



R-COMPOSIT™

**A SERIES OF LIQUID POLYMER MATERIALS
ON LATEX ACRYLIC BASE MODIFIED BY MARBLE**

**Quality system certified
as per Quality Management System GOST ISO 9001:2008 (ISO 9001:2008)**

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R-COMPOSIT™ RADON ANTIRADON MASTICS

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WHAT IS RADON

Radon is an element of the periodic table of chemical elements which has atomic number 86 and is denoted by Rn symbol.

Radon is monoatomic inert gas, colorless and odorless, which is released from soil everywhere in the world and from some of construction materials (for example, granite, pumice, brick of red clay).

Radon is released from the soil in a particular active way in the so-called "fracture zones", which are deep cracks in the upper crust, spread over the surface of our planet.

Radon is radioactive and poses a real threat to human health and life. According to experts of the International Commission on Radiological Protection, the effect of **radon** is the most dangerous on children and young people under 20 years old.

That is why all developed countries of the world have already done or doing cartography to identify areas of high concentrations of **radon**.

In Russia, the highest concentrations of **radon** are found in the North-West region, for example on the Karelian Isthmus, the Leningrad region (including St. Petersburg, where the largest radon zone is the southern part of the city), and in Karelia, on the Kola Peninsula, Altai region, in the region of Caucasian Mineral Waters, in the Urals and other regions.

The solubility of **radon** in water is 460 ml / l, and solubility of **radon** in organic solvents and in human fat tissue is ten times higher than in water.

Because of its high biological efficiency (20 times higher than other types of radiation), **radon** is one of the most dangerous types of radioactivity, which leads to internal irradiation. And considering that **radon** is a gas, pneumonic is the most irradiated tissue.

Entering the human body, **radon** contributes to processes that lead to lung cancer.

Combination of **radon** and smoking is especially dangerous. **Radon** is the second most common (after smoking) factor in causing lung cancer. Lung cancer caused by **radon** irradiation is the sixth leading cause of cancer death.

Radon is responsible for more than half of the total dose of radiation that an average human body gets from natural and man-made environmental factors.

Basic and the most likely path of accumulation of **radon** indoors is associated with release of **radon** from the soil, on which the building is constructed.

Because **radon** is a gas, it penetrates easily into the building through cracks and small pores in the screed and basement walls, concrete floors, through the walls, joints, drains, etc.

Besides, decrease in pressure relative to atmospheric pressure happens during the heating season in buildings. This phenomenon can cause additional leak of **radon** from the soil plus to the diffusion of **radon** into the building.

In the winter time buildings are poorly ventilated, so in winter **radon** concentration indoors increases significantly (research showed that in temperate climate regions **radon** concentration indoors can be 5-8 times higher than in the outside air) and people staying indoors get most of **radon** radiation.

In addition, high concentrations of **radon** in buildings are often associated with construction and finishing materials which are used in construction or decoration of buildings. **Radon** is usually released from materials, used to manufacture floors and walls, and the reason is radioactivity of building materials and presence of higher concentrations of **radon** in them.

Thus, total **radon** concentration in buildings can increase a hundredfold.

Another important fact is that **radon** gas has high density and therefore spreads in the lower layers of buildings and can affect children, usually playing on the floor.

So, **radon** is a dangerous gas that enters into our body with air. And since we can not live without air, it should not be dangerous. That means that the air in our homes should not contain **radon**.

Every house and every room should be tested, and if necessary, method of protection against **radon** should be selected.

You can buy a special device and independently determine the levels of indoor **radon**.

You can also contact your local center for radiation protection and ask for testing of your home for presence and level of **radon**.

In Russia, the norm is 100 Bq / m³ for buildings just put into operation, and 200 Bq / m³ for exploited buildings. In case of excess of these figures, special measures should be taken to minimize the levels of radon.

