Economic Value of Weatherstripping

Tables 39 and 40 show the heat losses in B.t.u. per hour per foot of crack for plain windows and weatherstripped windows to heat the incoming air from 0 to 70 deg. fahr. The tables also show the radiation in square feet that must be installed to take care of these heat losses. This radiation is based on a heat emission factor of 240 B.t.u. per square foot.

For example, consider a double-hung window at a wind velocity of 15 miles per hour. For a plain non-stripped window, Table 39 shows that 0.65 sq. ft. of radiation is required to take care of the infiltration loss per foot of crack. This table shows for the weatherstripped window, a corresponding radiation requirement of 0.12 sq. ft. per foot of crack, indicating that the application of good weatherstripping has brought about a reduction of 0.53 sq. ft. in the radiation required per foot of crack.

Assuming the heating system costs $2.00 per square foot of radiation installed, and weatherstripping to cost $0.30 per lineal foot installed, there would result for each $0.30 invested in weatherstripping, a reduction of $1.06 in the initial cost of the heating system. For any particular installation the costs applying to that locality and for that particular type of construction should be used in making such a cost analysis. No attempt is made here to figure the reduction in operating cost due to the application of weatherstripping, as this varies greatly depending on how the plant is operated.

WIND MOVEMENT

The effect of wind on the heating requirements of any building should be given consideration under two heads:

1. Wind movement increases the heat transmission of walls, glass, and roof, affecting poor walls to a much greater extent than good walls.

2. Wind movement materially increases the infiltration (inleakage) of cold air through the cracks around doors and windows, and even through the building materials themselves, if such materials are at all porous.

It is entirely possible that a building may require more heat on a windy day with a moderately low outside temperature than on a quiet day with a much lower outside temperature. It will, therefore, be evident that the wind movement in any locality must be given careful consideration in computing the probable heating requirements of a building, and for the purposes of calculation, not less than the average wind movement in any locality during December, January and February should always be provided for in computing (1) the heat transmission of a building, and (2) the heat required to take care of the infiltration of outside air.

The first condition is readily taken care of, as already explained, by using a surface coefficient f_o for the outside wall surface which is based on the proper wind velocity (Table 5). In case specific data are lacking for any locality, use an average wind velocity of approximately 15 miles per hour. In a similar manner, the heat allowance for infiltration through cracks (Tables 39 to 42), must be based on the average wind velocity for a given locality, and is explained in the next subdivision of this chapter.

TABLE 40. INFILTRATION THROUGH DOUBLE-HUNG METAL SASH WINDOWS PER FOOT OF CRACK

	Wind Velocity Miles per Hour	Non-Weatherstripped Window, Locked			Non-Weatherstripped Window, Unlocked			Weatherstripped Window, Unlocked		
		Leakage Cu. Ft. per Hour	Heat Loss B.t.u. per Hour 0-70 Deg. Fahr.	Equivalent Steam Radiation Sq. Ft.[a]	Leakage Cu. Ft. per Hour	Heat Loss B.t.u. per Hour 0-70 Deg. Fahr.	Equivalent Steam Radiation Sq. Ft.[a]	Leakage Cu. Ft. per Hour	Heat Loss B.t.u. per Hour 0-70 Deg. Fahr.	Equivalent Steam Radiation Sq. Ft.[a]
PART I Values actually determined by tests	5.0	25.0	31.5	0.13	25.5	32.1	0.13	8.1	10.2	0.04
	10.0	56.8	71.5	0.30	59.1	74.4	0.31	23.2	29.2	0.12
	15.0	88.0	110.8	0.46	92.5	116.8	0.49	39.4	49.6	0.21
	20.0	120.4	151.8	0.63	129.7	163.4	0.68	57.5	72.4	0.30
	25.0	156.3	197.0	0.82	171.4	216.0	0.90	75.3	94.9	0.40
	30.0	192.2	242.2	1.01	213.0	268.7	1.12	95.0	119.9	0.50
	35.0	233.8	294.9	1.23	265.0	334.3	1.39	118.1	148.8	0.62
PART II Values for practical use; average test values reduced by 20 per cent to allow for building up of pressure in room, etc.	5.0	20.4	25.7	0.10	20.4	25.7	0.10	6.5	8.2	0.03
	10.0	45.4	57.2	0.24	47.3	59.6	0.25	18.6	23.4	0.10
	15.0	70.4	88.6	0.37	74.0	93.1	0.39	31.5	39.7	0.17
	20.0	96.3	121.2	0.51	103.8	130.7	0.55	46.0	57.9	0.24
	25.0	125.0	157.6	0.66	137.1	172.8	0.72	60.2	75.8	0.32
	30.0	153.8	193.4	0.81	170.4	215.0	0.90	76.0	95.6	0.40
	35.0	186.8	236.0	0.98	212.0	267.5	1.11	94.5	119.0	0.50

[a] Based on heat emission of 240 B.t.u. per sq. ft.