

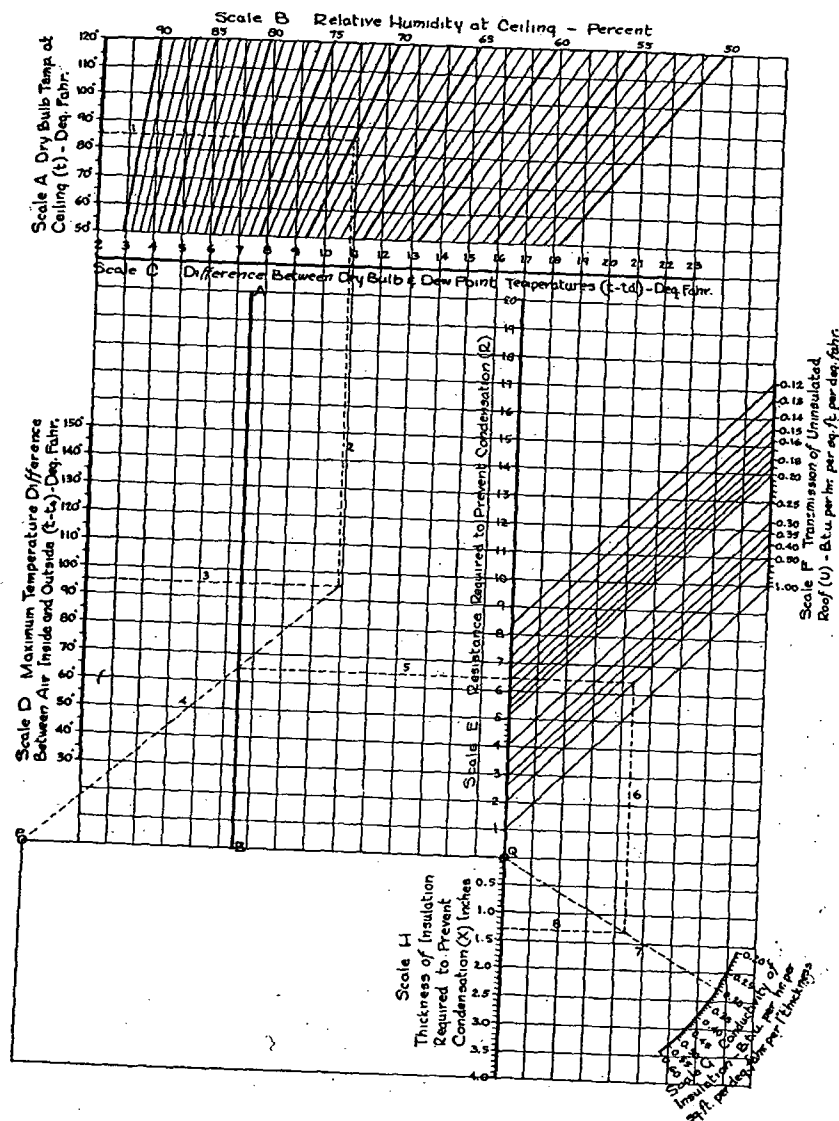


FIG. 2. CHART FOR DETERMINING THICKNESS OF INSULATION REQUIRED TO PREVENT CONDENSATION

TABLE 3. CALCULATION SHEET SHOWING METHOD OF ESTIMATING HEAT LOSSES OF BUILDING SHOWN IN FIG. 1

PART OF BUILDING	WIDTH IN FEET	HEIGHT IN FEET	NET SURFACE AREA OR CRACK LENGTH	COEFFICIENT	TEMP. DIFF.	TOTAL BTU
North Wall:						
Brick, $\frac{1}{2}$ in. plaster	50	16	656	0.34	59.6	13,293
Doors (3 in. Wood)	12	12	144	0.46	57.2	3,789
$\frac{1}{4}$ in. Crack		1 pair doors	60	0.90	57.2	1,544 ^a
West Wall:						
Brick, $\frac{1}{2}$ in. plaster	120	16	1380	0.34	59.6	27,984
Glass (Single)	15 x 4	9	540	1.13	60.2	36,734
$\frac{1}{4}$ in. Crack		Double Hung Windows (15)	450	0.45	60.2	6,095 ^a
South Wall	Same as North Wall					18,626
East Wall	Same as West Wall					70,793
Roof, 3 in. Concrete and Slag-surfaced built-up roofing	50	120	6000	0.77	69.2	319,704
Floor, 5 in. Stone Concrete on 3 in. Cinder Concrete	50	120	6000	0.63	5b	18,900
GRAND TOTAL of heat required for building in Btu per hour						517,442

^aThis building has no partitions and whatever air enters through the cracks on the windward side must leave through the cracks on the leeward side. Therefore, only one-half of the total crack will be used in computing infiltration for each side and each end of building.

^bA 5 F temperature differential is commonly assumed to exist between the air on one side of a large floor laid on the ground and the ground.

CONDENSATION ON BUILDING SURFACES²

Condensation on the interior surfaces of buildings is often a serious problem. Water dripping from a ceiling may cause irreparable damage to manufactured articles and machinery. It often results in short-circuiting of electric power and lighting systems, necessitating shut-downs and incurring costly repairs. It also causes rotting of wood roof structures, corrosion of metal roofs, and spalling and disintegration of gypsum and other types of roof decks not properly protected.

Condensation is caused by the contact of the warm humid air in a building with surfaces below the dew-point temperature, and can be remedied in two ways, (1) by increasing the temperature of such surfaces above the dew-point temperature, or (2) by lowering the humidity.

Dehumidification, of course, is not permissible where a high relative humidity is necessary for manufacturing processes. Hence, the only alternative is to increase the surface temperature by decreasing the inside surface resistance. This can be accomplished by increasing the velocity of air passing over the surface, or by increasing the over-all resistance of the wall or roof by installing a sufficient thickness of insulation.

The latter method is generally used, and the thickness of insulation is determined by ascertaining the amount of resistance to be added to increase the temperature of the interior surface above the dew-point temperature for the maximum conditions involved. This in turn is based

²For additional information on this subject see Preventing Condensation on Interior Building Surfaces, by Paul D. Close (A.S.H.V.E. TRANSACTIONS, Vol. 36, 1930).