



## STANDARDIZED PROCESS CHART FOR APPLICATION OF HEAT-INSULATING COATINGS

## PROTERM® NORD

### I. GENERAL NOTES

1.1. Heat insulation of buildings' façades with the heat-insulating coating PROTERM® NORD is performed in accordance with this process chart.

1.2. Before treating the façades with the energy-saving coating the following works should be performed:

- cleaning the façade surface with brushes or sand-blast cleaning and removing peeling paint layers with scrapers depending on the condition of the surface;
- repairing or dismantling of old plasterwork;
- restoring or mounting additional structures if necessary;
- roofing works;
- repair of walls, outside window casements and door apertures.

1.3. The coating can be applied on surfaces with temperature from -30°C to +45°C.

- Applied at the ambient temperature: from -30°C to +45°C;
- Applied on surfaces with temperature: from -30°C to +45°C;
- After drying the coating layer operates within the temperature range: from -60°C to +150°C;
- Basic color of coating: — white;
- Film thickness: 500 µm for one layer;
- Material consumption: 1.0-1.5 l/m<sup>2</sup> for 1 mm thick layer (depending on application technique and properties of the insulated surface);
- Solvent: — orthoxylene (5-10% of the volume, depending on the equipment used);
- Transport conditions: from -20°C to +30°C;
- Material PROTERM® NORD and solvents should be stored in closed well-ventilated explosion-protected and fireproof areas.**

### II. OPERATING PROCEDURES AND WORKS ORGANIZATION

2.1. Material PROTERM® NORD belongs to solvent-borne systems and contains suspension of closed-cell microgranules in silicone-modified resin solution with the added plasticizers, biocides, fungicides and other admixtures. It is moisture-resistant, has high vapor permeability and high light resistance. Material PROTERM® NORD has good adhesion to most of substrates, is waterproof and alkali-resistant and can be used on various surfaces.

2.2. Material PROTERM® NORD is supplied ready for use in air-tight containers, which must have the marking, including the following data:

- name and trademark of the manufacturer; - instruction on application;
- weight; - color; - manufacture date.

2.3. After transportation or long storage the layering of material inside the storing container is acceptable, which is eliminated by thorough mixing immediately before application.

2.4. To achieve the required consistency of the material it is recommended to use the following solvents: orthoxylene. Do not use other types of solvents!

**As the material contains volatile, highly-flammable solvents, fire safety regulations should be strictly observed while working with the material.**

2.5. For material application it is allowed to use airless spraying devices or paint brushes. The thickness of the applied layer should be no more than 1 mm. One layer should be dried for no less than 8 hours. Please note that with the increase of air humidity or with the reduction of substrate temperature or ambient temperature the drying time may increase up to 24 hours.

2.6. The surfaces, prepared for the material application, should be dry, smooth and clean. The dampness of the surfaces to be coated should be no more than: 5 % for plastered and brick surfaces, 4 % for concrete surfaces;

2.7. At applying the material PROTERM® NORD the ambient air humidity should be no more than 80%;

2.8. Do not perform the application of PROTERM® NORD:

- when it rains or when the façade surface is damp after raining;
- when it snows or when the façade surface is damp after snow;
- if there is hoarfrost or ice on the treated surface.

2.9. The material PROTERM® NORD is not recommended to be applied on substrates, which have been previously coated with silicate paints or primers.

