EURASIAN JOURNAL OF ACADEMIC RESEARCH
Innovative Academy Research Support Center
UIF = 8.1 | SJIF = 5.685 www.in-academy.uz

WAYS TO INCREASE THE ENERGY EFFICIENCY OF EXTERNAL BARRIER CONSTRUCTIONS OF BUILDINGS

[1]Nosirova Sobira Alimovna,
Teacher,
[2]Matyokubov Bobur Pulatovich
Teacher,
Samarkand State Architecture and Construction University named after Mirzo Ulugbek (SamSACU).
pulatovich93@gmail.com
https://doi.org/10.5281/zenodo.7703547

ARTICLE INFO

Received: 24th February 2023
Accepted: 06th March 2023
Online: 07th March 2023

KEY WORDS

Public and residential buildings, energy efficient structures, Penoplex comfort.

ABSTRACT

In this article, we will consider the technology of turning external barrier structures (walls) of public and residential buildings into energy-efficient structures, using construction materials produced in Kazakhstan and Russia and brought to Uzbekistan by "Techno DAT" LLC.

By the end of the 20th century, due to the fact that natural resources are declining and most of the extracted natural resources are spent on the construction of buildings, the terms “Energy Efficient Buildings” entered the construction industry.

In this regard, in our country, together with UNDP, several projects have been implemented, and in recent years, changes have been made and a number of building regulations and urban planning norms and rules have been approved in practice. One of them is QMQ 2.01.04-18 Building heat engineering.

Taking into account the above, we will consider the technology of converting external enclosing structures (walls) of public and residential buildings into energy-efficient structures using building materials produced in Kazakhstan and Russia, imported by Techno DAT LLC.

Basalt wool slab 50x600x1200mm (IZOVER FACADE) or PENOPLEX COMFORD 50x600x1200mm is used as a heat-shielding layer.

The volumetric weight of the above heat-insulating materials for basalt wool (IZOVER FACADE) is γ=150 кг/м^3, and the coefficient of thermal conductivity is $\lambda = 0{,}037$ $BT/(м^0C)$, the volumetric weight of PENOPLEX COMFORD is γ= 28-33 кг/м^3 ,and the coefficient of thermal conductivity $\lambda = 0{,}028$ $BT/(м^0C)$.

Calculated heat transfer resistance of non-homogeneous external wall with thermal insulation of 5cm:

- For basalt wool (ISOVER FASADE) $R_0 = 2{,}03$ $м^2 \cdot {}^\circ C/\text{BT}$
- for PENOPLEX COMFORD $R_0 = 2{,}46$ $м^2 \cdot {}^\circ C/\text{BT}$

EURASIAN JOURNAL OF ACADEMIC RESEARCH
Innovative Academy Research Support Center
UIF = 8.1 | SJIF = 5.685 www.in-academy.uz

QMQ 2. 01.04-18 Our external enclosing structure, designed according to the requirements of building heat engineering, meets the requirements of the 2nd level of thermal protection, i.e.

$$R_O^{TP} = 2{,}0 \ м^2 \cdot ^\circ C/\text{BT} \leq \ R_0 = 2{,}03 \ м^2 \cdot ^\circ C/\text{BT} \leq \ R_0 = 2{,}46 \ м^2 \cdot ^\circ C/\text{BT}$$

The sequence of the correct installation of the heat-shielding layer from the outer surface of the outer enclosing structures is as follows:

 First, the main (bearing) wall is cleaned of dust and covered with a primer to strengthen its surface (Fig. 1);

 A mixture (adhesive mixture) is applied for gluing a heat-shielding layer onto a load-bearing wall (Fig. 2);

 The thermal protection layer is glued with basalt wool (IZOVER FACADE) or PENOPLEX COMFORD and reinforced with dowels (Fig. 3), (Fig. 4), (Fig. 5);

 A plaster mix (thickness-adhesive mixture) is applied for gluing the reinforcing mesh over the heat-shielding layer (Fig. 6);

 after gluing the reinforcing mesh over the plaster, the plaster mixture (thickness-adhesive mixture) is re-applied (Fig. 7);

 Before applying patterned plaster, the surface of the outer wall is once again covered with a primer (primer for decorative putty) (Fig. 8);

 A white patterned plaster (decorative plaster) on a cement base is applied to the surface, and after the patterned plaster has dried, it can be painted in different colors (Fig. 9).

