

ENERGY EFFICIENCY AND PROPERTIES OF MATERIALS USED IN THE KINDERGARTEN DESIGN

In accordance with the tender requirements, for a typical design of a kindergarten the requirement has been taken into account, according to which a kindergarten for 100 children was designed which can be used in various regions of Georgia in different geographical and climatic conditions.

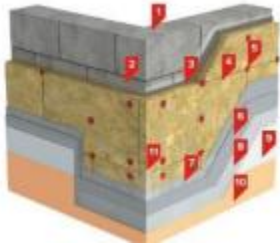
During designing and selection of material, the climatic factors characteristic for the mentioned areas and the relevant loads on the building were taken into consideration.

On the entire perimeter of the building, on the outer walls, the following combination is used for energy efficiency of the building:

1. Block
2. Soil
3. Adhesion spackles
4. Rock wool "Techno fas optima"
5. Plastering grid
6. Spackle knives 1 and 2 blades
7. Plastering grid
8. Decorative cover

Thermal insulation of a Facade

System-old façade



The system provides thermal and noise insulation

Protects wall from atmosphere impact

Make an opportunity to make a wall breathe

Makes the exploitation term of a building longer

Instead of rock-wool, penoplast Eps or XP might be used

Combination of facade thermal insulation the protection of the building from heat, as well as from cold and other environmental factors. That's why it can be used for any climatic zone.

Thermal Insulation

Thanks to the structure and fiber features of the material, the mineral wool (rock wool) products have high thermal insulation properties and small weight. These characteristics are the basic indicator of any thermal insulation materials and are needed for calculation for thermal resistance in constructions.

Thermal insulation provides minimum loss of heat with constriction and significantly reduces energy cost and increases energy-efficiency of premises. The thermal insulating properties of the material create the most comfortable conditions throughout the year - in the cold period of the year it maintains heat, and in warm weather - maintaining pleasant coolness.

Energy saving

In case of using mineral wool, the cost for maintenance comfort climate in the storage room is reduced. Therefore, storage heating and cooling expenses are reduced. The cost of heat insulation will be compensated after a short time.

High sound insulation ability

Due to fiber structure, mineral wool thermal insulation has high sound insulation ability. The fibers absorb the sound wave energy in the frequency range. The production allows to solve sound insulation issues in areas and reduce sound levels in neighboring spaces.

Fire safety

The base for mineral wool production is non-flammable natural components, so the fibers work in temperature ranges. Therefore, "Knauf Insulation" thermal material use does not cause fire spreading and making areas smoky in case of a fire.

Increased waterproof properties

The technology of aquastatik, which is used for mineral wool materials, provides high water efficiency.

The penetration of water in the material structure is significantly reduced, and thus the stabilization of warming thermal properties is increased.

Environmentally safe thermal insulation

- Absence of the risk of human health by insulation
- The substance is not carcinogenic
- Not collected in the body

High hardness against deformation

An important indicator of thermal insulation materials is the compression strength in case of 10% deformation.

The materials have an excellent indicator of strength and low compression, which makes the construction of the buildings durable.

High resistance against tearing layers

Thermal materials with mineral wool carpet ensures good adhesion, unity of construction with unity of fibers which determines resistance against tearing layers.

Steam resistance

Fiber structure of insulation materials provide high absorption of water steam. Due to ability of "breathing" the steam leaves the area into the construction materials , in heating layer and provides necessary humidity for construction materials and human

The high level of steam absorption provides maintenance of the necessary micro-climate in the building and durability of the construction materials.

Term for exploitation

Thermal insulation products have undergone conformity with the standard requirements for thermal conductivity and efficient exploitation

Resource Tests.

Thermal insulation materials are subject to secondary processing.

· Rock-wool KWB Techno Fas Optima - 12 Gel / sq.m - Facade thermal insulation;

Supplies company "GRC"

Combination used for internal partitions:

1. Thermal insulation- rock-wool- Techno acoustic
2. Gypsum-carton profile
3. Spackle knife
4. Gypsum-carton profile

The energy efficiency properties are similar in the case of internal partitions, as in this case the "rock-wool" material is used. Additional system provides noise reduction to 57 decibels.

Insulation of partitions of the rooms



1. Thermal insulation rock-wool Techno Acoustic
2. Gypsum-carton profile
3. Gypsum-carton
4. Spackle knife
5. Gypsum-carton profile
 - The system will reduce the noise to 57 decibels
 - Mineral wool can be used for thermal insulation

Combination used for floors:

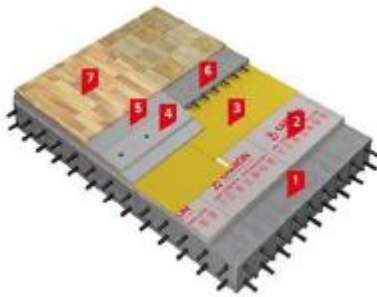
- 1.Reinforced-concrete construction
- 2.XPS carbon eco
3. Steam-insulation membrane
6. Sand-cement bracing
- 7.Decorative cover

