## Russian Academy of Sciences Ural Branch Institute of Technical Chemistry

OKP (the Russian Classification of Production) 214930 OKS (the Russian Classification for Standards) 91.100.10

AGREED	APPROVED
Head of the Inspectorate of	Head of Institute of
State Construction Supervision	Technical Chemistry UB RAS
O.A. Antipova	V.N. Strelnikov
"20" February 2007	"20" February 2007

## PENETRATING WATERPROOFING MIXTURE HYDROISOL-ITH®

Organization standard (technical specifications)
Tech.Spec. 2149-007-04740886-2006

Commisioning date: 20 February 2007

AGREED
General manager
POOOOF "TsKS"
V.F. Shardin
"20" February 2007

## Российская Академия Наук Уральское отделение Институт технической химии

ОКП 214930

OKC 91.100.10

СОГЛАСОВАНО

**УТВЕРЖДАЮ** 

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Imperrop UTX/VpO PAH

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2007г.

## СОСТАВ ПРОНИКАЮЩЕЙ ГИДРОИЗОЛЯЦИИ ГИДРОИЗОЛ-ИТХ

Стандарт организации (Технические условия) ТУ 2149-007-04740886-2006

Дата введения 20 оргвраля 2007 г

СОГЛАСОВАНО

Генеральный директор

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These specifications apply to the dry construction waterproofing mixture of penetrating (capillary) action HYDROISOL-ITH®.

HYDROISOL-ITH® is designed for treatment of concrete and reinforced concrete surfaces in order to increase water resistance, frost resistance and durability of concrete structures. HYDROISOL-ITH® is used for waterproofing during construction, repair and reconstruction of concrete and reinforced concrete structures of I, II, and III categories of crack resistance (with crack opening in structures up to 0.4 mm), exterior and interior surfaces of enclosing structures of residential, public and industrial buildings, hydraulic and purification facilities, filters and drinking water reservoirs.

HYDROISOL-ITH® protects concrete and reinforced concrete structures from the effects of water: sewage, groundwater, sea water; aggressive media: acids, alkalis, petroleum products, etc. Increases the corrosion resistance of concrete, prevents corrosion of steel reinforcement.

HYDROISOL-ITH® is applied to the interior or exterior surfaces of the concrete structure, regardless of the side of exposure to fluid media on the concrete object. After applying the product the water-soluble functional chemical additives in the form of an aqueous solution penetrate through the pores deep into the wet concrete. The additives interact with calcium and aluminum oxides to form insoluble needle crystalline hydrates that fill capillaries, microcracks and pores of concrete. The rate of formation of insoluble crystalline hydrates depends on humidity, porosity and temperature of the concrete. As a result of filling the pores of the concrete body the capillary penetration of water into the concrete body becomes impossible and the concrete structure gradually becomes waterproof. Some of the water in the pores of the concrete body is chemically bound into complex crystalline hydrates, resulting in the formation of a low-porous structure that allows the concrete to retain its vapor permeability. The vapor permeability of the concrete further contributes to the removal of the remaining moisture from the body of the concrete, which leads to its gradual "drying out".

Example product entries in other documents and when ordering:

Penetrating waterproofing mixture HYDROISOL-ITH® - Specifications 2149-007-04740886-2006.

Specifications can be used as a regulatory document for product certification.

							Technical specifications 2149-007-04740886-2006					
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_	Develop. Вальцифер  Contr. Дорохова		Вальцифер				Penetrating	Letter	Sheet	Sheets		
				Waterproofing mixture	A	2	15					
							HYDROISOL-ITH®					
			Technical specifications	ITCh UB RAS								
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Подп. и дата Взам.инв.№

#### 1 Technical requirements

1.1 Penetrating waterproofing mixture HYDROISOL-ITH® must meet the requirements of these technical specifications and manufactured according to the technological regulations, which contain requirements for the manufacture and quality control at all stages of the production process.