- 2.10. Please bear in mind that despite the high alkali-resistance of the polymerized coating, material PROTERM<sup>®</sup> NORD in its liquid state poorly interacts with substrates having high pH. Therefore, it is not recommended to apply the material on the concrete, cement and sand-cement surfaces, if their drying time is less than 30 days.
- 2.11. Before applying the PROTERM<sup>®</sup> NORD coating the surface to be coated should be prepared. When preparing the façade surface remove the peeling paint layers mechanically by using scrapers, pallet knives and other tools.
- 2.12. After the partial removal of old paint layers clean the façade surface from soot, dirt and dust.
- 2.13. The cleaning at restoration works is performed with compositions of AFG type with the subsequent degreasing by means of dissolvent 649, 147 etc.
- 2.14. The coating is applied in a solid uniform layer without gaps. Each new layer is applied after the previous layer is completely dry.
- 2.15. During spray application of the coating conform to the following rules:
- the material is applied in two perpendicular directions: the first layer is applied moving the paint sprayer vertically, the second layer - moving the paint sprayer horizontally;
  - the velocity of the paint sprayer movement should be uniform and amount to 14 - 18 m/min.;
  - to obtain solid coating the applied band of material should overlap the previous one by 0.3-0.5 breadthwise;
  - when preparing paint sprayers for work pay attention to the cleanness and the coaxiality of nozzle openings in the air cap and air-tightness of the device.

### **III. Surface Preparation.**

- 3.1. The PROTERM<sup>®</sup> NORD energy-saving coating can be applied on plaster, brick, concrete or solid old oil-based and synthetic (perchlorovinyl, polystyrene) paint coat. Before application of the material clean and wash away dirt and other impurities from the surface.
- 3.2. If the old finishing includes areas, treated with vitriol primer, before applying the energy-saving coating make a trial application. When (after 1-2 days) the stains from old vitriol primers appear on the surface, clean and prime the surface with any acrylic primer and after that apply the energy-saving coating.
- 3.3. If the surface needs filling with putty, perform the puttying with wooden or rubber spattles. The thickness of putty layer should be no more than 1 mm. Fill low spots and irregularities with putty until they are completely smooth and flush with the surface. If a putty layer thicker than 1 mm is needed, apply each new layer after the previous one is completely dry.
- 3.4. Depending on the type and condition of the treated surface, the energy-saving coating PROTERM<sup>®</sup> NORD is applied in the following order:
- a) brick surfaces, or refinished surfaces, which don't need filling with putty, are cleaned of dust with a brush or by blowing (with an air gun) and are primed with an acrylic primer. After drying (see the acrylic primers application instruction) apply the necessary number of layers (according to the thermotechnical calculation) of the PROTERM<sup>®</sup> NORD energy-saving coating; the drying time of each layer is 24 hours, the thickness of each layer should be no more than 1 mm;
  - b) the areas with new plastering or the areas with the removed old paint layer are primed with an acrylic primer, filled with a perchlorovinyl or acrylic putty, and then covered with PROTERM<sup>®</sup> NORD.
- 3.5. Gypsum or cement stucco mouldings are primed with an acrylic primer and then covered with PROTERM<sup>®</sup> NORD.
- 3.6. Tools, equipment, clothes or window glasses, stained during works with the material, should be washed with a solvent before the material is dry.
- 3.7. The quality of PROTERM<sup>®</sup> NORD energy-saving coating application and its durability on the façade after repair works depends to a large extent on the thorough preparation of the surface for the material application. The system of energy-saving coatings requires the following measures for preparing the surface for heat insulation:
- 3.8. The surface should be thoroughly cleaned of dirt, dust and loose peeling paint with a brush.
- 3.9. The old decayed, dampened or tarred plaster, or the plaster peeling off from the wall (determined by dull sound at tapping) should be removed and the new plastering should be made. The finishing coat of the plaster should be similar in texture and sand grain size to the finishing coat of the remaining old plaster, so that the spots with new plaster were not standing out on the façade after completion the works.
- 3.10. The prevention of salt efflorescence formation on the façade surface should be performed. For this purpose the dampened part of the wall should be dried after removing old plaster, and the salt efflorescence patches should be scraped off.
- The new plaster is made of hydrophobic mortar, preventing the penetration of salts into the paint layer. The hydrophobic plastering mortar is made of 1:0.5:4 composition, with adding 1 kg of the 50% organosilicon GCL-94 emulsion or 12 kg of 10% naphtha-soap solution for 1 m of mortar.
- 3.11. According to the climatic conditions, at plastering repairs the frost-resistant mortar compositions 1:0.5:5 by volume (Portland cement: lime putty: sand) should be used. Gypsum and lime-gypsum mortars remain durable only in dry environment, but the leaks and frost make them deteriorate quickly, so such mortars should not be used for façades. It is also not recommended to use "fat" mortar compositions with high lime content, as though such mortars are easy-to-work, later they result in shrinkage cracks in the plastering layer. It is also not recommended to use slag-lime and lime-puzzolan mortars or slag-portland cements and puzzolan-portland cements for plastering façades, for, as it is known by experience, such plastering quickly deteriorates on façades.