You can decrease **radon** concentration in indoor air in the following ways:

- Use of materials that prevent penetration of **radon** into the building;
- Elimination of **radon** from indoor air by forced ventilation. However, forced ventilation system needs a source of energy and maintaining. In addition, there are cases when underpressure of air was created in the basement due to the forced ventilation system, and **radon** concentration increased due to air leaks out of the soil and exceeded the standards at 40 - 50 times!

Therefore, the most important are measures which prevent penetration of **radon** into the basement from the soil.

Basic measures are hermetic sealing of foundations, floor screeds and basements slabs. To carry out these measures they can use a variety of penetrating coatings, membranes of special sheet or roll materials, various foams and other sealing materials, and they even can build special barriers of monolithic fracture-tough concrete.

However, almost all of these methods and materials are associated with high cost of application, and in addition, they do not meet the aesthetic demands and therefore require additional expenses for cosmetic finish.

We can note Alfapol materials (which contain magnesite and shungite and which are produced by Alfapol Company, St. Petersburg) as one of the most effective materials which really protect the building from **radon**.

Innovative Technology, LLC, Kazan, Russia develops and manufactures very effective R-COMPOSIT™ RADON materials which are the most cost effective in the terms of price of materials and cost of application works, and also have excellent aesthetic properties.

WHAT IS **R-COMPOSIT™ RADON**

R-COMPOSIT™ RADON materials are liquid polymer materials on latex acrylic base modified by marble which are produced in the form of an aqueous suspension with special fillers of magnesite (R-COMPOSIT™ RADON-1) or magnesite combined with shungite (R-COMPOSIT™ RADON-2).

Magnesite is a natural mineral of magnesium carbonate ($MgCO_3$). It received its name after the place of discovery in the historic area of Magnus in Greece.

In powdered form the mineral is dissolved in hot acid with effervescence.

Magnesite is used to produce refractory materials that can withstand temperatures of up to $+1887^{\circ}C$. These materials are applied in construction, chemical and petrochemical industries, pulp industry, production of fertilizers, production of flame retardants, as well as to neutralize the acids, for purification of water from heavy metals, for cleaning gases, including air.

Building materials based on magnesium binders (magnesian concrete, magnesian floors) have been widely used in Russia since the end of the twentieth century and are increasingly popular due to the unique properties of magnesite.

Shungite is a specific carbon containing solid which got its name from the Karelian village Shunga on the bank of Lake Onega.

Shungite is a unique mineral in terms of its composition, structure and properties.

The only explored deposits of shungite are in Karelia, where schungites come ashore on Lake Onega.

According to scientists, the age of shungite is almost 2 billion years old. This mineral looks similar to coal, but it lies in very ancient layers of the earth's crust, which were formed when there was nothing alive on the Earth.

There is an opinion that deposit of shungite is a fragment of the Phaeton planet, which fell on Earth one day. But anyway, the shungite mineral has no equivalent in the nature which could be compared with it by variety of properties in general and its healing qualities in particular.

The first official mention of the shungite and its miraculous power refers to the beginning of the XVII century and is connected with the name of Boyarina Ksenia Romanova (great-grandmother of Peter I, who was exiled by Boris Godunov in Tolvuysky Monastery on the coast of Onega). Local "living" water, infused with the "black stone", helped the woman to cure her disease and give birth to Mikhail Romanov, the future monarch of Russia.

Peter the First tried the miraculous water and built a palace near the source which became the first Russian resort and was named Martsialnie Vody. ("Martial Waters").

It is an excellent adsorbent (catcher) of broad spectrum, including biological toxins, pesticides, heavy metals, radionuclides and other hazardous substances (for example, adsorption activity to phenol is 14mg/g, to thermolysis resins - 20 mg/g, to oil products it is more than 40 mg/g). Its adsorption is also active against bactericidal cells, phages, pathogenic saprophytes. Particles of shungite have bipolar properties regardless of their size.

Shungite absorbs toxic impurities from water, from biological fluids, as well as from gas emissions, including the air.

