

# HYDROEFFECT

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# HYDROEFFECT

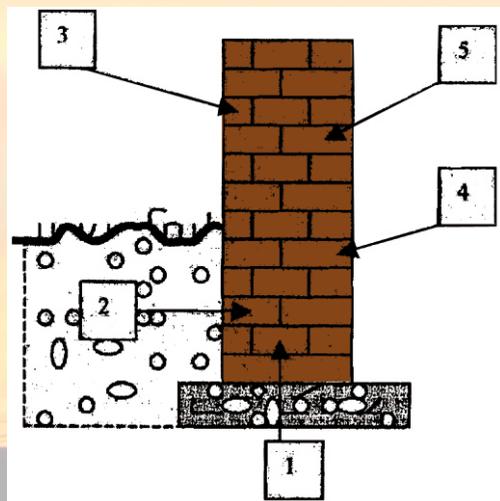
## HIGHLY EFFICIENT WATERPROOFING AGENT FOR CONSTRUCTION MATERIALS (HYDROFOBIZATOR)

(multifunctional waterproofing compositions based on nanotechnologies and having precise physical-and-chemical characteristics)

### Purpose:

HYDROEFFECT performs protection, restoring and preservation of all treated materials and can be made from domestic raw materials. It belongs to the class of the complex (composition) materials.

### Water Penetration Mechanism into Construction Structures



Capillary lift of water  
Subsoil waters  
frontal rain  
Dew point condensation  
Capillary condensation

It is impossible to mix concrete without water. Therefore, water is at the same time the main ally and enemy component of concrete. But, as soon as concrete hardens, water, as it often happens in life, from a faithful ally turns into the main enemy of concrete, starting a quiet war against it, and in there is no chance for concrete to win in this war. A question is just to wait for a victory day...

Why this happens? Practically in any concrete construction between neighbouring particles of sand and gravel there are molecules of water. Under the change of temperature and mechanical impact water constantly renders a hydrostatical pressure on the particles of concrete, which are limiting their freedom. And in addition to that they dissolve some components of concrete and there try to break away from the layer of concrete they gradually create cracks and micro cracks in it. Concrete is permanently soaking water from outside, the amount of water increases, and it does not “calm down” continuing to increase these cracks and eventually leading to the total destruction of concrete.

### Benefits of **HYDROEFFECT**:

**Unlike the existing materials, which are retained on the surface only by the forces of adhesion, the HYDROEFFECT forms up a polymolecular layer which links the polymer itself with the base material forming in such way a single monolith for the depth of 5...10 mm, which can be destroyed only by means of mechanic destruction of the treated material.**

### Technical Characteristics:

- wettability angle - 119...128 degrees;
- life term – unless the basic material is mechanically destroyed;
- is ecologically clean, chemically neutral, without toxic combinations and heavy metals;
- water-proof film is fire-resistant, stable against ultraviolet radiation and under temperatures ranging from -60 to +200°C.

### Areas of Application:

- concrete, foam-concrete, walkway slabs and bricks;
- marble;
- airfield runways and motor-ways treatment;

- all types of bricks (lime-sand, calcareous, ceramic, shell limestone, sandstone, natural and artificial stones);
- gypsum panels, roofing slate, facade, plastered surfaces;
- porous mineral surfaces;
- wood;
- metal;
- paint and lacquer finishing;
- waterproofing basalt and other fibers;
- other types of hydrophilic materials.

### *Features:*

- protects, repairs, restores, conserves different types of materials;
- resistant to ultraviolet radiation;
- resistant to heat;
- anticorrosive;
- waterproofs (hydro-isolates), protects from a moisture capillary lift;
- decreases:
  - soiling;
  - heat-conducting;
  - dust formation (for ex., when processing concrete floors);
- antiseptic (protects against aggressive environments and fungus appearance);
- preserves the „breathing” of materials (gas and vapor permeability); the color and structure of treated materials.