#### 1.2 Main characteristics

Взам.инв.№

- 1.2.1 HYDROISOL-ITH® consists of Portland cement, aggregates and active chemical additives.
- 1.2.2 HYDROISOL-ITH® is a dry mixture of gray color with white inclusions, which is mixed with water for application to the treated concrete surface. When mixed with water, the functional chemical additives in the mixture interact with the subsequent formation of aqueous solutions of complex salts.
- 1.2.3 Application of the penetrating waterproofing mixture HYDROISOL-ITH® is carried out by hand or by hardware directly on the treated concrete surface at a temperature not below +5 °C. Aqueous solutions of complex salts migrate from the applied surface layer of waterproofing material and penetrate into the pores of the body of concrete. There is a chemical interaction of aqueous solutions of complex salts with calcium and aluminum compounds present in the pores of the concrete body with the formation of insoluble complexes. The formation of supersaturated solutions of insoluble complexes in concrete pores and their further crystallization in the form of needle-shaped structures leads to partial overgrowth of pores in the concrete body, while maintaining its vapor permeability.
- 1.2.4 Penetrating waterproofing mixture HYDROISOL-ITH® increases the water resistance of concrete and reinforced concrete structures, the strength, wear resistance, frost resistance, corrosion resistance of concrete and reinforced concrete structures due to the growth of needle-shaped elements in the pores of the concrete body.
- 1.3 The properties of HYDROISOL-ITH® correspond to the main physicochemical indicators and properties of the treated concrete.
- 1.3.1 The main physico-chemical parameters of HYDROISOL-ITH® must meet the requirements specified in Table 1.

Подп. и дата								
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Инв.№							Tech.Spec. 2149-007-04740886-2006	2
Ив	Ch.	Qt.	Sheet	№doc	Sign.	Date		3

Parameter	Specifications of HYDROISOL-ITH®	Validation
1. State of aggregation	Dry powder of grey color with white inclusions	Visual control
2. Humidity, %	Less than 1	p. 4.4, Tech.Spec. 2149- 007-04740886- 2006
3. Apparent density of unconsolidated mixture, kg/m <sup>3</sup>	1300±150	p. 4.5, Tech.Spec. 2149- 007-04740886- 2006
4. Increase of the grade of waterproofness of treated concrete in comparison with untreated, W	Not less than 3	p. 4.6, Tech.Spec. 2149- 007-04740886- 2006
5. Increase in compressive strength of treated concrete from the initial value, %, at least	5	p. 4.7, Tech.Spec. 2149- 007-04740886- 2006
6. Setting time, min: -start (no less) -end (no more)	40 160	p. 4.8, Tech.Spec. 2149- 007-04740886- 2006

- 1.4 Requirements for the initial components of HYDROISOL-ITH®.
- 1.4.1 The materials used for the manufacturing of penetrating waterproofing mixture, should pass the incoming inspection according to State Standard 24297, meet the requirements of the regulatory documents for these materials and provide waterproofing with the specified characteristics.

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Подп. и дата

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1.4.2 It is necessary to use cement binder on the basis of Portland cement and high aluminate clinker or mixed mineral binders, Portland cement 400 D-O, 400 D-20 according to State Standard 10178, sand according to State Standard 8736 with particle size of 1mm according to State Standard 6613, grid No.1 to prepare waterproofing penetrating mixture HYDROISOL-ITH®. Also, as the initial raw materials can be used dry mortar mixture, which meets the requirements of technical

$\frac{1}{2}$	materials can be used dry mortal mixture, which meets the requirements of technical									
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specifications 5746-005-12032152-98 or other similar mortar mixture consisting of cement and sand.

- 1.5 Marking.
- 1.5.1 The marking of HYDROISOL-ITH® is made on the label in any easily accessible place of the container.
  - 1.5.2 The marking inscription must contain:
  - name of the manufacturer, legal address;
  - name of the product;
  - designation of technical specifications;
  - batch number and date of manufacture;
  - net weight;
  - brief description, conditions of transportation and storage of the product;
  - designation of the regulatory document.
  - 1.6 Packaging.
- 1.6.1 HYDROISOL-ITH® is supplied in hermetically sealed plastic buckets according to State Standard R 51760 of domestic and imported production with a capacity of 1 to 50 liters. In agreement with the manufacturer, the product may be packed in another container that ensures the tightness of the package. The net weight of the composition in the package must correspond to the weight indicated on the package, with a maximum deviation of  $\pm$  1%.