They say that shungite cures, cleanses, heals, protects, normalizes and restores, that shungite kills and absorbs anything that harms people and living beings, but it concentrates and directs for the benefit anything that is healthy.

However, for a long time, the unique healing properties of shungite and schungite sources had no scientific explanation.

The mystery of shungite was revealed recently. As it turned out, this mineral is mostly made up of carbon, significant part of which is represented by specific molecules of spherical shape which are called fullerenes.

Fullerenes were first discovered in a laboratory while trying to model processes occurring in space. And this new (the third after diamond and graphite), crystalline form of carbon existing in nature was discovered by American scientists in 1985.

Fullerenes are not toxic, do not suppress normal cells, but instead help all biological structures of the body function normally.

Shungite turned out to be the world's only natural mineral containing fullerenes, hollow spherical carbon ions.

This explains its unique properties.

PROPERTIES OF R-COMPOSIT™ RADON

R-COMPOSIT™ RADON materials look like paint, can be applied with a brush, a spatula or a roller. Using an airless spray gun of high pressure (for large areas) increases productivity by ten times.

R-COMPOSIT™ RADON materials are convenient to use on the surfaces of complex geometric shapes and / or when there are plenty of different utilities (like piping, wiring, etc.).

R-COMPOSIT™ RADON materials have excellent adhesion (the application basis can be concrete screed, foundation blocks and floor slabs, any stucco, brick, tile, plaster, plasterboard, hardboard, particleboard, wood, etc.).

R-COMPOSIT™ RADON materials do not support combustion, and are applied without use of open flames and organic solvents, and therefore can be used on fire risk facilities.

After drying, R-COMPOSIT™ RADON forms a continuous seamless glossy coating, which is waterproof and resistant to external influences.

Ready to use R-COMPOSIT™ RADON coatings have unique flexibility and strength (tensile of finished coating until tear is 500%). This means that R-COMPOSIT™ RADON cover will stretch to 5 (!) times before it breaks or tears.

R-COMPOSIT™ RADON coatings are resistant to moisture, UV-irradiation and temperature changes (they do not change their properties in the temperature range from -30C to +100C); they have low thermal conductivity, high resistance to many chemical and biochemical environments; they have high abrasion resistance, reliability and long (over 15 years) durability.

R-COMPOSIT™ RADON are finishing materials and do not require additional coating after their application.

R-COMPOSIT™ RADON are produced in two modifications which differ in composition and color:

R-COMPOSIT™ RADON-1 has white color and easily tinted to any colour.

R-COMPOSIT™ RADON-2 has grey color and can be tinted to dark colors only.

R-COMPOSIT™ RADON-1 and R-COMPOSIT™ RADON-2 modifications are identical in terms of their functional purpose and features of application.

R-COMPOSIT™ RADON materials do not contain any toxic components and have State Hygienic Certificate in the territories of Russia, Belarus and Kazakhstan.

PURPOSE AND APPLICATION OF R-COMPOSIT™ RADON

- protection of buildings from penetration of the radioactive radon gas;
- anti-radon protection of floors screeds, foundations and slabs of basements and ground floors of buildings;
- anti-radon sealing of seams and joints between the elements of enclosing structures of buildings;
- anti-radon sealing of cracks and hollows of enclosing structures of buildings;
- anti-radon sealing of apertures for laying of utilities in the basement of the buildings and in underground slabs;

R-COMPOSIT™ RADON materials are recommended for application in childcare and medical institutions, food productions, in all types of industrial, public and residential buildings, or any other facilities that need anti-radon protection.

R-COMPOSIT™ RADON materials are designed and manufactured by Innovative Technology, LLC (Kazan) specially for protection from the hazards of radioactive radon gas and other geopathogenic factors to reduce the impact of natural and man-made electromagnetic radiation and harmful environmental factors.

