

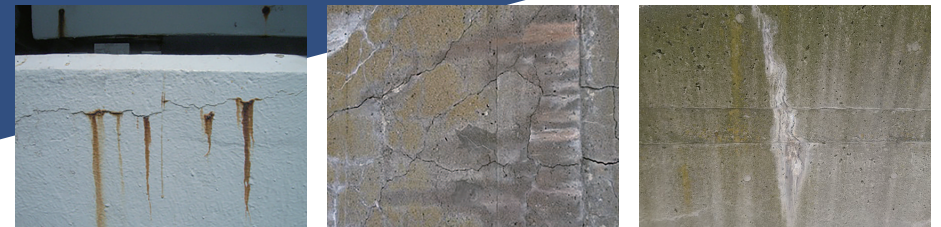


# Invisible strength. Visible protection. The ultimate shield for concrete and stone.

HydroTherm is a nano-level molecule. It penetrates deep into concrete, improves mold and cracks, and provides semi-permanent protection from water and dirt.



Rupture and rust juice due to rusting of steel frame , Hydrolysis of paint with cement alkali, large amount of efflorescence, etc



Only HydroTherm can protect against salt damage, freeze damage, alkali aggregate reactions, carbonates, and increase the durability of concrete without changing its color or texture. HydroTherm has excellent durability on concrete.

It is essential for modern architecture, which maximizes the use of materials without changing the color or texture after construction.

HydroTherm, which is composed of nano-level molecules, penetrates deep into concrete through the capillary action of air and water, repairs cracks and mold within the concrete, and coats the concrete surface.

After coating, air can pass through, but water cannot pass through.

The effect lasts semi-permanently.

# Examples of reviving old buildings and reproducing them as new buildings

## Prevention of deterioration and contamination of natural stone exterior walls

Treatment with HydroTherm in February 1989  
Manufactured by Chemix Japan Co., Ltd.  
Nippon Fire Insurance Co., Ltd. Yokohama Building  
Yokohama Bashamichi Design: Nikken Sekkei Co., Ltd.  
Trustee: Kumagai Gumi Co., Ltd. J.V.  
along with other contractors.



Before



After rebuilt

### Product Outline

HydroTherm consists of inorganic solution and high reactivity catalyst, and it is transparent, non-film forming, non-yellowing, and non-solvent agent for preventing permeation, reaction, deterioration, and water absorption on various types of concrete or stone materials. By reacting isolated alkali in concrete and stone materials, it fills the air gap in concrete with hydrophobic inorganic substance and provides permanent sealing and water resistance. Accordingly, the hardness of concrete and resistance to efflorescence or crushing increase.

### Required Amount

(for concrete or mortar)

4-8 m<sup>3</sup> /litter or 0.12-0.25ℓ/ m<sup>2</sup>  
(depending on materials)

### Compliance Criteria

\*The container can be incinerated/UMP No. 3004767

ASTM C-67 Section 7 (water absorption),  
Section 9 (suction), Section 10 (efflorescence)  
ASTMC-666 (freeze-thaw resistance),  
ASTMC G23-69 and ASTM E42-65  
(artificial weakening) and for stain and dusting  
resistance (ORF method)  
US Department of Agriculture' s permission of  
use at food processing facilities (US Testing Lab  
in New Jersey)  
Water criteria in Water Works Act per Ordinance  
56 by Ministry of Public Welfare

### Usage

HydroTherm can be used for slab hardening,  
dust proofing, preventing deterioration and  
waterproofing on all types of cement' s surface,  
concrete, blocks, stucco, bricks, and terrazzo.

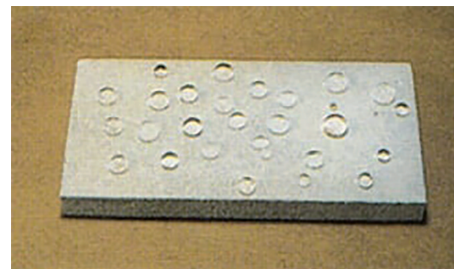
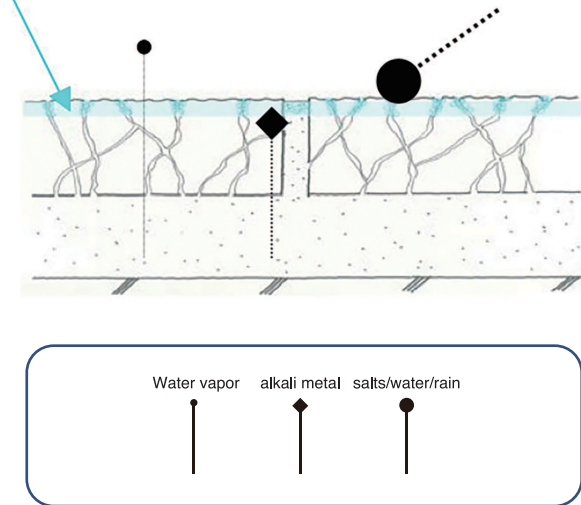
# HydroTherm mechanism