In order to avoid this, it is recommended to use standard Portland cement in complex plastering mortars. The usage of unhydrated ground magnesian and dolomitic lime in complex mortars results in crack formation in plaster, so such lime should be soaked in water for two days before usage. The old layers of limewater, casein, polyvinylacetate, perchlorovinyl or polystyrene paints are usually scraped off by sandblasting and then cleaned with scrapers and brushes. The old oil-paint layers which are not always possible to remove by means of sandblasting are removed with steel scrapers and burnt with soldering guns or gas torches.

3.12. The sand for sandblast cleaning should be dry and clean, having no clay particles, screened through a sieve with mesh size 1.2 -2 mm. Sandblast cleaning is performed with sand-blasting machines with capacity of 170 l and 250 l. These machines work by means of compressed air, fed with a ZIF-55 compressor. The working pressure during the cleaning is selected according to the state of paint and plaster, so that not to damage them with excessive pressure in places where they should be kept, but at the same time the pressure should be sufficient for removing impurities and loose paint layers. Usually the working pressure of 2-3 atm is enough. At sandblast cleaning of a façade the distance between the nozzle and the treated surface is 0.4-0.8 m.

3.13. Dry sandblast cleaning is usually accompanied with considerable dust formation; to prevent it the hydrosandblast method of cleaning was designed and successfully tested. At this method the cleaning is done with the mix of sand and water. For this purpose the standard nozzle is replaced with a special device (Fig. 6), which, apart from a spout and a hose for sand, has a separate spout and hose, connected to the house water supply system. The device operates with two nozzles; the water pressure in the system should be no less than 0.5 atm. Cleaning 1 m of the surface requires approximately 5 kg of sand and 5 l of water.

3.14. At cleaning façades with sand-blasting machines one should be careful with stucco mouldings. After cleaning the façade of impurities and old paint the repairing of plaster is performed.

At large amounts of replaced plaster it may be feasible to use grout pumps for feeding mortar to the jet. It is advisable to select such grout pumps, which do not require liquid grouts, but can work with heavy mortars (5-6 cm by the slump test). For mortar application compressorless jets are preferable, as they allow preventing fogging and rebounding of mortar. For the mechanized mortar scouring the finishing machines are used.

3.15. Simultaneously with plaster repairing the condition of stucco mouldings on the façade is checked: the deteriorated or missing are replaced with new ones, made at the workshop; the remaining mouldings are cleaned of dirt and old paint; the damaged parts are repaired, the fastenings of stucco mouldings to the façade are examined and fixed. Fastening both old and new stucco mouldings to the wall with gypsum only is not allowed; but they should be also fixed with galvanized wires, hooks, dowels etc. The new stucco mouldings (replacing the deteriorated ones) should be manufactured in advance at the workshop, as preparing models, making casting moulds and drying the ready items take a lot of time.

3.16. At repairing balconies and bay-windows the floorings of balconies and the water-proofing should be checked and repaired if necessary; the required floor gradient should be provided, for example, by making a sand-cement leveling blanket (underlayment) with a hydrophobic mortar.

#### Succession of operations:

All the works should be performed with strict adherence to work safety and occupational safety rules.