Figure 1: *Load-bearing wall*

Figure 2: *Heat protection layer primer applications.*

Figure 3: *ISOVER FASADE*

Figure 4: *PENOPLEX КАМФОРД*

Figure 5: *DOUBLE*

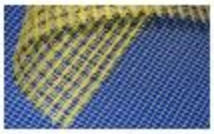

Figure 6: *Plaster and glue mixture* ***Figure 7 :*** *Reinforced mesh*

Figure 8: *Primer for decorative plaster* ***Figure 9 :*** *decorative paint*

.

References:

1. ҚМҚ 2.01.04-18. “Қурилиш иссиқлик техникаси”. Тошкент 2018 й.
2. Матьязов С., Носирова С., Джалилов Х. “Биноларни таъмирлашда энергия самарадор том конструкциялари” “ Биноларни энергия самарадорлигини ошириш ва қурилиш физикасининг долзарб муаммолари” мавзусидаги республика илмий –техник анжумани материаллари. (Самарқанд 2015йил14-15 май) 340сах
3. Носирова С. А., Рустамова Д. Б., Эгамова М. Т. ЭНЕРГИЯТЕЖАМКОР УЙЛАР-ЎЗБЕКИСТОННИНГ ЯҚИН ЙИЛЛАРДАГИ ЭНГ АСОСИЙ ШИОРИ //Журнал Технических исследований. – 2021. – Т. 4. – №. 2.
4. Тулаков Э.С., Бўронов Ҳ., Матёқубов Б.П., Абдуллаева С. А.. Кам қаватли турар-жой бинолари ертўла деворларининг иссиқлик изоляция қатлами қалинлигини ҳисоблаш. //Me’morchilik va qurilish muammolari Проблемы архитектуры и строительства.Samarqand 2020. №2. -С.41-45.
5. Pulatovich, M. B. . (2021). Energy Efficient Building Materials for External Walls of Residential Buildings Physical Properties of Heat. International Journal of Culture and Modernity, 9, 1–11. Retrieved from https://ijcm.academicjournal.io/index.php/ijcm/article/view/67