HydroTherm components in an aqueous solution with a surface tension less than half that of water penetrate deeper through the capillary pores and voids of concrete than water, causing free alkali (mainly free lime) in concrete and the concrete aggregate. It reacts with highly reactive silica (amorphous silica) and gradually becomes a water-insoluble inorganic compound in water gaps and voids, filling the water gaps and voids, preventing the concrete from absorbing water, and simply applying it to other surfaces. Unlike organic water repellents and resin coatings, it forms a breathable waterproof layer. Neutralization (carbonation), which is considered to be a major cause of concrete deterioration, is mainly due to carbonation or acidification of free alkalis in concrete, and this action is mainly promoted by carbon dioxide gas and water, so it is necessary to stop water absorption. By converting the free alkali in the substrate into a stable substance, neutralization is prevented, and by applying highly alkaline HydroTherm to concrete that has already been neutralized, the alkalinity will be restored and improved.

## Products

- ✓ Low surface tension and high permeability.
- ✓ Allows air to pass through, but not water.
- ✓ Restores the alkalinity of concrete.
- ✓ Essential for the preparation of painting material substrates.
- ✓ Cleansing effect and reinforcing action on dirty walls.

HydroTherm Crystal





# Action & Effect

## 01 Penetration

The components of HydroTherm in a solution with surface tension less than half that of water penetrate more deeply than water itself, moving through the capillary water gaps and voids in concrete and stone, achieving deep penetration.

## 02 Reaction

Once penetrated, HydroTherm reacts with the free alkalis (primarily free lime) in concrete and stone, as well as with the highly reactive silica (amorphous silica) in the concrete aggregate. Over time, it transforms into an insoluble inorganic compound within the water gaps and voids.

## 03 Reinforcement

The inorganic compound formed is more stable than before the reaction, filling the water gaps and voids. It starts to reinforce the substrate approximately four days after application.

## 04 Waterproofing

The insoluble inorganic compound, which fills the water gaps and voids and densifies the structure, impedes the absorption of water by the concrete and stone itself. Unlike organic water repellents or resin coatings that are merely applied to the surface, it forms a permanent, breathable waterproof layer.

## 05 Protection

Neutralization, a major cause of concrete deterioration, is primarily due to the carbonation or acidification of free alkalis in the concrete, a process that is mainly accelerated by carbon dioxide and water. By stopping water absorption and converting the free alkalis in the substrate into stable substances, neutralization is prevented. When high-alkaline HydroTherm is applied to concrete that has already undergone neutralization, the alkalinity is restored.

## 06 Durability

Concrete and stone treated with HydroTherm are protected from water penetration by a stable and dense protective layer. This not only prevents neutralization and alkali-aggregate reactions but also guards against salt damage and frost damage, significantly enhancing the durability and stability of concrete structures.

## Comparison/valuation of performance ⊙ outstanding ○ good △ fair × poor

Items	HydroTherm (type: inorganic reaction)
<b>Ingredient</b>	⊙ inorganic chemical compound
<b>Salt damage</b>	⊙ permanent effectiveness
<b>Alkali-silica reaction (ASR)</b>	⊙ effective to prevent reaction
<b>Water repellence</b>	○ no 100% waterproof, but enough water repellence lasts permanently
<b>Cement' s alkali resistance</b>	⊙ unaffected permanently
<b>Freezing damage</b>	○ almost no influence by increased density, and the effect lasts permanently
<b>Construction base</b>	⊙ dry/wet does not matter
<b>Surface after application</b>	⊙ almost no change in appearance and increases hardness
<b>Durability</b>	⊙ permanent effectiveness due to chemical reaction
<b>Usability</b>	⊙ very easy and simple
<b>Appearance of effect</b>	○ 12-24 hours/10 days for complete hardening
<b>Other characteristics</b>	○ very effective as priming paint and mold prevention

# Essential Qualities and Performance

Single application will demonstrate following effects:

- 01 Improvement of moisture resistance and waterproofing
- 02 Preventing deterioration of surface
- 03 Decrease penetration of grease, oil, and acid
- 04 Prevent cracks due to freezing
- 05 Prevent generation of mold and algae
- 06 Harden the material from the surface towards inside
- 07 Improve heat and cold tolerance
- 08 Easy removal of ice forms
- 09 Increase elasticity of concrete
- 10 Demonstrate high performance as concrete' s primer, and increase durability of paints and wall finishing materials
- 11 Prevent cracks and peeling of paintings and wall finishing materials due to humidity and moist

○ HydroTherm adheres rigidly to glass and aluminum, so adequate curing is required for those materials.