To prepare the façade surface for priming it is necessary:

- to treat eave overhangs, to install and fix protective fences on the roof, to mount the fire service ladder;
- to cover all the architectural details with roofing steel in accordance with the project;
- to treat temperature and settlement joints and joints of prefabricated or bearing-wall buildings; to fill large low spots and cracks on the façade with cement mortar;
- to cover window and balcony door glasses with standard panels to prevent damage and staining;
- to make wood-board protective bridges over staircase entrances;
- to check the strength of hanging stages' ropes and the functioning of hoisting mechanisms;
- to give a safety briefing to the workers about safety rules when working at height.

The operations of façade surface preparation are performed in the following order:

- the façade surface is cleaned of dirt and mortar spatters;
- small cracks and low spots are pointed and filled;
- the filled places are scoured.

Surface cleaning (scrapers, protective goggles, respirators). The workers are lifted in a hanging stage to the upper part of a façade, put on protective goggles and respirators and remove dirt, hardened mortar spatters and other types of unevenness with steel scrapers.

The work is performed from top downward at a division, the width of which depends on the length of the hanging stage. Pointing up and filling small cracks and low spots (stripping knives, mortar box). The workers treat the cracks with stripping knives up to 5 mm deep. The stripping knives are moved forcefully along the crack at an angle 45° to the wall. Small low spots are pointed in the same way.

After pointing up the cracks and stripping the low spots the workers fill them with cement mortar. Scouring of the filled places (hinged smoothing trowels, respirators, protective goggles). Moving a smoothing trowel up and down, the workers scour the filled places until the surface is smooth.

#### **IV. Preparation of the energy-saving coating.**

4.1. The energy-saving coating PROTERM® NORD is ready for use.

To achieve the required consistency of the material it is recommended to use orthoxylene. Do not use other types of solvents!

Seek advice in the nearest representative office.

4.2. After long storage the layering of material into fractions inside the storing container is acceptable. When using a mixer, the allowed mixing rate is up to 200 rpm. Moving the blade vertically, submerge the thickened part into the liquid, switch on the mixer and use slow rotation of the blade to blend the thickened clusters with the liquid. Mix until the material has the consistency of heavy cream. Approximate mixing time:

- mixer 3-5 minutes,
- manual mixing 5-7 minutes.

#### **V. Application of the Coating.**

5.1. On small surfaces and surfaces with complex configuration the material can be applied with a soft brush. The surfaces from 100 m<sup>2</sup> can be treated with airless sprayers. The coating can be applied at the ambient and surface temperature from -30°C to +45°C; the work in humid weather is not allowed.

5.2. Metal surfaces are covered with 2-3 crossing layers, with the intermediate drying of each layer "until tack-free" for 0.5-2.0 hours depending on the ambient air temperature.

Concrete, asbestos-cement, plastered, sand-cement surfaces are covered with 3 layers of coating.

Drying of coatings at natural temperature no more than 2 hours; the complete polymerization is achieved while in service.

5.3. The material is applied in a solid uniform layer without gaps. Each new layer is applied after the previous layer is completely dry.

5.4. During spray application of the coating conform to the following rules:

- the material is applied in two perpendicular directions: the first layer is applied moving the paint sprayer vertically, the second layer - moving the paint sprayer horizontally;
- the velocity of the paint sprayer movement should be uniform and amount to 14 - 18 m/min;
- to obtain solid coating the applied band of material should overlap the previous one by 0.3-0.5 breadthwise;
- when preparing paint sprayers for work pay attention to the cleanness and the coaxiality of nozzle openings in the air cap and air-tightness of the device.

5.5. Material consumption for 1 mm layer amounts to approximately 1.0-1.5 litres for 1 m<sup>2</sup> depending on the type of the treated surface, weather conditions and the qualification of workers.

The 1 mm thickness of the layer can be identified with a thickness gauge of the "painter's comb" type or by the "optical depth" of the material (the substrate is not visible through the material).

The coating is not washed off after drying, therefore the stained clothes, tools, window glasses should be washed with water before the material is dry.

