

NAME OF PRODUCT

PreWIS®

CERTIFICATE HOLDER

**Narmapinnoitus Oy,
Jonkankatu 2a1, 20360 Turku**



MANUFACTURERS

Listed concrete
element factories

PRODUCT DESCRIPTION

PreWIS® prefabricated wall insulation system consists of pre-insulated wall elements and coating on building site:

Pre-insulated wall elements consist of reinforced concrete elements insulated in the concrete element factory with mineral wool lamella insulation PAROC Linio 80 (earlier PAROC FAL1) and coated with Armatop MP bedding mortar and when needed mechanical fastenings 3 pieces/m in edge zones.

When elements are installed into building final coating can be installed. coating system include installation of reinforcement net with Armatop MP mortar or defined alternative and after drying, priming the surface and applying final coating with defined surface coatings included in the system.

CERTIFICATION PROCEDURE

This certificate is based on an initial type assessment of the product and an initial inspection of the factory and the factory production control. The general certification procedures are based on the certification system of VTT Expert Services Ltd.

This certificate is valid until February 11, 2019. The conditions of validity are described in section 17.

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REGULATIONS, STANDARDS AND INSTRUCTIONS

1. Product requirement standards

1.1 In the opinion of VTT Expert Services Ltd, PreWIS® prefabricated wall insulation system, if used in accordance with the provisions of this certificate, will contribute to meet the relevant requirements of the Finnish building regulations as stated in the following:

B1	Structural safety and loads, regulation 1998, in accordance with clause 7 of this certificate
C2	Moisture, Regulations and Guidelines 1998, in accordance with clause 8 of this certificate
C4	Thermal insulation, Guidelines 2003, in accordance with clause 9 of this certificate
D3	Energy management in buildings, regulation and guidelines 2010
E1	Structural fire safety in buildings, Regulations and Guidelines 2011, in accordance with clause 10 of this certificate.

2. Other standards and instructions

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PRODUCT INFORMATION

3. Product description, marking and quality control

3.1 PreWIS® prefabricated wall insulation system consists of pre-insulated wall elements manufactured in the concrete element factory and coating system done on building site.

3.2 Pre-insulated wall elements consist of reinforced concrete elements designed and reinforced according to approved element plan of the building. Concrete elements are CE-marked.

3.3 Concrete elements are insulated in the concrete element factory with mineral wool lamella insulation PAROC Linio 80 (earlier PAROC FAL1) in connection of production of elements using cement as glue. Thickness of insulation is chosen according to the chosen U-value of the facades. Minimum thickness of insulation is 50 mm.

3.4 After drying the mineral wool surfaces of the elements are coated with Armatop MP bedding mortar. When needed mechanical fastenings 3 pieces/m are installed in edge zones. Parts of the elements, which cannot be handled on building site can be handled already in the factory with surface reinforcement net fastened with Armatop MP mortar.

3.5 After façade elements have been installed into building, joints and gaps between the elements are filled with soft mineral wool (e.g. UNM 37). After straightening of possible uneven parts of the façade, final coating system can be installed.

Coating system include installation of reinforcement net with Armatop MP mortar or defined alternatives (Armatop L or AKS, or Quattro or Carbon). After drying of mortar priming the surface and applying final coating with defined surface coatings included in the system. Primer is chosen according to the chosen coating type (for mineral based coatings silicate primer, for polymeric coatings Haftgrund P and for silicone coatings Haftgrund Sc).

3.6 Internal quality control of element factory consists of process control and visual inspection of the product in the factory and controls on building site after installation. When damages due to the .manufacturing, transport or installation are found they are repaired.

3.7 Manufacturing, transport installation and coating are done according to Narmapinnointus Oy's manufacturing, transport. storage and coating instructions, which are given to element factory and building site

3.8 External quality control is carried out by VTT Expert Services Ltd according to a separate quality control agreement.

4. Delivery and storage on site

4.1 The products are transported to building site like ordinary concrete elements. Upper edges of the elements shall be protected from rain and snow.

4.2 Elements shall be handled carefully in order to prevent the surface damages. when delivery arrives possible transport failures shall be checked and reparations done according to instructions of certificate holder.

DESIGN INFORMATION

5. General

5.1 The design data given in this certificate is based on the assumption that construction solutions, fastening methods and other details given in this certificate will be followed together with the mentioned requirements, guidelines, standards and instructions.

6. Installation

6.1 PreWIS® prefabricated wall insulation system shall be installed according to separate installation instructions of certificate holder.

6.2 Corners and window, door and all other gaps shall be reinforced and handled according to installation instructions. Installation of window and other weathering shall be done using inclinations which ensure water running away from the façade.

6.3 Special attention shall be paid that no gaps or holes remain in the rendering or coating layer.

6.4 Rain pipes shall be fastened through the insulation layer into load bearing concrete. Fasteners shall be inclined downwards so that water runs away from façade. Connections between rendering and fastening shall be tightened.