### 2 Safety and environmental requirements

- 2.1 HYDROISOL-ITH® is non-toxic, fire and explosion-proof, according to the degree of exposure to the human body and animals according to State Standard 12.1.007-76 belongs to the class of low-hazard substances (hazard class 4, MPC 50  $mg/m^3$ ).
- 2.2 HYDROISOL-ITH® does not have a harmful effect on the environment and human health during storage, transportation and operation under ambient temperature conditions.
- 2.3 When carrying out work, it is necessary to follow the safety rules set out in Building Codes and Regulations 12-04.
- 2.4 In case of contact of HYDROISOL-ITH® with skin and eyes rinse with water, in case of severe irritation consult a doctor.

## 3 Acceptance Rules

- 3.1 The product must be accepted by the technical control service of the manufacturer.
  - 3.2 Acceptance of the product is carried out in batches.

Ch.	Qt.	Sheet	№doc	Sign.	Date

Batch consists of the volume of the product, made by one recipe on a single production line of materials of the same type and quality in an amount not exceeding 5 tons and not more than the daily output of the mixing plant.

- 3.3 Acceptance is based on the data of the input and operational control by the results:
- periodic tests on water resistance, apparent density of unconsolidated product,
- acceptance tests on the appearance of the product, moisture, completeness, bulk density, labeling and packaging.
- 3.4 Periodic tests are carried out on samples taken from the batch of products that have passed the acceptance test and meet the requirements of these specifications.
- 3.5 Periodic tests are carried out when putting it into production, when changing technology, formulation, type and quality of raw materials used, but not less frequently:
  - once every 12 months for water resistance;
- once every four months by the apparent density of the unconsolidated product;
- 3.6 Acceptance tests are carried out for each batch by the method of continuous and random control.
- 3.7 With continuous inspection, the appearance, labeling, packaging and completeness are checked.
- 3.8 In case of unsatisfactory results of control of the product at least one of the indicators one should repeat the test for this indicator of twice the volume of the product, selected from the same batch.
- 3.9 If the results of repeated testing are unsatisfactory, the product batch is not accepted.
- 3.10 Each accepted batch of the product must be accompanied by a Quality Passport, which specifies:
  - name of the manufacturer, legal address;
  - the name of the product;
  - batch number and date of manufacture;
  - quantity of the product in the batch;
  - results of acceptance and periodic tests;
  - specific effective activity of natural radionuclides in the mixtures;
  - designation of the normative document;
  - stamp and signature of the person responsible;
  - designation of technical specifications.

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Tech.Spec. 2149-007-04740886-2006

Qt. Sheet №doc Sign. Date

#### 4 Test methods

- 4.1 Sampling for testing.
- 4.1.1 Single samples should be taken from at least 5% of the packages from the beginning, middle and end of the batch in equal quantities and with a total mass of at least 1 kg.
- 4.1.2 Single samples are combined into one, thoroughly mixed and a combined sample is obtained. From the combined sample by quarting, an average sample is obtained, the mass of which must be sufficient to determine all standardized indicators.
- 4.1.3 The sample is stored in a hermetically sealed polyethylene or glass container, equipped with a label containing the brand of the mixture, sample number, date of sampling.

Before testing, the averaged sample must be thoroughly mixed.

- 4.2 Testing of mixtures should be performed in rooms with an air temperature of  $(20\pm2)$  °C and relative humidity of  $(65\pm5)$  % after a preliminary exposure of the sample for at least 3 hours.
  - 4.3 The appearance of the product is evaluated visually.
  - 4.4 Humidity measurement.
- 4.4.1 Humidity is measured according to State Standard 8735, section 10. It is allowed to measure humidity using automatic humidity measuring devices.
- 4.4.2 The humidity value is calculated as the arithmetic mean of the test results of three samples. The product is considered to have passed the test if the humidity is not more than 1%.
  - 4.5 Determination of apparent density of unconsolidated product

The method is based on determining the ratio of the mass of freely poured powder to its occupied volume.

4.5.1 Equipment and materials.

Glass measuring cylinder with a lapped cap of diameter (35 $\pm$ 5) mm, a capacity of 250 cm<sup>3</sup> and the division value of not more than 2 cm<sup>3</sup>;

Scales with a limit of weighing at least 300 g and an accuracy of weighing of no more than 0.1 g (eg, VLE-134);

Stopwatch with an accuracy of measuring not more than 1.0 s for 10 minutes (for example, SOSpr-2b-2-000).

