

Table 5 Coefficients of Transmission (U) of Frame Walls*

These coefficients are expressed in Btu per (hour) (square foot) (Fahrenheit) degree difference in temperature between the air on the two sides, and are based on an outside wind velocity of 15 mph

Example—Wall D 4		Example of Substitution	
Resistances used are given below in this table or in Table 3 or 4		Resistances used are given below in this table or in Table 3 or 4	
Construction	Resistance (R)	Replace items 3 and 4 with insul. bd. sheathing (3/8 in.) and items 6 and 7 with gypsum wall board (3/2 in.)	
1. Outside surface (15 mph wind)	0.17	Total resistance	4.18
2. Siding, wood, 1/2 in. x 8 in. lapped (av. R)	0.85	Deduct 3. Building Paper	0.06
3. Building paper	0.06	4. Wood sheathing (3/8 in.)	0.28
4. Wood sheathing (3/8 in.)	0.28	5. Gypsum lath (3/8 in.)	0.28
5. Air space	0.22	6. Gypsum lath (3/8 in.)	0.28
6. Gypsum lath (3/8 in.)	0.28	7. Plaster (sand agg.) (3/2 in.)	0.09
7. Plaster (sand agg.) (3/2 in.)	0.09	Difference	0.87
8. Inside surface (still air)	0.68	Add 4. Insul. bd. sheathing (3/8 in.)	0.06
Total resistance	4.18	5. Gypsum bd. (3/2 in.)	0.45
$U = 1/R = 1/4.18 =$	0.24	Total resistance	6.18
See value 0.24 in boldface type in table below.		$U = 1/R = 1/6.18 =$	0.19

To Adjust U Values for Construction with Added Insulation between Framing Members, See Table 16.

Exterior*			Interior Finish			Type of Sheathing*								Number
						None, Building Paper	Gyp- sum Board 3/2 in.	Ply- wood 3/8 in.	Wood, 3/8 in. and Build- ing Paper	Insulation Board Sheathing				
										3/2 in.	3/8 in.			
Material	R	Av. R	Material	R	U	A	B	C	D	E	F			
					Resistance	0.06	0.45	0.39	1.04	1.32	2.06			
Wood siding Drop—(1 in. x 8 in.) Bevel (3/4 in. x 8 in.) Wood shingles 7/8 in. exposure Wood panels (3/4 in.)			None.....	—	0.57	0.47	0.48	0.36	0.33	0.27	1			
			Gypsum bd. (3/8 in.).....	0.58	0.33	0.29	0.30	0.25	0.23	0.20	2			
			Gypsum lath (3/8 in.) and 3/2 in. plas. (lt. wt. agg.).....	0.64	0.30	0.27	0.27	0.23	0.22	0.19	3			
		0.79	Gypsum lath (3/8 in.) and 3/2 in. plas. (sand agg.).....	0.41	0.32	0.28	0.29	0.24	0.23	0.19	4			
		0.81	Metal lath and 3/2 in. plas. (lt. wt. agg.).....	0.47	0.31	0.28	0.28	0.24	0.22	0.19	5			
		0.87	Metal lath and 3/4 in. plas. (sand agg.).....	0.13	0.35	0.31	0.31	0.26	0.24	0.21	6			
		0.94	Insul. bd. (3/4 in.).....	1.43	0.24	0.22	0.22	0.19	0.18	0.16	7			
			Insul. bd. lath (3/4 in.) and 3/2 in. plas. (sand agg.).....	1.58	0.24	0.22	0.22	0.19	0.18	0.16	8			
			Plywood (3/4 in.).....	0.31	0.33	0.29	0.30	0.25	0.23	0.20	9			
			Wood panels (3/4 in.).....	0.94	0.27	0.25	0.25	0.22	0.20	0.18	10			
			Wood lath and 3/2 in. plas. (sand agg.).....	0.40	0.32	0.28	0.29	0.24	0.23	0.19	11			
Face-brick veneer ¹ Plywood (3/8 in.)			None.....	0.73	0.56	0.58	0.42	0.38	0.30	12				
			Gypsum bd. (3/8 in.).....	0.35	0.37	0.33	0.33	0.27	0.25	0.21	13			
			Gypsum lath (3/8 in.) and 3/2 in. plas. (lt. wt. agg.).....	0.64	0.33	0.30	0.30	0.25	0.24	0.20	14			
		0.44	Gypsum lath (3/8 in.) and 3/2 in. plas. (sand agg.).....	0.41	0.36	0.32	0.32	0.27	0.25	0.21	15			
		0.45	Metal lath and 3/2 in. plas. (lt. wt. agg.).....	0.47	0.35	0.31	0.32	0.26	0.25	0.21	16			
		0.47	Metal lath and 3/4 in. plas. (sand agg.).....	0.13	0.40	0.35	0.36	0.29	0.27	0.22	17			
			Insul. bd. (3/4 in.).....	1.43	0.26	0.24	0.24	0.21	0.20	0.17	18			
			Insul. bd. lath (3/4 in.) and 3/2 in. plas. (sand agg.).....	1.58	0.26	0.23	0.24	0.21	0.19	0.17	19			
			Plywood (3/4 in.).....	0.31	0.38	0.33	0.33	0.27	0.26	0.21	20			
			Wood panels (3/4 in.).....	0.94	0.30	0.27	0.28	0.23	0.22	0.19	21			
			Wood lath and 3/2 in. plas. (sand agg.).....	0.40	0.36	0.32	0.32	0.27	0.25	0.21	22			

Heat Transmission Coefficients of Building Materials

Table 5 Coefficients of Transmission (U) of Frame Walls* (Concluded)

