BRONYA®

SUPERFINE HEAT INSULATION

Economic justification of insulation Walls using liquid ceramic thermal insulation coatings of the series Bronya

liquid ceramic thermal insulation of the Bronya series

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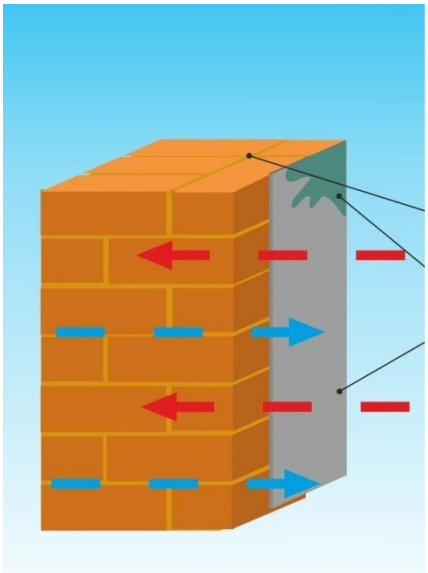
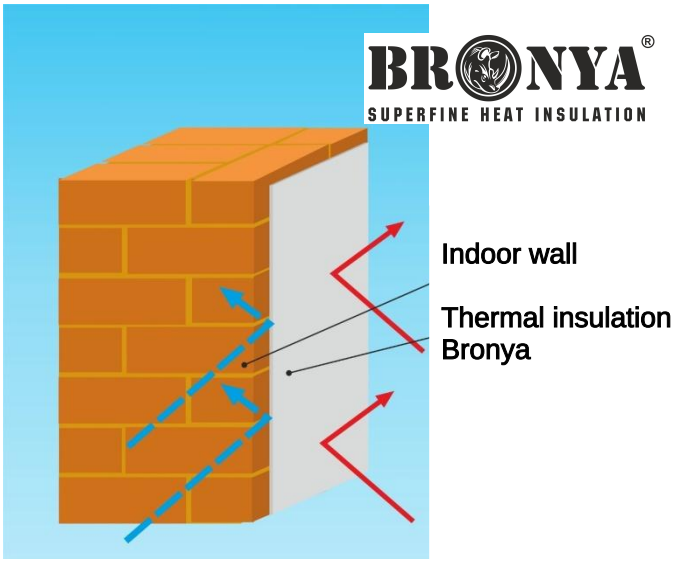
The heat engineering calculation was made in accordance with the requirements of SNiP II-3-79, SNiP 23-01-99, SNiP 2.01.01.-82.

The calculation will be made for a brick wall with a thickness of two bricks.
Initial data:

- $\delta_к$=0,48 m - thickness of the enclosing structure;
- $\lambda_к$=0,69 W/(m * ° C) - coefficient of thermal conductivity of brickwork;
- $t_{ВН}$=25 ^{O}C – indoor air temperature;
- $t_{ОТ}$= -6,5 ^{O}C – average daily temperature of the heating period (for Moscow);
- $z_{ОТ}$=214 days - the number of days of the heating period (for Moscow);





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- $C_т$=1400 RUB/Gcal - the average cost of 1 Gcal of thermal energy in Russia (Without VAT);
- $\delta_Б$=0,001 m - thickness of thermal insulation Bronya;
- $\lambda_Б$=0,001 W/(m * °C) is the coefficient of thermal conductivity of the liquid ceramic material Bronya.

Calculation:

1. Determine the thermal resistance of the enclosing structure:

$$R_o = \frac{\delta_к}{\lambda_к} = \frac{0,48}{0,69} = 0,7 \quad \frac{м2 * °C}{W}$$

2. Determine the heating costs of 1 m2 of the enclosing structure:

$$C_{от} = \frac{11,3 \cdot 10^{-4} \cdot (t_{вн} - t_{от}) \cdot z_{от} \cdot C_т}{R_o} =$$

$$= \frac{11,3 \cdot 10^{-4} \cdot (25 - (-6,5)) \cdot 214 \cdot 1400}{0,7}$$

$$= 15\,234,66 \text{ rub/m2}$$

3. Determine the thermal resistance of the enclosing structure insulated with liquid ceramic thermal insulation coating of the "Bronya" series:

$$R = R_О + R_Б = \frac{\delta_к}{\lambda_к} + \frac{\delta_Б}{\lambda_Б} =$$

$$= \frac{0,48}{0,69} + \frac{0,001}{0,001} = 0,7 + 1 = 1,7 \quad \frac{м2 * °C}{W}$$

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4. Determine the heating costs of 1 m2 of the enclosing structure, insulated with liquid ceramic thermal insulation coating of the "Bronya" series:

$$C_{от\,Б} = \frac{11{,}3 \cdot 10^{-4} \cdot (t_{вн} - t_{от}) \cdot z_{от} \cdot C_т}{R_o} =$$

$$= \frac{11{,}3 \cdot 10^{-4} \cdot (25 - (-6{,}5)) \cdot 214 \cdot 1400}{1{,}7}$$

$$= 6\,273{,}10 \text{ rub/m2}$$

5. Calculate the savings on heating when insulating enclosing structures with liquid ceramic thermal insulation coatings of the "Bronya" series per 1 m2 for one year of operation:

$$\Delta C = C_{от} - C_{от\,Б} = 15\,234{,}66 - 6\,273{,}10 =$$

$$= 8691{,}56 \text{ rub/m2}$$

Conclusion:
When warming the facades of buildings or interior walls of premises with liquid ceramic thermal insulation coatings of the "Bronya" series, it is possible to reduce heating costs by up to 60%, this will not only fully return the funds spent on insulation, but also bring additional benefits.

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