* Steam-insulation protects thermal insulation from "milk" leakage

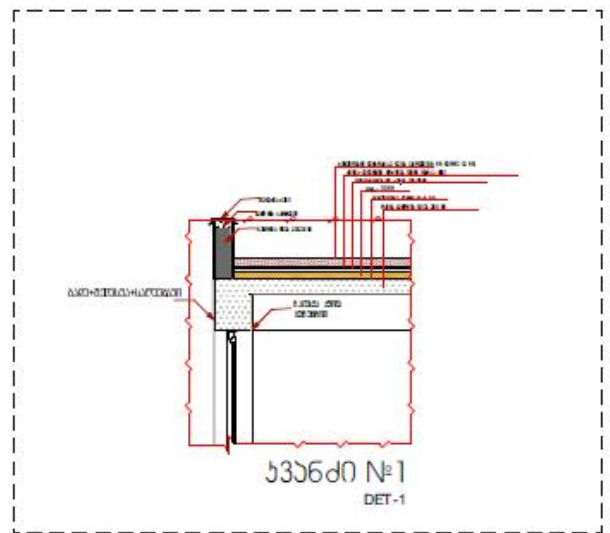
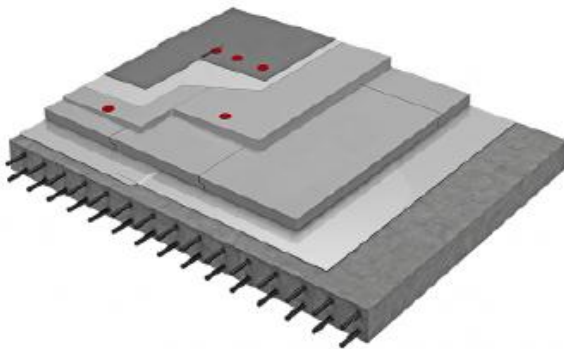
* This system reduces the noise level to 28 decibels

Flooring Insulation

System-standard



1. Reinforced concrete construction
2. XPS carbon eco
3. Steam absorption membrane
4. Sand-cement bracing
5. Decorative cover



Roofing system:

- 1.Reinforced-concrete tile 200 mm.
2. Bitum membrane - 80 mm
- 3.XPS-50 mm
- 6.Refining sand 130/50 mm
7. Arranging sand-cement cover 100 mm(mark 400)

8. Bitum membrane 2 layers

Slope does not exceed 2-3% despite sediments. It is effective in any precipitation. The roof is separated in several parts where the water flows into pipes

Advantages:

- Installing speed
- Resistance against mechanical load
- Economy
- Fire resistance

Decorative material used on the façade

Facade mass "FUDREMAX" is used to arrange the main entrance of facade in decorative manner. The same visual other facade decorative panels might be used too.

FUNDERMAX facade HPL panels

HPL (High Pressure Laminate)-

Is a high density large format panel made from composite material which is covered by hard laminate having rich palette from both sides. It is used in interior and exterior. HPL panels are manufactured in France by POLYREY which has been the world's leading manufacturer for 50 years in interior and exterior panels.

Due to its modern technologies, it is possible to create any design and pallet from old timer and metal, also with design with modern colors and illustrations.

Panels have the following exclusive 3D gamma: all range of natural colors, wooden texture and color range, stone and metal imitations, leather and tissue imitation, digital photo and individual photographs on the board.

Most importantly, these panels resist environmental impacts: rain, snow, moisture, sun, ultraviolet irradiation, dust, etc.

Panel 65% consists of wooden paper, while the remaining 35% is a special resin coating material.

The panel protects the building walls from damaging, prevents the moisture on the wall, is quite solid and light, due to its structural

it does not get easily deformed, can be easily installed on the façade of the building and most importantly , it can be ventilated.

In particular, Fundermax-0162 Afro Sahara is included in the project



Fundermax-0162 Afro Sahara



Alternatively, alukabond panels may be used

PVDF COATING ALUMINUM COMPOSITE PANEL-TL-8016 Pure Yellow



Different colorful decorative elements are used on facade made with Alukabond. Aluminum composite panel is a multi-layer material which is distinguished by high strength and small weight.

It is convenient for processing. The composite panel Dibond is characterized with aluminum layer thickness which covers panel from both sides. The less popular thickness sizes are 0,2 ; 0,3; 0,4 mm. 0,4 mm panels are used to decorate building and ventilated facade.

Due to processing simplicity (boring, curving, cutting, etc.) there are many options to use construction material. In case of mechanical processing the panel can be deformed. So any kind of ad banner might be arranged. The radius of panel increases range to use Alukabond.

Panel can be arranged with screws and adhesive aluminum profile. In several cases welding is also used and its options. In case of adhesion we should consider the specialty of dibond panel as non-painted panel can be applied easily.

Due to smooth and straight surface , the color printing, printing and applying paint via printing machine is available. Aluminum composite panel is solid and has small weights. It is resistance against corrosion and chemical agents. They can operate in any temperature and rapidly changing temperature ranges.

It is resistant against ultra violet rays and keeps the original look. Alukabond material is used on facade. The data and codes are shown in a table.

Aluminum doors and windows

The window gaps are filled with aluminum doors and windows in a kindergarten. The windows are filled with glass materials. Aluminum doors and windows are widely spread and used material for construction.

The popularity is due to technical data and durability against environmental impact. Aluminum doors and windows ensures optimum levels of thermal loss, noise and water insulation. Aluminum can be used for various levels of security as well as different class of fire resistance.

With energy-efficient glass:

In summer, only 25% reach the room from 100% hot rays of the sun, 75% of heat is reflected

In winter, only 25% are spread from the room outside from 100% heating (is lost), whereas 75% is remained.

Energy efficient glass provides:

- Heat in the winter
- Cool summer
- Small expenses
- Care for ecology

Energy-efficient glass significantly reduces the cost of utility taxes in winter or summer.

In case of energy efficient glass only 25% reaches the room, and in winter only 25% of 100% heat goes outside (is lost).



Note: These materials are available on the Georgian market.

See the materials certificates below