6.5 Both rendering and coating works shall be done in suitable weather conditions and drying times of different rendering and coating types shall be taken into account. guidance of drying times of different products is available from the certificate holder. If weather conditions provide façade shall be covered with shelter.

7. Structural performance

7.1 PreWIS® prefabricated wall insulation system is non load bearing product. it resit its own weight and wind pressure and suction loads directed to façade.

7.2 According to test results of adhesion strength and wind suction load calculations average adhesion strength of the rendered and coated wall insulation system 0,080 N/mm² (in dry conditions) is enough to meet the wins suction loads in zone 1 (sea coast) installed on to 12 storey high building façade (height highest 35 m). If building is located in area where driving rains are regular this shall be taken into account in choosing the insulation system in high buildings.

8. Moisture behaviour

8.1 PreWIS® prefabricated wall insulation system has water absorption $\leq 0,5 \text{ kg/m}^2$.

8.2 If facade details like window weather are done incorrectly moisture content of thermal insulation can increase.

9. Thermal behaviour/insulation

9.1 The thermal performance of PreWIS® prefabricated wall insulation system depends on the thickness of insulation. Typical U-value of the wall insulated with 220 mm thick insulation layer is 0,17 W/m² K. Certificate holder has U-values calculated for different insulation thicknesses.

10. Fire safety

10.1 National Building Code of Finland, E1, Structural fire safety in buildings, Regulations and guidelines 2011, give requirements for fire safety of buildings and building products.

10.2 thermal insulation used in the system have reaction to fire class A1. reaction to fire class of mortar Armatop MP is A2-s1,d0. Reaction to fore class of glass fibre reinforcement net, fastenings and surface coatings are not defined..

11. Durability

11.1 Durability of the PreWIS® prefabricated wall insulation system has been assessed with impact tests and weather resistance test.

11.2 Impact tests were done according to ETAG 004, Guideline for European Technical Approval for External Thermal Insulation Composite Systems with Rendering using 10 J impact energy (steel ball). Results indicate that when thickness of mortar and coating layer is at least 12 -13 mm the product meet the requirements of category 1 (*A zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use*)

11.3 Durability of wall insulation system has also been tested using the following weather stress cycle:

- rain 60 min, with intensity about 1 litre/min/m²
- freezing 240 min , temperature - 20°C
- IR radiation 160 min, surface temperature + 60°C

Test comprised 100 cycles. Test piece was concrete wall (1920 x 1420) mm² with two window insulated with 200 mm thick mineral wool and coated with Armatop MP mortar and silicone coating (Siliconharzputz Sc with primer (Haftgrund Fc).

Small cracks appeared during the test on the upper window corners. They did not cause wetting of the insulation. Some wetting occur due to not so good installation of the steel sheet weather in windows lower edge. Adhesion strength of the coating/rendering system were after test -12 % lower compared with the results before the test..

INSTRUCTIONS FOR INSTALLATION AND USE

12. Manufacturer's instructions

12.1 Installation is performed according to the instructions of the manufacturer. The instructions shall be carefully followed in order to achieve the intended functional performance of the construction.

TECHNICAL ASSESSMENT

13. Testing and analysis for this certificate

VTT Expert Services Ltd has evaluated testing and calculations performed for the insulation system. Results are presented in the text of this certificate.

14. Other materials

14.1 components of the thermal insulation system like insulation material, mortar and coatings are mainly CE-marked.

VALIDITY OF THE CERTIFICATE

15. Validity period of the certificate

This certificate is valid until February 11, 2019..

16. Conditions of validity

The certificate is valid assuming that no fundamental changes are made to the product, and that the manufacturer has a valid quality control contract. A list of valid certificates is available from VTT Expert Services Ltd.

17. Other conditions

The references made in this certificate to standards and instructions are valid in the format used at the time the certificate was awarded.

The recommendations in this certificate concerning the safe use of this product are minimum requirements that shall be satisfied when using the product. The certificate does not override current or future requirements imposed by laws and statutes. In addition to the issues presented in this certificate, design, manufacturing and use shall follow appropriate construction methods.

The manufacturer is in charge of the product's quality and factory production control. In awarding this certificate, VTT Expert Services Ltd does not bind itself to indemnification liability concerning personal injury or other damage that may directly or indirectly result from using the product described in this certificate.

VTT Expert Services Ltd finds PreWIS® to be suitable for use in construction as described in this certificate. This certificate no. VTT-C-10787-14 has been awarded as described above to

Narmapinnoitus Oy

On behalf of VTT Expert Services Ltd on February 12, 2014



Tiina Ala-Outinen
Business Area Manager



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VTT EXPERT SERVICES LTD

Product Approval and Certification

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