

DEFINITIONS OF INSULATION TERMS

Thermal insulation in construction is rated by the amount of heat that will flow through one square foot, per hour, per degree F temperature difference. This measurement is made in Btu and expressed as either "k", "C", or "U" values.

"k" (conductivity):

The measurement of heat flow through one-inch thickness of any single material per hour x °F is technically written: $k = \text{Btu}/(\text{hr})(\text{sq.ft.})(\text{°F}/\text{inch})$. "k" values are determined by laboratory tests and may be found in product manufacturers' literature.

Example:

"k" of Rigid Urethane Foam	0.14 Btu/(hr) (sq.Ft.) (°F/inch)
"k" of Glass Fiber	0.25 Btu/(hr)(sq.Ft.) (°F/inch)
"k" of Expanded Polystyrene Bead Board	0.28 Btu/(hr)(sq.Ft.) (°F/inch)
"k" of Fiberboard Roof Insulation	0.34 Btu./(hr)(sq.Ft.) (°F/inch)
"k" of Concrete (not dried)	12.00 Btu/(hr)(sq.Ft.) (°F/inch)

"C" (conductance):

The measurement of heat flow through any single material that is more or less than one-inch thick is expressed as $C = \text{Btu}/(\text{hr})(\text{sq.ft.})(\text{°F})$. To find "C", divide thickness (T) of the material into its "k" factor. Formula: $C = \frac{T}{k}$ (For one inch of material, "k" and "C" are the same).

"U" Factor:

The measurement, in Btu of heat flow, per hour square foot (°F) ... through a combination of materials or structure, such as, hung ceiling and air space (if used), roof-deck vapor barrier, roof insulations, built-up roofing and the air films below and above these combinations. Formula: $U = \text{Btu}/(\text{hr})(\text{sq.ft.})(\text{°F})$.

"R" Factor:

Since "k" and "C" values decrease as insulation value increases, it is impossible to add "C" and "k" values. Therefore, it is necessary to use an additional factor to find the "U". This is called the "R" factor. "R" is the reciprocal of the material's "C" and is found by dividing "C" into 1. Therefore, the formula is: $R = \frac{1}{C}$

"R" factors of each material in construction are added together to obtain total resistance (R1). To calculate the thickness of insulation required to meet a specified "U", first determine the total resistance of the structure.

R_1 is the reciprocal of "U" and is found by dividing "U" into 1. Therefore the formula is $R_1 = \frac{1}{U}$

"Degree Days"

The number of degrees the average temperature deviates from 65°F each day during the heating season.

For more information contact:

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THERMA bloc™



BOEHMERS
operating under *Hargest Block Ltd.*

You deserve the best products and the best service for your every masonry requirement. With this ideal in mind, we present to you **Therma Bloc**. This metric insulated wall system allows the builder to achieve approximately R 0.97 (5.0) in the wall using lightweight block in one easy application. This R rating was established by the Ontario Research Foundation, performed in accordance with the procedure outlined in ASTM C 236-66 Standard Test Method for Thermal Conductance and Transmittance of Built-up Sections by Means of the Guarded Hot Box.

Installed in the masonry unit at the point of manufacture, the insulative molded one-piece polystyrene liner provides a Thermal Break in the web area. The liners which have a material grade of 24 kg/m³ (1.5 lb/ft³) and water vapour permeability of 145 (2.5) or less, still allow easy accessibility for reinforcing rod and conduit.

On the job, you receive pre-insulated block, and the insulated wall within a wall requires no special handling or installation procedures.

Therma Bloc is available in 20cm, 25cm and 30cm units, in lightweight or concrete, standard or decorative, plain or coloured. The Architect, Engineer, Design Builder now has an opportunity to design with energy conservation in mind, and enhance the overall project, by using masonry insulated single wythe or cavity wall construction.