4.5.2 Conducting the test.

A  $(100.0 \pm 0.1)$  g of powder is placed in a clean dry cylinder using a funnel. The cylinder is closed with a stopper and turned over by rotational movements in a vertical plane, making 10 full revolutions with a frequency of about 0.5 s<sup>-1</sup>. Immediately after the end of rotation, the cylinder is placed vertically, the powder is

Ch.	Qt.	Sheet	№doc	Sign.	Date

Tech.Spec. 2149-007-04740886-2006

allowed to settle for (180  $\pm$  5) s, the volume V, cm<sup>3</sup> occupied by the powder is determined.

4.5.3 Processing of results.

The apparent density of unconsolidated powder in free-fill  $\rho_{\text{H}}$  in kilograms per cubic meter is calculated by the formula:

$$\rho_H = m/V$$
,

where m - actual weight of the powder sample, g;

V - the volume occupied by the powder sample after sedimentation for (180  $\pm 5$ ) s, cm<sup>3</sup>.

4.6 Determination of the increase in the grade of water resistance of concrete.

Increase in water resistance grade of the concrete treated with the HYDROISOL-ITH® in comparison with untreated concrete is determined by the "wet spot" according to State Standard 12730.5.

In the course of the tests, the waterproof grades of control concrete samples and concrete samples treated with HYDROISOL-ITH ® are compared.

4.6.1 Equipment and materials.

Measuring instruments and devices according to State Standard 12730.5;

Scales according to State Standard 53228 with a margin of error of no more than 0.01 kg;

A caliper according to State Standard 166;

A wide brush for coating by HYDROISOL-ITH ®;

A container with stands for water saturation of samples;

Plastic film;

Manual sprayer.

4.6.2 Preparation of test samples.

For testing, a control volume of concrete of a class of at least B22.5 (State Standard 26633) with a water resistance of at least W6 (State Standard 12730.5) is selected. A series of samples (18 samples-cylinders with a diameter of 150 mm and a height of 150 mm) are made from this volume of concrete, from which 6 samples - control and 6 samples - will be selected according to density for applying HYDROISOL-ITH ®.

All samples are marked and kept for 28 days in a normal hardening chamber (temperature  $20 \pm 2$  °C, air humidity at least 95%).

After 28 days, the average density of all concrete samples is determined according to State Standard 12730.1. The average density of samples should not differ from the maximum by more than 50 kg / m³. If this requirement is not met, the samples are discarded. It is necessary to leave 12 samples for testing.

Ch.	Qt.	Sheet	№doc	Sign.	Date

Tech.Spec. 2149-007-04740886-2006

Further, the selected 12 samples are cleaned of the upper end side (upper during concreting) from cement milk using a grinding and angle grinder with an installed abrasive stripping wheel or any other method.

Next, all samples are placed in a container with water (temperature 20  $\pm$  2  $^{\circ}$  C) for 48 hours. The samples must be completely submerged in water.

After moistening, all samples are taken out and wiped with a dry cloth.

6 samples are selected for the coating by HYDROISOL-ITH ®.

HYDROISOL-ITH  $\circledR$  is mixed with water in a ratio of 3:1 - 5:1 (by mass) to obtain a sour consistency. Prepared mixture is applied with a brush to the upper damp grinded face surface of concrete samples. Consumption of HYDROISOL-ITH ข is 0,8-1,3 kg/m² which corresponds to the thickness of the applied layer of 0.5 - 1 mm.

Then 6 control samples and 6 samples coated by HYDROISOL-ITH ® are placed in two different containers with water. Samples are placed in the container with the lower end surface, the water should cover 135 mm of the sample height. Tanks with samples are covered with a polyethylene film and the upper end faces are moistened abundantly with a hand sprayer 2 times a day. In this way all the samples (6 control and 6 with HYDROISOL-ITH ®) are kept for 19 days.

Then all samples are placed in room conditions (temperature  $20\pm2$  °C, humidity  $55\pm5\%$ ) for 7 days.