#### **VI. Conditions of storage and transportation of the PROTERM® NORD energy-saving coating**

6.1. Material PROTERM® NORD should be stored in tightly closed containers at temperature from -20°C to +30°C and air humidity no more than 80%, out of direct sunlight.

6.2. Material can be transported by any means of transport at temperature from -20°C to +30°C, keeping out of direct sunlight. Transport packing should provide for the correct arrangement of containers and their safety. Damage to containers' integrity causes the spoilage of material.

6.3. Storage time - 24 months in air-tight factory package.

#### **VII. OCCUPATIONAL, ENVIRONMENTAL AND FIRE SAFETY REQUIREMENTS at working with the PROTERM® NORD energy-saving coating**

##### **7.1 Personal protection**

At the application of PROTERM® NORD material, the workers should be provided with:

- safety footwear and protective clothing (GOST 12.4.103-83);
- rubber gloves (GOST 20010-93);
- cotton gloves (TR 17 RSFSR 06-7745-84);
- safety glasses or goggles for eye protection;
- respirators RU-60M, RU-60MA, RPG-67A, SHB-1, U2K, Topol-A1, Uralets-GP-A, Unix-A, ZM-7202 for breathing protection.

##### **7.2. Emergency situations**

7.2.1 In case of contact with eyes, rinse immediately with flowing water within 15 minutes. If the irritation stays, seek medical advice.

7.2.2 In case of contact with skin or mucous linings, remove the material with hand cleaner and wash with plenty of water.

7.2.3. At the ignition of structures, covered with the coating, extinguish fire with water, foam, dry chemicals or carbon dioxide. If the material is spilled, use any absorbing matter like sand, soil etc.

##### **7.3. General occupational safety requirements**

The application of PROTERM® NORD material should be performed with strict adherence to occupational, environmental and fire safety requirements according to:

- SNiP 12-03-2001. Occupational safety in construction. Part 1. General requirements.

- SNiP 12-04-2002. Occupational safety in construction. Part 2. Building construction.
- SSBT. Organization of training for labour safety. General rules.
- SSBT. Fire safety. General requirements.
- SSBT. Painting works. General safety requirements.
- POT RM-016-2001 Cross-industry occupational safety regulations at electricity-generating equipment maintenance.
- SP 12-135-2002 Safety on labor conditions in construction. Industry branch standard instructions on labor protection.

**Foremen and workers must bear in mind that in case of nonobservance of occupational safety requirements they endanger both themselves and the people working with them.**

Before starting work check the stability of scaffolding and hanging stages. The frames of scaffolding must be completely stable, firmly fastened to the wall and mounted on solid base; the flooring ends must lie on bases; the joints of flooring and planks between bases are not allowed. Flooring and ladders must be fenced with guard rails and (below) with guard boards to prevent foot slipping and the fall of materials; there must be no sticking nails or clamps in the flooring, rails, posts or steps. Scaffolding should be cleared from debris regularly. If the works are performed at several scaffolding levels simultaneously, the workers should be placed in such a way, so that no one was directly above another.

When working from hanging stages the strength of hawsers, ropes and pulleys should be ensured, the security of their fastening should be checked. To prevent damage to the ledges the hanging stage should be hung on special equipment (hammer beams, footboards, wall hooks etc.). Before use the hanging stage should be tested with double working load, and the stability and operability of hoisting machine and brake assembly should be checked. Ascent and descent of hanging stage with people in it is allowed only if there is special mechanism for it in the hanging stage itself. When working from hanging stages, on the roof or in other high places, having no guard rails, the workers should be provided with safety belts and ropes, fixed to solid parts of the building. The area under hanging stages at the façade should be fenced.

During works all the electrized devices and tools must be thoroughly grounded, to prevent the occurrence of electrical shock. All the electric wire connections must be properly insulated; the wires must be hung on insulators, and not on temporary planks or nails; switches and safety fuses should be placed in special cases.