○ Use of HydroTherm does not damage air permeability and change the hue of texture.



Quantity: 20ℓ  
colorless and transparent liquid.

# General properties of HydroTherm

**Natural stone, brick, plaster, concrete, water-repellent frame reinforcement agent**

main componen	Alkali metal salt + silicate compound
specific gravity	1.13 (20°C)
surface tension	32dyn/cm (20°C)
PH	12.8 (strongly alkaline)
solvent	water
clay	3cps or less
exterior	Colorless transparent liquid or translucent liquid

- 01 When HydroTherm is applied to the surface of natural stone, brick, plaster, or concrete, it penetrates into capillaries and voids, creating a water-repellent layer over most of the surface to prevent water absorption. It forms a film and has a waterproof effect. There is a notable difference in durability and stain resistance, and it also has an anti-mold effect.
- 02 HydroTherm reacts with carbon dioxide gas in the air, and the water repellent effect on the surface becomes apparent after 12 hours. Therefore, avoid getting rainwater during construction. Be careful not to apply too much, especially as white spots may appear on the surface of dark-colored stones that have low water absorption.
- 03 HydroTherm contains potassium hydroxide, so the solution is strongly alkaline. Be careful not to splash it into your eyes, skin, clothing, or other surrounding areas. If it sticks to aluminum or glass and scatters, wash it off immediately with plenty of water.
- 04 HydroTherm becomes cloudy when it comes into contact with carbon dioxide gas in the atmosphere, so please seal it immediately after use. Avoid contact with lead, zinc, tin, aluminum, glass, etc. as they corrode. Stable for at least 12 months when stored in an airtight container.

## Construction method

- ✓ Use mortar or mortar sealant to fill cracks, rock pockets, and holes..
- ✓ Put protective covering to avoid adhering to glass surface, aluminum, and plants. ※Avoid using RX or GT when using water base paint/finishing materials Application
- ✓ If the application surface is above 50°C due to heat source or direct daylight, cool it with plenty of water before applying HydroTherm.
- ✓ Apply plenty of HydroTherm, using brush, paint roller, or paint gun for perpendicular face or ceiling.  
Set compressor discharge pressure low as 1.5-2.0kg/ cm<sup>2</sup> and apply/spray from top to bottom for several times for economical usage.
- ✓ Pour directly from the container and apply plenty until the surface stops suction, using brush or paint roller, for floor face.
- ✓ Wipe off enough with wet cloth during half-dry when HydroTherm crystals on the tiling finish surface, etc.

## Main delivery destinations

Obayashi Corporation  
Kajima Corporation  
Shimizu Corporation,  
Taisei Corporation  
Takenaka Corporation  
Kumagai Corporation  
Sumitomo Mitsui Construction

Tokyu Construction  
Okumura Corporation  
Nikken Sekkei  
Sekigahara Stone Materials  
Yabashi Marble  
Ando Marble,  
etc. (in no particular order)



<b>Company name</b>	Hydro Co., Ltd.
<b>Founded</b>	April 1, 1980
<b>Main store</b>	2-5-8 Shinkawa, Chuo-ku, Tokyo. 104-0033

## Main construction examples

### For Masonry

1989	National Diet Building, bookstore spire section Large ceramic board waterproofing work
1989	Tokyo, Japan Patent Office Building Newly built granite leakage color prevention back treatment

### Application to brick

1985	Osaka/Subway Namba Station Tile joint waterproofing/eflo prevention work
1989	Tokyo Station/JR Art Museum Built 80 years ago, brick exterior wall waterproofing/moisture proofing work Application to tiles

### Civil engineering work

1985	Tokaido Shinkansen JR Shinkansen elevated bridge deck/elevation repair work
1987	Metropolitan Expressway Yokohane Line Elevated bridge deck waterproofing work

### precast concrete

1990	Tokyo, Takebashi, Palace Site Building PC exterior wall refresh/deterioration prevention work
1990	Tokyo, Ikebukuro, Tokyo Metropolitan Theater Exterior/interior walls Eflo/deterioration prevention work

### plaster

1991	National Treasure Himeji Castle Plaster wall mold prevention work
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