After that all samples are dried at 60°C to constant weight. The mass is considered constant if the difference between two consecutive weighings of the sample is less than 0.2%. Weighing is carried out no more often than after 4 hours.

Before determining the water resistance of the samples, the applied layer of HYDROISOL-ITH ® is removed from the machined end surface using a grinder-angled machine with an abrasive scraper wheel or any other method.

Water resistance of concrete samples treated with HYDROISOL-ITH ® and control samples is determined by the method "by the wet spot" according to State Standard 12730.5. Samples are placed in metal cylinders and the side surfaces are sealed with waterproof material (for example, technical paraffin). Samples treated with HYDROISOL-ITH ® are set in the testing unit so that water supply was carried out from the side of the end, not treated with HYDROISOL-ITH ®). Water pressure is increased in steps of 0,2 MPa within 1-5 minutes, the exposure time of samples at each step is 16 hours (temperature in the room is  $20\pm5^{\circ}$ C, relative humidity at least 60%).

It is necessary to test all the samples (6 control and 6 with the applied HYDROISOL-ITH ®) until the appearance of water filtration in the form of wet

| Ch. Qt. Sheet № doc Sign. Date | Sheet | Sh

Инв.№ подл. Подп. и дата Взам.инв.№

drops or wet spot on the upper end surface of the sample and record the amount of water pressure and time after which at this pressure water filtration was observed.

#### 4.6.3 Processing of results.

The water resistance of each sample is evaluated by the value of the maximum water pressure at which no water has yet been observed penetrating through the sample. The water resistance of a series of samples is evaluated by the maximum water pressure at which no water penetration is observed in four out of six samples. If the tests do not observe water penetration through any of the six samples of the series, and the transition to the next stage is not possible due to the technical characteristics of the test equipment used, and the maximum test stage of not less than W16 is achieved, the minimum allowable value of the increase in water resistance is taken as a value of 2 stages.

Concrete grade of water resistance is taken according to State Standard 12730.5. The test results are recorded in the journal, where the marking of samples, the composition of the concrete mixture, density and date of manufacture of samples, test date, the value of the water resistance of individual samples and a series of samples indicating the time and pressure at which water penetration was observed through each sample, increasing the grade of concrete water resistance.

4.7 Determination of the degree of increase in the strength of concrete.

Determination of the increase in the strength of concrete treated with the HYDROISOL-ITH ® is carried out by experimental comparison of the chosen indicator in the treated and untreated sample of concrete.

In the process of testing compare the strength of concrete samples treated with the HYDROISOL-ITH  ${\mathbb R}$  and control concrete samples prepared from the same mixture.

4.7.1 Equipment and materials.

Measuring instruments and devices according to State Standard 12730.5;

Scales in accordance with State Standard 53228 with a margin of error not exceeding 0.01 kg;

A caliper by State Standard 166;

A wide brush for application of HYDROISOL-ITH ®;

A container with stands for water saturation of samples;

Plastic film;

Hand sprayer.

4.7.2 Preparation of test samples.

For testing, a control composition of concrete of a class of at least B22.5 (State Standard 26633) is selected. A series of samples (6 samples of cubes 100x100

							Sheet
						Tech.Spec. 2149-007-04740886-2006	10
Ch.	Ot.	Sheet	Nodoc	Sign.	Date		10

mm) are made from this composition. HYDROISOL-ITH ® will be applied to 3 samples, 3 samples will be control.

All samples are marked and kept 28 days in a chamber of normal hardening (temperature  $20 \pm 2$  °C, humidity not less than 95%).

Then all the samples are cleaned of all sides of the cement milk with a grinding and angle machine with an abrasive grinding wheel or any other method.

After that the samples are placed in a container with water (temperature  $20 \pm 2^{\circ}$ C) for 48 hours. Samples must be immersed in water completely.

After moistening all samples are taken out and wiped with a dry cloth.

3 samples are selected for the application of the HYDROISOL-ITH  ${\mathbb R}$  on all sides of the cube.

HYDROISOL-ITH ® is mixed with water in a ratio of 3:1 - 5:1 (by mass) to obtain a sour consistency. Prepared mixture is applied with a brush to the all face surfaces of concrete samples in 2 layers with a time interval between layers of 2 hours. Before applying the second layer the concrete samples are moistened with a sprayer. Consumption of HYDROISOL-ITH ® is 0,8-1,3 kg/m2 which corresponds to the thickness of the applied layer of 0.5 - 1 mm.