### *External effect after treatment:*

- without changes;
- glossy effect;
- a „wet stone” effect – aligns and enhances the colors of treated surfaces, masks small surface finish defects;
- allows for „coloring” of the material by putting in color pigments.

### *Method of application:*

- treated surface should be **dry, cleaned of dirt and others**;
- processing is carried out at the temperature not lower than +5°C and humidity not exceeding 80%;
- **before application the material should be stirred well**;
- is applied with a brush, roller or sprayer up until absorption stops while avoiding leaks;
- when treating in-pored materials it is recommended to repeat the treatment in 1-3 hours, not allowing for a complete drying of the previous layer.

### *Material Spread:*

Depends on the porosity of the processed surface and amounts to 50...200 ml/m<sup>2</sup>.

### *Quality Testing:*

- Quality testing is to be performed upon a complete dry-out of the treated surface, but not earlier than in a three days time after treatment;
- For testing it is necessary to wet the treated surface profoundly with water. Water is supposed to slither down in the form of drops, and the surface shouldn't be wet.

### *Safety Provisions:*

- when working one should stick to the State Standard requirements - use rubber gloves, respirator, protective clothing and etc.

After drying out the treated surface becomes a flame-proof, non-toxic, keeps „breathing” and surface finish structure.

## **HYDROEFFECT ADDITIVE FOR BETON MIXTURES**

### **POLYFUNCTIONAL HYDRO-ISOLATING MODIFIER**

(multifunctional waterproofing compositions based on nanotechnologies and having precise physical-and-chemical characteristics)

#### **Purpose**

This additive has been designed to protect and improve the production technology and technical characteristics of construction and beton based materials by adding it into the material composition. The additives can be made from domestic raw materials. It is chemically neutral, and belongs to the class of complex (composition) materials.

#### *Technical Characteristics:*

- plasticizing effect - 12 cm;
- compression strength - 125...130%;
- water absorption - 1%, not more;
- frost resistance – 300 cycles, not less;
- consumption - 0.3% from the weight of beton (0.5 - 1.0 l/m<sup>3</sup> of concrete);

#### *Areas of Application:*

- airfield runways and motor-ways, walkway slabs;



- concrete (monolith, special and reinforced, etc.) and other beton based materials

#### *Ensures:*

- plasticizing effect;
- increase of materials strength and hardness;
- hydrophobicity (water-repellent properties);
- freeze resistance;
- resistance to ultraviolet radiation, icing, impact of aggressive environments, soiling;
- heat insulation.

## IMPORTANT:



One of reasons why the surface of road is getting destroyed is the action of water. HYDROEFFECT can significantly increase the quality of asphaltic roads and increase their life-time. As it acts in asphalt the same way as in concrete: HYDROEFFECT takes from water its ability to create micro cracks and cracks in the surface of road and considerably reduce its destructive activity.

Method of Application for the manufacture of beton mixture (or concrete)

1. The main condition when using the material HYDROEFFECT in the beton mixtures: HYDROEFFECT required in an amount of 0.3% by weight of beton.

Note: Depending on the type of cement HYDROEFFECT required in an amount of  $0.2 \div 0.3\%$  by weight of beton. However, application of HYDROEFFECT in an amount of 0.3% by weight of beton provides high properties of beton mortar or concrete with any brand of beton.

2. Let us assume that for the production of  $1 \text{ m}^3$  of concrete used variant:

- Beton - 500 kg;
- Water - 200 liters.

Then can to determine the quantity of HYDROEFFECT:

$(0.2 \div 0.3\%) \times 500 \text{ kg of beton} = (0.002 \div 0.003) \times 500 \text{ kg} = (1 \div 1.5) \text{ kg of supplementation HYDROEFFECT.}$

Note: For convenience, we define the quantity in liters.