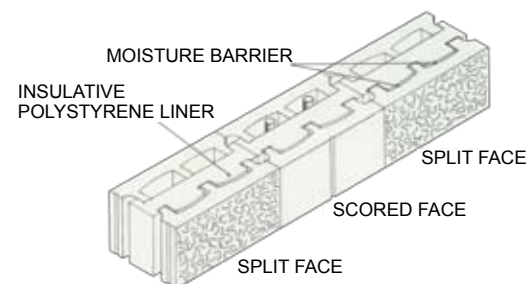
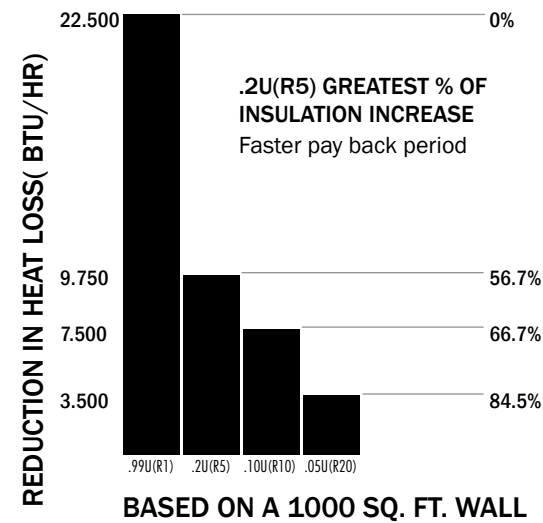
Our sales representatives will assist you in obtaining samples, literature, and methods of further cost savings in using Therma Bloc.

FEATURES

- Reduce overall construction costs
- Minimize insulative problems
- More consistent insulative values
- Metric units only
- No waste or clean-up costs
- Benefits residential or commercial
- Easy installation of pipes, conduit
- Eliminate cold spots in exterior walls
- Improve dewpoint
- Speed completion of job
- Improve sound resistance
- Warmer walls in winter, cooler walls in summer
- Use above or below grade
- Greater fuel efficiency
- Eliminate vandalism to interior insulated walls, with drywall

BENEFITS

% Reduction in Heat Loss



NCMA Concrete Masonry R-Value Evaluation

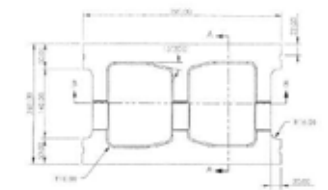
20 x 20 x 40 cm Concrete Masonry Unit With Expanded Polystyrene Inserts • Evaluation No. 13-292-1 • Report Date 3/27/2013 • Expiration Date 3/27/2018

Thermal Values	Concrete Density	20-cm units			
	lb/ft ³	R _{IP} ^A	U _{IP} ^B	R _{SI} ^C	U _{SI} ^D
	80	5.6	0.18	0.98	1.02
	95	5.1	0.19	0.90	1.11
	105	4.7	0.21	0.83	1.20
	115	4.3	0.23	0.76	1.32
	125	3.9	0.25	0.69	1.45
	135	3.6	0.28	0.63	1.60



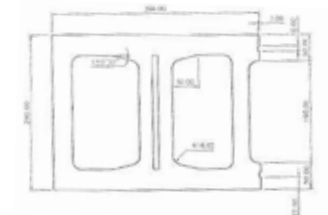
25 x 20 x 40 cm Concrete Masonry Unit With Expanded Polystyrene Inserts • Evaluation No. 09-466-2 • Report Date 3/27/2013 • Expiration Date 3/27/2018

Thermal Values	Concrete Density	25-cm units			
	lb/ft ³	R _{IP} ^A	U _{IP} ^B	R _{SI} ^C	U _{SI} ^D
	80	5.5	0.18	0.98	1.03
	95	5.1	0.19	0.90	1.11
	105	4.7	0.21	0.83	1.20
	115	4.4	0.23	0.77	1.30
	125	4.0	0.25	0.69	1.42
	135	3.6	0.27	0.64	1.56



30 x 20 x 40 cm Concrete Masonry Unit With Expanded Polystyrene Inserts • Evaluation No. 09-466-3 • Report Date 3/27/2013 • Expiration Date 3/27/2018

Thermal Values	Concrete Density	30-cm units			
	lb/ft ³	R _{IP} ^A	U _{IP} ^B	R _{SI} ^C	U _{SI} ^D
	80	5.2	0.19	0.91	1.10
	95	4.8	0.21	0.85	1.18
	105	4.5	0.22	0.78	1.28
	115	4.1	0.24	0.72	1.38
	125	3.8	0.26	0.66	1.50
	135	3.5	0.29	0.61	1.64



* ^A hr.ft².oF/Btu ^B Btu/hr.ft².oF ^C m².K/W ^D W/m².K

Notes:

- Unit properties based on mold drawing above. Picture is of 20 cm units provided to the Laboratory
- Values between those shown in the table above can be determined by interpolation.
- Concrete masonry provides thermal mass to structures that minimizes interior temperature fluctuation and reduces heating and cooling costs. The R-Values shown above do not take into account the benefits provided by thermal mass, which should be considered separately.