Then 3 control samples and 3 samples treated by HYDROISOL-ITH ® are placed in two different containers with water. The water should cover about 3/4 of the sample height. Tanks with samples are covered with a polyethylene film and 2 times a day the upper end faces are humidified abundantly with a hand sprayer. Under the described conditions, the samples are stored for 19 days.

Then all samples are placed in room conditions (temperature  $20\pm2^{\circ}$ C and humidity  $55\pm5\%$ ) for 7 days.

After that all samples are dried at 60°C to constant weight. The mass is considered constant if the difference between two consecutive weighings of the sample is less than 0.2%. Weighing is carried out no more often than after 4 hours.

Before the test, the layer of HYDROISOL-ITH ® is removed from the treated samples with an angle grinder with an abrasive scraping wheel or any other method.

## 4.7.3 Processing of results.

The test results are recorded in the journal, where the marking of samples, the composition of the concrete mixture, density and date of manufacture of samples, test date. The strength of the samples treated with HYDROISOL-ITH ® should be at least 5% higher than the strength of the control samples.

4.8. Setting time of the mortar mixture HYDROISOL-ITH ® is determined by p.2 State Standard 310.3.

Ch. Qt. Sheet №doc Sign. Date

Tech.Spec. 2149-007-04740886-2006

#### **5** Transportation and storage

- 5.1 HYDROISOL-ITH ® can be transported by any types of transport that ensures safety in accordance with the Rules of transportation of goods, operating on the relevant types of transport.
- 5.2 Transportation and storage of HYDROISOL-ITH  $\ \ \$  is carried out in a package at a temperature of 50  $^{\circ}$  C to +50  $^{\circ}$  C.

#### 6 Instructions for use

- 6.1 It is necessary to clean the concrete surface from dirt, paintwork, lime, efflorescence, cement laitance, oil products and any other substances that prevent the penetration of the chemical components of HYDROISOL-ITH ® into the pores of the treated concrete surface. Existing concrete defects and static cracks must be expanded, moistened and repaired. Immediately before applying HYDROISOL-ITH ®, the surface is abundantly wetted with water.
- 6.2 When performing work with HYDROISOL-ITH ®, it is necessary to be guided by the Building codes and regulations 12-04 "Labor safety in construction. Part 2. Construction production", State standards and technical specifications. When working with HYDROISOL-ITH ® at facilities subordinate to the Gosgortehnadzor of the Russian Federation, it is necessary to be guided by the "Rules for the design and safe operation of steam and hot water pipelines".
- 6.3 HYDROISOL-ITH ® can be used at air temperature from +5 to +35°C. During processing it is necessary to exclude the influence of direct sunlight, strong wind and rain on the treated surface. Apply only on the moistened concrete surface.
- 6.4 Before using HYDROISOL-ITH ® should be mixed with tap water in a ratio of 3:1 5:1 (by weight) using a low-speed drill (no more than 400 rpm) with a screw nozzle. Continue stirring until the mixture becomes homogeneous without lumps. The ready-to-use mixture has a creamy consistency. The lifetime of the prepared mixture is 10 -20 minutes.
- 6.5 HYDROISOL-ITH ® is applied to a moistened base with a brush, a stiff brush or a plaster spray. On horizontal surfaces HYDROISOL-ITH ® isapplied in one layer, on vertical surfaces it is necessary to apply 2 layers. The second layer can be applied after setting the first, but not earlier than 1-2 hours. The second layer is applied perpendicular to the previous one. For the preparation of the HYDROISOL-ITH® mixture, when applying the second layer, it is recommended to use the minimum recommended amount of sealing water, especially at low application temperatures. Immediately before applying the mixture, its short-term mixing is required to achieve working viscosity. The consumption of HYDROISOL-ITH ® is 0.8-1.3 kg/m².