6. Тулаков Э.С., Матёқубов Б.П.. Thermal Insulation Of The Foundation Walls Of Buildings And Calculation Of ItsThickness. THE AMERICAN JOURNAL OF ENGINEERING AND TECHNOLOGY (TAJET) SJIF-5.705 DOI-10.37547/tajet Volume 3 Issue 04, 2021 ISSN 2689-0984 The USA Journals, USA www.usajournalshub.com/inde x.php/tajet -C.70-78
7. Pulatovich, M. B. . (2021). Analysis of Underground Projects of Energy-Efficient Residential Buildings. International Journal of Culture and Modernity, 9, 12–18.Retrieved from https://ijcm.academicjournal.io/index.php/ijcm/article/view/68
8. Inatillayevich, G.O. and Pulatovich, M.B. 2021. Analysis of Underground Projects of Energy Efficient Low-Rise Residential Buildings Built on Highly Flooded Soils. International Journal on Integrated Education. 4, 9 (Sep. 2021), 96-102. DOI:https://doi.org/10.31149/ijie.v4i9.2156.
9. Pulatovich, M. B. ., & Innatillayevich, G. O. . (2021). Laboratory Experimental Studies on the Properties of Highly Sedimentary Lyos Soils when their Moisture Changes Over Time. European Journal of Life Safety and Stability (2660-9630), 8, 91-98. Retrieved from http://ejlss.indexedresearch.org/index.php/ejlss/article/view/119
10. Pulatovich, M. B. ., & Shodiyev, K. . (2021). Thermal Insulation of Basement Walls of Low-Rise Residential Buildings and Calculation of its Thickness. International Journal of Culture and Modernity, 9, 19–27. Retrieved from https://ijcm.academicjournal.io/index.php/ijcm/article/view/69
11. Матёкубов, Бобур Пўлатович, and Сарвара Музаффаровна Саидмуродова. "КАМ СУВ ТАЛАБЧАН БОҒЛОВЧИ АСОСИДАГИ ВЕРМИКУЛИТЛИ ЕНГИЛ БЕТОНЛАР ТЕХНОЛОГИЯСИНИ ҚЎЛЛАНИЛИШИ." INTERNATIONAL CONFERENCES. Vol. 1. No. 15. 2022.
12. Pulatovich, M. B. . (2021). Energy Efficient Building Materials for External Walls of Residential Buildings Physical Properties of Heat. International Journal of Culture and Modernity, 9, 1–11. Retrieved from https://ijcm.academicjournal.io/index.php/ijcm/article/view/67
13. Тулаков Э.С., Иноятов Д., Қурбонов А.С., Матёқубов Б.П.. Бинолар-нинг ертўла деворларини иссиқлик изоляциялаш ва унинг қалинлигини ҳисоблаш. //Me'morchilik va qurilish muammolari Проблемы архитектуры и строительства.Samarqand 2020. №4.(2-қисм) -С.29-32.
14. Матёкубов, Б. П., & Саидмуродова, С. М. (2022). КАМ СУВ ТАЛАБЧАН БОҒЛОВЧИ АСОСИДАГИ ВЕРМИКУЛИТЛИ ЕНГИЛ БЕТОНЛАР ТЕХНОЛОГИЯСИНИ ҚЎЛЛАНИЛИШИ. INTERNATIONAL CONFERENCES, 1(15), 103–109. Retrieved from http://researchedu.org/index.php/cf/article/view/319
Inatillayevich G. O., Pulatovich M. B. Analysis of Underground Projects of Energy Efficient Low-Rise Residential Buildings Built on Highly Flooded Soilshttps //doi. org/10.31149/ijie. v4i9. – T. 2156.
15. Matyokubov , B. P., & Saidmuradova, S. M. (2022). METHODS FOR INVESTIGATION OF THERMOPHYSICAL CHARACTERISTICS OF UNDERGROUND EXTERNAL BARRIER STRUCTURES OF BUILDINGS. RESEARCH AND EDUCATION, 1(5), 49–58. Retrieved from http://researchedu.org/index.php/re/article/view/364.

16. Bolikulovich K. M., Pulatovich M. B. HEAT-SHIELDING QUALITIES AND METHODS FOR ASSESSING THE HEAT-SHIELDING QUALITIES OF WINDOW BLOCKS AND THEIR JUNCTION NODE WITH WALLS //Web of Scientist: International Scientific Research Journal. – 2022. – Т. 3. – №. 11. – С. 829-840.
17. Egamova , M. ., & Matyokubov , B. . (2023). WAYS TO INCREASE THE ENERGY EFFICIENCY OF BUILDINGS AND THEIR EXTERNAL BARRIER STRUCTURES. Eurasian Journal of Academic Research, 3(1 Part 1), 186–191. извлечено от https://www.in-academy.uz/index.php/ejar/article/view/8419
18. DT I., ES T. Theoretical Solutions for Calculating the Height of the Capillary Rise of Water in the Foundation of a Building //International Journal of Trend in Scientific Research and Development (IJTSRD). – 2022. – Т. 3. – №. 2. – С. 15-20.
19. Nosirova S., & Barotov K. THE RELEVANCE OF ENERGY EFFICIENCY IN THE CONSTRUCTION OF STANDARD RESIDENTIAL BUILDINGS. Journal of innovations in architecture, ISSN 2181-9440 Vol.2 Issue 1.DOI https://doi.org/10.5281/zenodo.5810006