Exterior*			Interior Finish		Type of Sheathing*							Number
					None, Building Paper	Gyp- sum Board 3/2 in.	Ply- wood 3/8 in.	Wood, 3/8 in. and Building Paper	Insulation Board Sheathing			
									3/4 in.	3/8 in.		
											Resistance	
Material	R	Av. R	Material	R	U	U	U	U	U	U		
					A	B	C	D	E	F		
Wood shingles over insul.: backer bd. (3/8 in.) Asphalt insul. sid- ing	1.40	1.484	None.....	—	0.43	0.37	0.38	0.30	0.28	0.23	23	
			Gypsum bd. (3/8 in.).....	0.38	0.28	0.25	0.25	0.22	0.20	0.18	24	
	Gypsum lath (3/8 in.) and 3/4 in. plas. (lt. wt. agg.).....	0.64	0.25	0.23	0.23	0.20	0.19	0.17	25			
	Gypsum lath (3/8 in.) and 3/4 in. plas. (sand agg.).....	0.41	0.27	0.24	0.25	0.21	0.20	0.18	26			
	Metal lath and 3/4 in. plas. (lt. wt. agg.).....	0.47	0.27	0.24	0.24	0.21	0.20	0.17	27			
	Metal lath and 3/4 in. plas. (sand agg.).....	0.13	0.29	0.26	0.27	0.23	0.21	0.18	28			
	Insul. bd. (3/4 in.).....	1.43	0.21	0.20	0.20	0.18	0.17	0.15	29			
	Insul. bd. lath (3/4 in.) and 3/4 in. plas. (sand agg.).....	1.58	0.21	0.19	0.19	0.17	0.16	0.15	30			
	Plywood (3/4 in.).....	0.31	0.28	0.25	0.25	0.22	0.20	0.18	31			
	Wood panels (3/4 in.).....	0.84	0.24	0.22	0.22	0.19	0.18	0.16	32			
Wood lath and 3/4 in. plas. (sand agg.).....	0.40	0.27	0.24	0.25	0.21	0.20	0.18	33				
Asbestos-cement siding Stucco 1 in. Asphalt roll siding	0.81	0.194	None.....	—	0.91	0.67	0.70	0.48	0.42	0.32	34	
			Gypsum bd. (3/8 in.).....	0.32	0.42	0.38	0.37	0.30	0.27	0.23	35	
	Gypsum lath (3/8 in.) and 3/4 in. plas. (lt. wt. agg.).....	0.64	0.37	0.32	0.33	0.27	0.25	0.21	36			
	Gypsum lath (3/8 in.) and 3/4 in. plas. (sand agg.).....	0.41	0.40	0.35	0.36	0.29	0.27	0.22	37			
	Metal lath and 3/4 in. plas. (lt. wt. agg.).....	0.47	0.39	0.34	0.35	0.28	0.26	0.22	38			
	Metal lath and 3/4 in. plas. (sand agg.).....	0.13	0.45	0.39	0.40	0.31	0.29	0.24	39			
	Insul. bd. (3/4 in.).....	1.43	0.29	0.26	0.26	0.22	0.21	0.18	40			
	Insul. bd. lath (3/4 in.) and 3/4 in. plas. (sand agg.).....	1.58	0.28	0.25	0.26	0.22	0.21	0.18	41			
	Plywood (3/4 in.).....	0.31	0.42	0.36	0.37	0.30	0.27	0.23	42			
	Wood panels (3/4 in.).....	0.84	0.33	0.29	0.30	0.25	0.23	0.20	43			
Wood lath and 3/4 in. plas. (sand agg.).....	0.40	0.40	0.35	0.36	0.29	0.27	0.22	44				

* See text section Calculating Overall Coefficients for basis of calculations.

† To adjust U values for the effect of added insulation between framing members, see Table 16.

‡ Note that although several types of exterior finish may be grouped because they have approximately the same thermal resistance value, it is not implied that all types may be suitable for application over all types of sheathing listed.

§ A average resistance of items listed. This average was used in computation of U values shown.

¶ Building paper is not included except where noted.

‡ Small air space between building paper and brick veneer neglected.

* Where stucco is applied over insulating board or gypsum sheathing, building paper is generally required, but the change in U value is negligible.

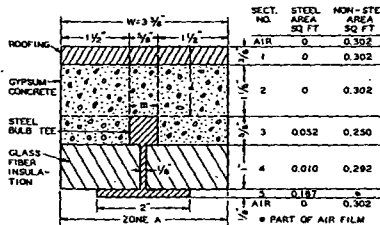


Fig. 6 Enlarged Section of Zone A of Fig. 5

Solution: The basic area is 2 sq ft (24 in. x 12 in.), with a tee-bar (12 in. long) across the middle. This area is divided into two zones, A and B.

Zone A is determined from Equation 4 as follows:

$$\text{Top Side } W = m + 2d = 0.625 + 2 \times 1.5 = 3.625 \text{ in.}$$

$$\text{Bottom Side } W = m + 2d = 2.0 + 2 \times 0.5 = 3.0 \text{ in.}$$

Using the larger value of W, the area of Zone A is $(12 \times 3.625)/144 = 0.302$ sq ft. The area of Zone B is $2.0 - 0.302 = 1.698$ sq ft.

To determine the area transmittance for Zone A the structure within the zone is divided into five sections parallel to the top and bottom surfaces as shown in Fig. 6. The area conductance C-A of each section is calculated by adding the area conductances of its metal and non-metal paths. The area conductances of the sections are converted to area resistances