TECHNICAL INFORMATION ON BUILDING MATERIALS

TIBM-15

FOR USE IN THE DESIGN OF LOW-COST HOUSING

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THE NATIONAL BUREAU OF STANDARDS
UNITED STATES DEPARTMENT OF COMMERCE
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THERMAL INSULATION

Insulating Values for Frame Wall Construction--- Wood Shingles with Various Types of Interior Finishes

This is a brief presentation of calculated thermal insulating values for frame wall construction---wood shingles with various types of interior finishes, based on tests conducted by the National Bureau of Standards and presented in detail in former Letter Circular No. 227, "Thermal Insulation", (April 19, 1927);[1] and Bureau of Standards Research Paper No. 291, "Heat Transfer Through Building Walls", (August 6, 1930),[2] by M. S. Van Dusen and J. L. Finck.

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[1] Out of print.

[2] Out of print and not available by purchase but may be consulted in Government depository libraries.

COMPARATIVE INSULATING VALUES (I.V.) FOR FRAME WALL CONSTRUCTION--
WOOD SHINGLES WITH VARIOUS TYPES OF INTERIOR FINISHES[1]

Exterior Wall Construction		Commercial Insulating Materials Placed Between 2" x 4" Studding (1 5/8" x 3 5/8" Dressed)		Interior Finish: 3/4" Plaster and Metal Lath or 1/2" Plaster Board or Wall Board[2] alone		3/4" Plaster and Wood Lath		1/2" Plaster Applied on Rigid Insulation Boards (If plaster is omitted, deduct 0.22)		
								Thickness of Board		
Finish	Type of Sheathing	Type	Thickness Inches	I.V.[1]		I.V.[1]		1/2" I.V.[1]	3/4" I.V.[1]	1" I.V.[1]
Wood Shingles (If shingles are applied on wood strips forming 7/8" air space, add 1.03)	3/4" Wood Sheathing and Building Paper[3,4,5]	Unfilled Air Space	3 5/8	4.6		4.8		6.0	6.7	7.5
		Flexible Insulation Placed against one side, with one air space	1/2	6.4		6.6		7.8	8.6	9.3
			3/4	7.4		7.6		8.8	9.6	10.3
			1	8.3		8.5		9.7	10.5	11.2
			2	12.0		12.2		13.4	14.2	14.9
		Rigid Insulation Board Centered, with 2 air spaces of equal thickness	1/2	6.8		7.0		8.2	9.0	9.7
			3/4	7.6		7.8		9.0	9.8	10.5
			1	8.3		8.5		9.7	10.5	11.2
		Flexible Insulation Centered, with 2 air spaces of equal thickness	1/2	7.1		7.3		8.5	9.3	10.1
			3/4	8.1		8.3		9.5	10.3	11.0
			1	9.0		9.2		10.4	11.2	12.0
			2	12.7		12.9		14.1	14.9	15.6
		"Fill" Insulation	3 5/8	16.0		16.2		17.4	18.1	18.9
		Flexible Insulation	3 5/8	16.9		17.1		18.3	19.0	19.8

[1]The insulating value is defined as the number of hours required for the passage of 1 Btu of heat through 1 square foot of wall area, per degree Fahrenheit temperature difference between the air on one side of the wall and the air on the other.

[2]If 1/2" plaster is applied to plaster board or wall board, add 0.22.

[3]If wood sheathing is replaced by 1/2", 3/4", or 1" rigid insulation boards, add 0.77, 1.52, or 2.28 respectively.

[4]If 1/2", 3/4", or 1" rigid insulation board is used with wood sheathing, add 1.52, 2.27, or 3.03 respectively.

[5]If 1/2", 3/4", or 1" flexible insulation is used with wood sheathing, add 1.85, 2.78, or 3.70 respectively.