

Project:

Thermal insulating, cementitious, lightweight rendering or plastering mortar

Product:

FeatherPlast PT400

Key Benefits:

- Thermal Insulating - Extremely low thermal conductivity value λ
- Lightweight
- Weathering resistant - does not crack
- Water repelling
- Highly breathable
- Excellent adhesion on substrate
- Sound absorbent
- Fire retardant
- Energy conserving
- Excellent workability
- Ready-to-mix

Applications:

External application on interior or exterior surfaces such as wall, brick, stone, aerated cement blocks, cement boards, gypsum boards and more. Use as a base or medium coat. A finish plaster coat is highly recommended.

Colours:

PT400W White

PT400G Grey

Packaging:

15L Carton bags

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FeatherPlast

PT400W
PT400G

Lightweight Thermal Insulating Rendering and Plastering Mortar

When thermal energy is transferred through walls and other surfaces, large amounts of energy are often necessary for cooling in the summer and heating in the winter. FeatherPlast PT400 is a wall insulating product. It is an easy-to-apply thermal insulating cementitious dry-mix mortar to be used as an external insulating render or in the internal as an insulating plaster.

Gentoo penguin has inspired the development of Featherplast PT400, for its thermal insulating and waterproof properties. To insulate himself, Gentoo penguin uses a thick, air-filled, waterproof coat, similar to a waterproof open-cell foam. Thus he eliminates thermal conduction and reduces radiative and convective heat losses to a minimum. As such, FeatherPlast PT400 uses particles which are composed of many tiny closed air cells that provide a cellular structure resulting to its excellent insulation properties. FeatherPlast PT400 helps reducing overall material and labor costs, while improving thermal efficiency and lowering heating/cooling costs.

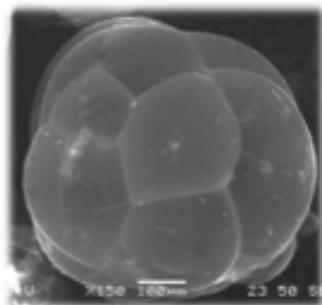
In contrast to conventional, perlite or polystyrene rendering and plastering mortars, FeatherPlast combines three unique elements: Extremely low thermal conductivity ($\lambda < 0,050 \text{W}/(\text{mK})$), improved mechanical strength and plasticity that underlines a crack-free behaviour, even in extreme weathering conditions.

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Pioneering
Nanotechnology

Technical Description

FeatherPlast PT400 is based in a brand new approach for insulating particles: An inorganic granular insulation material in the form of lightweight spheres with fine closed cellular pore structure. In contrast to glass spheres, the granular material has a packed, closed structure that permits a perfect combination with a cementitious matrix and better performance in terms of mechanical strength. On the other hand, the packed, closed structure prevents interaction with water and subsequent loss of thermal properties. In contrast to perlite formulations, water absorption is kept minimal. Smart engineering of FeatherPlast PT400 is concluded by the reduction of the cementitious binder to further decrease thermal conductivity. Mechanical strength is achieved using advanced materials, like cellulose fibers.



SEM image of FeatherPlast PT400 thermal insulating particles

	Conventional Cementitious Perlite Plastering Mortar	FeatherPlast PT400 Plastering Mortar
Thermal Conductivity:	0,290 W/(mK)	0,048 W/(mK)
Coverage:	1,25 Kg/m ² for d=1mm	0,45 Kg/m ² for d=1mm
Density:	1,07 Kg/L	0,45 Kg/L
Requirements for covering 1sqm @ d = 10mm		
Mass/Volume per sqm:	12,5Kg or 11,7L	4,5Kg or 10,0L
Thermal Resistance R:	0,0345 (m ² .K)/W	0,2083 (m ² .K)/W
Requirements for Thermal Resistance R = 0,15 (m²K)/W		
Thickness:	43,5 mm	7,2 mm
Mass/Volume per sqm:	54,38Kg or 50,8L	3,24Kg or 7,2L

Vis-à-vis performance of FeatherPlast PT400 with a conventional perlite plastering mortar

Testing & Performance

Thermal conductivity (ISO EN 1745:2002): $\lambda_{10} = 0.048 \text{ W/(mK)}$.

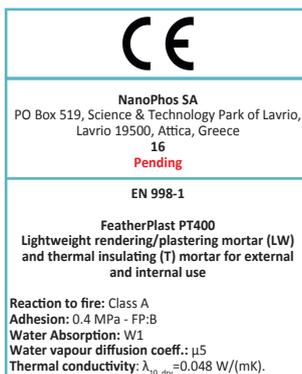
Compressive strength (ISO EN 1015-11:1999): 3,5 MPa @ 28days - Category CSII

Adhesion (ISO EN 1015-12:2000): Fracture pattern B: 0.4MPa

Water absorption (ISO EN 1015-18:2002): 0,144 kg/(m².min^{0.5}) Category W1.

