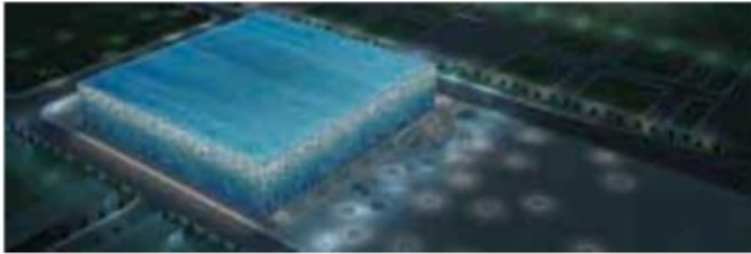


Figure 4 - Brush coating piles head with CN2000 waterproofing material

## “WATER CUBE” PHOTO’S AND ARTIST’S RENDERINGS







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