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CALCULATION OF HEAT LOSS OF PLOT OUTSIDE WALL BEHIND RADIATORS

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Heating devices usually installed near the outer walls of the room. The unit heats the active portion of the wall located directly behind it. Thus, the temperature of this area is much higher than other area of the wall, and can reach 50 ^{0}C. Instead of using all the heat to heat the air inside the apartment, spends heat radiator to heat the cold brick or concrete slabs of the outer wall of the building.

Significantly reduce heat loss in this situation makes it possible to heat-reflecting screens, that isolate walls area which are for the heater.

The research goal is to assess effect of wall's thermal resistance and screen's heat-reflecting facility resolution at saving heat.

The temperature on the surface of the heating device is taken equal to the average water temperature in the heating system (between feeding and return lines at an average ambient temperature of the heating period).

The resulting heat flux is defined as the difference between own radiation from the inner wall surface flow and convective losses (1) or from the part heat equation (2) (include only thermal conductivity and heat transfer to the outer wall).

The unknown value of the temperature on the inner surface of the case for the absence and presence of heat-reflecting screen is determined from the equation (1) and (2). By relation (2) we find the heat loss by area of the wall behind the radiator, substituting the appropriate temperature of the inner wall and the heat transfer coefficient.

Calculations of heat losses of outer walls of the building were performed under the following initial data:

surface temperature 60 ^{0} C;

outside temperature -1.1 ^{0} C;

internal air temperature 20 ^{0}C;

heating device, cast iron radiator five sectional dimensions of 0,6x0.5 meter; which degree of blackness $\varepsilon_r = 0.82$;

wall material - lime plaster $\varepsilon_s = 0,91$, $\lambda = 0,68$ W / m.^{0}C, $\delta = 0,01$ m;

and red brick masonry $\lambda = 0,7$ W / m. ^{0}C, $\delta = 0,35$ m;

heat-reflecting screen size 0,7x0,7 m of material – izolon with 4 mm thick , and thermal conductivity 0.044 W / m. ^{0}C reinforced by aluminum layer, the degree of blackness which $\varepsilon_{ek} = 0.055$.

As can be seen from the calculations, the use of heat-reflecting screen can reduce the overall heat loss of the wall located directly behind radiator about 20%.