Special safety measures should be taken when working on façades near electric power lines: do not touch wires; if the lines of tram or trolley-bus overhead wirings are fastened to the façade, do not start work until getting allowance from tram or trolley-bus service and until they switch off current.

**When working with mechanisms and apparatuses follow the guidelines for use, specified in the instructions, as well as the following rules:**

1. Before starting a mechanism, check its functioning at idle speed.
2. Do not clean, grease, open or repair a switched-on mechanism.
3. Do not use defective or unchecked testing or tuning devices (reducing valves, pressure regulating valves, manometers, starters etc.), or mechanisms without the enclosing of all moving parts of the drive (transmission belts, gears etc.).

If a worker feels nausea, dizziness, headache or any other sickness during working on a façade, he should address to the medical station immediately.

A worker must thoroughly wash hands and face after finishing work or before meal.

Persons under the age of 18 are not accepted to perform works in applying the PROTERM® NORD coating.

A worker should keep in mind that in case of nonobservance of the requirements, stated in the workplace safety guidelines and the day plan, the following hazards may occur;

- electrical shock;
- falling from height;

The working site should be organized in accordance with work flow charts and kept clean.

The state of scaffolding, hanging stages and scaffold towers should comply with the requirements of: GOST 12.2.003-91, GOST 26887-86, GOST 27321-87, GOST 27372-87.

In hazard areas safety posters and signs should be installed.

#### Safety requirements before starting works

##### A worker must:

- receive safety briefing from the job supervisor in case of changes in work type or labor conditions, understand the set task;
- put on and arrange the protective clothing or personal protective equipment;
- examine the working site; remove unnecessary objects, clear the passages;
- check the equipment health;
- put on the lighting if necessary;
- when using power-driven hand tools – check the integrity of electric equipment, cables, grounding, compressed air hose connections, check the equipment at idle;
- check the readiness of energy-saving coating for application.

#### Safety requirements at work

##### A worker must:

- not obstruct exits and working site with building materials or packages;
- use only ready paints;
- hand over pricking and cutting tools in such a way, that the worker taking the tool could take it by the handle.

##### Working at height:

- stack tools and containers only after taking measures against their inadvertent falling;
- use tested safety belts;
- descend only by portable or permanent ladders;

**PROHIBITED ACTIVITIES:**

- do not perform works without protective clothing or personal protective equipment;
- do not use defective equipment or tools;
- do not perform works at the malfunctioning or insufficient lighting;
- do not approach or stand under the suspended load;
- do not shim up trestlework or scaffolding poles with deal ends, bricks or other undue items or materials;
- do not dismantle trestlework or scaffolding by collapsing method;
- do not perform works on working sites without guard rails at height over 1 meter above ground level;

**Safety requirements after finishing work**

**A worker must:**

- clear out the working space;
- disconnect mechanisms and electro-driven tools from the electrical network;
- wash removable equipment and tools and put them into the storage location;
- remove mechanisms from trestlework and scaffolding.

**Requirements to worker's actions in the emergency situation.**

**Emergency situation can occur due to:**

- overloading the scaffold;
- short circuit and ignition of current-carrying cables;
- failure of power supply.

**A worker must:**

- give the danger alarm signal immediately;
- take measures for accident prevention and leave the hazard area;
- inform the job supervisor;
- render first aid to the injured if necessary.

In case of nonobservance of the material application and storage instruction, the manufacturer will not be liable for the quality of coating.

Approved by \_\_\_\_\_ A.V. Zapara

I have read and understood the process chart \_\_\_\_\_  
(job position) (signature) (full name)

Warning! All the aforementioned information is obtained as a result of laboratory testing and operational experience, and based on the material components' characteristics, but it is not warranty information. Due to impossibility to control the conditions of material application and the ready coating use, the manufacturer assumes no liability for the result, or for the possible expenses or damage, caused by using this product. The user evaluates the expedience of using the product in each specific case at his discretion and accepts all risks, connected with using this material. The product is intended solely for industrial usage by qualified personnel.