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Взам.инв.№

Tech.Spec. 2149-007-04740886-2006

- 6.6 The treated surface should be protected from mechanical influences and negative temperatures for 3 days, while it is necessary to ensure that the surface remains constantly wet during the first 3-4 days. Moistening of the treated surface is carried out by spraying tap water using manual or mechanical tools. When using high-pressure water jet installations to prevent the removal of HYDROISOL-ITH ® layer from the treated surface, water spraying is carried out from a long distance. In the intervals between humidification, if necessary, cover the treated concrete surface with a polyethylene film.
- 6.7 Before applying protective, painting or finishing materials to the surface treated with HYDROISOL-ITH ®, it is necessary to clean the surface from the layer of HYDROISOL-ITH ® mechanically using a high-pressure water jet, a grinder or a brush with a metal pile.

Cleaning is recommended to be carried out no earlier than 7 days after processing. The holding time can be shortened or increased depending on the requirements of the specific type and type of coating to the maximum permissible humidity of concrete.

- 6.8 Work tools should be cleaned from non-hardened mixture immediately after use with tap water. After hardening, HYDROISOL-ITH ® can be removed only mechanically.
- 6.9 HYDROISOL-ITH ® is effective only on cement-containing mineral surfaces. Weakly effective on concretes containing microsilica and polymer concretes. It is not applicable for gypsum and lime mortars. It is necessary to avoid working in direct sunlight, in the rain or in strong wind. The material is applied only on a solid, prepared base. In the production of waterproofing works, special attention must be paid to working and deformation seams and elements of complex shape.
- 6.10 Work on mixing and applying the composition of HYDROISOL-ITH ® must be carried out in rubber gloves and protective glasses. If the material gets on the mucous membranes or in the eyes, rinse immediately with plenty of water and consult a doctor. If the material gets on the skin, it must be thoroughly rinsed with plenty of water.

#### 7 Manufacturer's guarantees

- 7.1 The manufacturer guarantees the compliance of the product with the requirements of these technical specifications, provided that the consumer complies with the conditions of transportation, storage, and use.
- 7.2 The guaranteed shelf life of the product from the date of manufacture is 18 months.

**Sheet** 

13

Tech.Spec. 2149-007-04740886-2006
Ch. Qt. Sheet №doc Sign. Date

# List of normative and technical documents referred in the technical specifications.

No	Document designation	Title of the document				
1	State Standard 12.1.007	SSBT. Hazardous substances. Classification and general safety requirements.				
2	State Standard 450	Technical calcium chloride. Technical specifications.				
3	State Standard 166	Calipers. Technical specifications.				
4	State Standard 53228	Scales of non-automatic action. Part 1. Metrological and technical requirements. Tests.				
5	State Standard 26633	Heavy and fine-grained concretes. Technical specifications.				
6	State Standard 12730.1	Concretes. Density determination methods.				
7	State Standard 6613	Woven wire meshes with square cells. Technical specifications.				
8	State Standard 8735	Sand for construction work. Test methods.				
9	State Standard 8736	Sand for construction work. Technical specifications.				
10	State Standard 10178	Portland cement and slag-Portland cement. Technical specifications.				
11	State Standard 12730.5	Concretes. Methods for determining water resistance.				
12	State Standard 24297	Input control of products. The main provisions.				
13	State Standard 310.3	Cements. Methods for determining the normal density, setting time and uniformity of volume changes.				
14	State Standard 25336	Laboratory glassware and equipment. Types, basic parameters, sizes.				
15	Building Codes and Regulations 12-04	Labor safety in construction. Part 2. Construction production.				
16	Technical specification 5745-005-12032152-98	Dry mortar mixtures.				

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						Tech.Spec. 2149-007-04740886-2006	1.4
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## **REGISTRATION SHEET OF CHANGES**

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Chang	changed	replaced	new	cancelled	Total sheets (pages) in	<b>№</b> document	Incoming number of the accompanying	Sign.	Date
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1	1				16	Out. № 16355/01-271 dated 06.05.2010	Guice	Valtsifer	06.05 2010
2	1-5, 7-8, 10				11	Out. № 17700-t/01- 254 dated 17.07.2017		Valtsifer	17.07 2017
3	2-4, 8-11				15	Out. № 17700-t/01- 11 dated 13.01.2020		Valtsifer	13.01 2020
4	9-11				15	Out. № 17700-t/01- 430 dated 11.11.2021		Valtsifer	11.11 2021
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