Water vapour permeability (ISO EN 1015-19): The effect of water vapour permeability was determined by the water vapour diffusion coefficient: $\mu 5$.

Reaction to fire (ISO EN 13501-1:2007): FeatherPlast PT400 reaction to fire was measured by the non-combustibility test (ISO EN 1182), the gross calorific value test (EN 1716) and the Single Burning Item test (ISO EN 13823). Classification A.



Surface Preparation: The application surface must be free of dust, surface contaminants and loose or friable materials. Substrates should be thoroughly dampened, before the application of FeatherPlast PT400. Avoid application on non-porous substrates (e.g. granite) without using a mesh net, so as to ensure proper adhesion. To ensure adhesion on smooth surfaces (e.g. painted walls) score the wall at 10cm intervals before application.

Mixing: FeatherPlast PT400 can be mixed using a drum or plasterer's paddle mixer in a tub (use only a quarter of the amount speed for gentle mixing) or by hand using a trowel. Initiate mixing by pouring a quarter of the amount of clean water into a flat-bed mixing container. Empty the FULL bag content slowly (do not use part bag mixes) into the same mixing container. Add a half of the amount of water to the mixture and proceed with thorough mixing. Continue adding the remaining water while mixing until the desired consistency and workability is achieved. Ensure that no dry material has escaped the mixing process. **Surface Application:** The plaster is applied by hand or by using a plastering pump machine for lightweight premixed products. It is straightened by using a float or trowel and the plaster is then smoothed by hand, using a spongy float, after it has sufficiently set. Points and reference bands can be used in order to obtain the required thickness. Points and reference bands can be created with the same product. Alternatively, it is possible to use steel or wood edging. Apply successive layers after underlying substrate is left to dry for 24 hours. Do not exceed unique layer thickness by 15 mm. Wet substrate before application of each layer. Use appropriate plaster mesh when layers thickness is greater than 4cm. Working time depends on substrate absorptivity, ambient temperature and water content of the mixture. If the mixture has been left standing for a while and has become slightly stiff then mix again by hand or mechanically and if needed add a small amount of water while mixing to soften. **Cleaning of tools:** All tools and equipment should be cleaned immediately after use with water. **Setting:** Three (3) days in normal conditions and good ventilated areas (depends on the weather and the thickness application). Protect during setting time from harsh weather conditions such as frost, rain, direct sunlight and extreme temperature changes. **Consumption:** Estimated consumption rate of dry powder 4.5 kg/m² per 10 mm of thickness. **Technical Properties:** White or grey powder. Particle size: up to 1.25 mm. Water demand: ~ 0.7 l/kg, Pot life: 2 hours @ 20°C. Application Temperature: 5°C – 35°C. **Safety:** Causes severe skin burns and eye damage. May cause respiratory irritation. May cause an allergic skin reaction. Wash thoroughly after handling with water. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves / protective clothing / eye protection / face protection. IF INHALED: remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER / doctor. Store in a well-ventilated place. Keep container tightly closed. Contains Portland cement. **Self-life and storage:** 18 months from production date if stored in original, unopened packaging, in places protected from moisture and frost within a dry environment above 5°C.



What is Nanotechnology?

Nanotechnology refers to the scientific field, which deals with very small structures, usually sized below 100 nm. One nanometer (nm) is one billionth of a meter (10⁻⁹ m) - it is so small that if earth were one meter in diameter, then one nanometer would have been the size of an apple! Nanosized materials reveal unique properties when compared to ordinary, bulk materials or even molecules.

NanoPhos at a glance...

At NanoPhos, we take advantage of the unique properties of nanotechnology and invent clever materials that solve every day problems. By harnessing nanotechnology, we seek to create a more comfortable, safe and trouble-free living environment. We transfer innovations out of our lab into the hands of consumers. Our vision is clear: "Tune the nanoworld to serve the macroworld" – in simple terms we make nanoparticles solve common problems. NanoPhos was recognized in January of 2008 by Bill Gates as one of the most innovative companies NanoPhos is actively expanding its distribution network. Currently, the company is present in the UK, Scandinavia, Portugal, Spain, France, Germany, Italy, Greece, Cyprus, Egypt, Sudan, Saudi Arabia, Bahrain, UAE, Qatar, Oman, Iran, India, New Zealand, China, Japan, Mexico, Guatemala, Malaysia, Indonesia and Singapore.



NanoPhos SA has been approved by Lloyd's Register Quality Assurance to follow the EN ISO 9001:2000 Quality, the EN ISO 14001:2004 Environmental and the OHSAS 18001:2007 Occupational Health and Safety Management Systems for the development, production and sales of nanotechnology marine coatings and chemical products for cleaning and protection of surfaces and nanotechnology products.

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