R-COMPOSIT™ RADON TECHNICAL DATA

Name of parameter	Characteristics of parameter
Exterior	Continuous seamless coatings of white or gray color, tinting is possible
Density	1,0
Dry substance content, % by weight	not less than 71
Viscosity, s	not less than 14
Conventional strength, MPa	not less than 0,3
Relative elongation at break, %	not less than 503
Adhesion strength with the base,	not less than 0,4
Ultimate strength at separation from the base, MPa	1,7
Adhesion to other materials	Concrete, plaster, metal, wood, plastic, glass, etc.
Flexibility on a bar with a radius of curvature of 5 mm at temperature, °C	19
Water absorption for 24 hours, % by mass	not more than 3
Resistance to water pressure of 0.5 atm pressure, h	24
Hydrogen index, pH	not less than 10
Thermal conductivity, W / m C	0,1
Resistance to heat for 2 h at temperature, °C	not less than 110
Reflexivity (reflection of the visible part of solar radiation spectrum)	80%
Resistance to ultraviolet radiation, oxygen and ozone	Resistant
Thickness of the coating in a dry form, mm	1,0-1,2
Material consumption (average), kg / m ²	1,0 – 1,2
Temperature of transportation, storage and application, °C	+ 5... + 80
Temperature of operation, °C	- 70... + 100
Frost resistance of the finished coating, cycles	120 (not less than 15 years)

R-COMPOSIT™ RADON PACKAGING

R-COMPOSIT™ RADON is supplied in buckets:

- 10 kg and 20 kg;
- sealed lids;
- labels with detailed descriptions and instructions;
- holographic marks for protection against forgery.

TRANSPORTATION AND STORAGE CONDITIONS OF R-COMPOSIT™ RADON

Keep away from direct sunlight and exposure to high (more than +35°C) temperatures.

Transportation and storage should be at temperature not below +5°C.

INSTRUCTIONS ON THE APPLICATION OF R-COMPOSIT™ RADON

1. GENERAL CONDITIONS

1.1. This technological instruction describes a process of applying R-COMPOSIT™ RADON on various surfaces like concrete screed, foundation blocks and slabs, any stucco, brick, tile, plaster, plasterboard, gypsum fiber board, fiberboard, particleboard, wood, etc.).

1.2. The materials used for protection must meet the requirements of the technical documentation. R-COMPOSIT™ RADON material must comply with specifications TU 5775-001-89189728-2011.

1.3. Each batch of material must be accompanied by a passport certifying the quality of products, and each tare unit should carry a label of the manufacturing company.

2. TOOLS AND EQUIPMENT

2.1. Set of spatulas.

2.2. Hair brushes with long soft bristles.

2.3. Electromechanical tools for cleaning the surface.

2.4. Wire brushes and abrasive tools.

2.4. Airless spray painter («Graco», «Wagner», etc.).

3. REQUIREMENTS TO SURFACES

3.1. Before applying R-COMPOSIT™ RADON, the surface must be cleaned of debris, dirt, oil stains and loose rust, and if necessary, washed and dried. Before applying the material on concrete surfaces, you must remove roughness, for example rolls and particles of concrete aggregate, and wash fragile coating of laitance.

3.2. It is necessary to pay special attention to the careful processing of recesses, corners and joints. They should be sealed with cement mortar (M 200) or plaster filler.

3.3. After cleaning, and before applying R-COMPOSIT™ RADON, the surface must be dedusted. You can use compressed air or wet cleaning followed by drying.

3.4. New concrete surfaces must get 100% of the planned strength.

3.5. Surfaces must be dry (concrete surfaces must be dry for at least 48 hours before applying R-COMPOSIT™ RADON material, weight concrete humidity should be no more than 8%).

3.6. The temperature of the insulating surface during R-COMPOSIT™ RADON application should be between +5C to +40C.

4. PRIMING OF THE SURFACE

4.1. It is recommended to use highly concentrated NANO-FIX penetrating coating as a primer at a concentration of 1:5, following the instructions for its application.