Given the density of the supplementation HYDROEFFECT ( $1.353 \text{ g/cm}^3$ ), the volume required for preparation of the solution with 500 kg of beton is:

$(1.0 \div 1.5) \text{ kg} : 1.353 \text{ kg/m}^3 = (0.74 \div 1.25) \text{ liters.}$

This means that  $(0.74 \div 1.25) \text{ l}$  of the supplementation HYDROEFFECT is necessary to dilute in 200 liters of water.

That is:

- we take  $(1.0 \div 1.5) \text{ kg}$  (i.e.  $0.74 \div 1.25 \text{ liters}$ ) of supplementation HYDROEFFECT,
- breed HYDROEFFECT in 200 liters of water,
- gradually (in parts) add this solution (with constant stirring) to the beton mixture with 500 kg of beton (together with the necessary in this case by quantity of sand or sand and gravel).

A). The presence of supplementation HYDROEFFECT reduces the amount of water. Therefore, we recommend to reduce a standard the amount of water approximately 20% (i.e. in our example - instead of using 200 l take 160 l) and to dilute HYDROEFFECT in it .

If it turns out that this is not provides the necessary mobility of the concrete mix (which is dependent on the type of beton, sand, gravel and the like), it is necessary gradually added additionally water to the beton mixture in portions 2-3% from specied quantity of water (in our case - from the 160 liters) until an optimum of mobility of mix.

B). The use of supplements HYDROEFFECT can reduce significantly (to 25-30%) the standard amount of beton and to improve the strength and other performance characteristics. But it's best to test in practice mixtures with different contents of beton, to determine the exact quantity of possible savings of beton and the best version of parameters of mixture to choose as a working.

C). Calculating the number of additives HYDROEFFECT necessary for mixtures with different amounts of beton:

Quantity		
Beton <i>kg</i>	HYDROEFFECT	
	<i>Kg</i>	<i>Liter</i>
1,000	2.0 ÷ 3.0	1.48 ÷ 2.5
500	1.0 ÷ 1.5	0.74 ÷ 1.25
400	0.8 ÷ 1.2	0.6 ÷ 1.0
300	0.6 ÷ 0.9	0.45 ÷ 0.75
200	0.4 ÷ 0.6	0.3 ÷ 0.5
100	0.2 ÷ 0.3	0.15 ÷ 0.25
50	0.1 ÷ 0.15	0.08 ÷ 0.13

#### HYDROEFFECT SPECIFIC FEATURES

<b>Technical</b>	<ul style="list-style-type: none"> <li>▪ simultaneous improvement of at least 4 and more technical characteristics of concrete when adding only this additive, without a necessity to add additionally other additives;</li> <li>▪ transferring the products into another higher level of quality</li> </ul>	<ul style="list-style-type: none"> <li>▪ it is not recommended to apply various additives without a prior testing for their compatibility, as the results is unpredictable;</li> </ul>
<b>Economical</b>	<ul style="list-style-type: none"> <li>▪ saving on beton costs;</li> <li>▪ saving on other additives' expenses;</li> <li>▪ prime cost reduction;</li> <li>▪ increasing the value of the end product.</li> </ul>	

To illustrate concrete advantages of HYDROEFFECT we give here the results of its impact on the formulas and properties of hydraulic concrete (for a variable water level zone).

	Standard concrete	Concrete with HYDROEFFECT
<b>Consumption of Materials per 1m<sup>3</sup> of concrete</b>		
1. Beton M400	492 kg	300-350 kg
2. Water	204 kg	100-130 kg
3. Gravel	1092 kg	1200 kg
4. Sand	600 kg	850 kg

#### Classes и Grades

5. Beton	M400	M400
6. Concrete Class	B25	B35-B40
7. Water-resistance mark	W8	W10
8. Frost resistance mark	F200	F300- F400
9. Workability	П3	П4-П5

#### Additives

	Superplasticizer C-3-1.5kg Densifier (HK) - 5 kg Water-repellent (ГКЖ-11К) - 1 kg	«HYDROEFFECT» - 0.5-1kg
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