Any of the products from R-COMPOSIT™ or R-COMPOSIT™ RADON series can be used as a primer, diluted with water at a ratio of 1:5 (1 part of R-COMPOSIT™ or R-COMPOSIT™ RADON to 5 parts of water by volume). Before and during dilution R-COMPOSIT™ or R-COMPOSIT™ RADON materials must be thoroughly mixed.

Clean fresh water or distilled water should be used for dilution of R-COMPOSIT™ or R-COMPOSIT™ RADON. Consumption of the primer material depends on the state of the current surface and constitutes about 200 - 250 g/m².

4.2. Primer is applied by a brush or roller in 1 - 2 layers. Joints and cracks should be processed especially carefully.

4.3. The drying time of one primer layer at ambient temperature of +20C and relative humidity of $70 \pm 5\%$ is about two hours. Drying time increases in case of failure to comply with the conditions of drying. The second primer is applied after drying of the first layer to the state of "tack free."

5. APPLICATION OF R-COMPOSIT™ RADON

5.1. Before starting work, R-COMPOSIT™ RADON must be thoroughly mixed. If necessary, R-COMPOSIT™ RADON can be diluted with water, but not more than 5% by weight of the composition. For dilution use distilled or clean fresh water.

5.2. It is not allowed to apply the materials on wet or icy surfaces. Surface temperature must not be below +5C. It is not recommended to work in humid weather (over 75% of humidity), as R-COMPOSIT™ RADON is diluted with water, so it will increase the drying time.

5.3. Surfaces must be prepared and meet the requirements of paragraph 3 and paragraph 4 of the current instruction.

5.4. R-COMPOSIT™ RADON material is applied by a stiff brush, roller or rubber spatula (application by an airless spray gun is possible) in two (usually) or three layers.

5.5. Each next layer of R-COMPOSIT™ RADON is applied in the direction perpendicular to the first layer, and only after drying of the previous layer to the state of "tack free." Total thickness of the dry coating should not be less than 1 mm. Complete polymerization period of R-COMPOSIT™ RADON coatings is 24 hours.

5.6. Consumption of R-COMPOSIT™ RADON for dry layer of 1.0 mm thickness depends on the state of the surface (roughness, bumps, number of joints, etc.) and constitutes 1.0 - 1.2 kg/m².

5.7. Use visual quality control of the coating – the basic surface should not be seen under the layer of coating. To accurately measure the thickness of the finished coating use a thickness gauge for wet coatings.

5.8. After completion of works the instrument should be thoroughly washed with water.

6. SAFETY REQUIREMENTS

6.1 R-COMPOSIT™ RADON has no general toxic and skin-resorptive effects. According to GOST Standard 12.1.007, R-COMPOSIT™ RADON refers to the 4th class of danger.

6.2. When working with the product, it is recommended to wear protective goggles and an apron. When spraying R-COMPOSIT™ RADON indoors without ventilation, it is recommended to use respirators SB-11 "Lepestok-200" GOST 12.4.028. If the room is well ventilated or works are carried out outdoors, respirators are not required.

6.3. Storage and use of R-COMPOSIT™ RADON does not require special specification of safety, as it is fire- and explosion safe.

6.4. R-COMPOSIT™ RADON should be transported and stored in a sealed container at a temperature between +5C to +35C.

6.5. People who studied this instruction can be allowed to independently carry out works on applying the product.

6.6. R-COMPOSIT™ RADON materials comply with the standards of TU 5775-001-89189728-2011.

7. EMERGENCY CASES

7.1. After contact of R-COMPOSIT™ RADON with your eyes, immediately flush the eyes with running water for 15 minutes. Consult a doctor if irritation remains.

7.2. After contact of R-COMPOSIT™ RADON with your skin, wash the skin with soap and water. Launder contaminated clothes.

7.3. After contact of R-COMPOSIT™ RADON with your lungs, go outside into fresh air.

7.4. To facilitate cleaning in case of spillage of the product use any absorbent material such as sand, soil, rags, etc.