

EnergyWise Roof Calculator

Roof Area Name: Metal Roof
Building: American Science and Technology
Address: 6445 Packer Dr
City, St: Wausau, WI
Report Date: 4/16/2011
This Report consists of 8 pages.

The EnergyWise Roof Calculator Online allows the user to determine the minimum thermal insulation requirements for buildings' roofs, and the energy efficiency and approximate annual energy usage costs associated with various roof assembly designs. The calculations used to compile this report are based upon industry-accepted analysis methods utilizing user-defined variables. The results of these analyses are intended for only the specific building and roof assembly design(s) referred to in this report.

The values stated in this report can be valuable when comparing the thermal efficiency of a proposed new roof assemble to an existing assembly, or when considering several possible options for new roof assemblies.

This report focuses solely on the roof assembly and specifically does not include evaluation of other components of the building which also account for energy usage, such as the building's exterior walls, windows, and lighting. The "Annual Energy Cost" referred to in this report is the approximate annual energy usage cost attributable to the roof assembly only, not the total annual energy cost for the building. This value should not be confused with the building owner's overall energy costs, which in most instances will be somewhat larger than the "Annual Energy Cost" that is attributable to the roof assembly only.

It is important to realize energy efficiency and energy usage cost analyses are not an exact science. Actual energy cost for any given period will vary due to a number of factors, including varying climatic conditions, specific building occupancy and hours of operation, and the performance and actual efficiency of any heating and cooling equipment.

» Customized Report For

Roof Area Name:	Metal Roof
Building:	American Science and Technology
Building Location:	6445 Packer Dr, Wausau, WI
Roof Area (sq. ft.):	24700

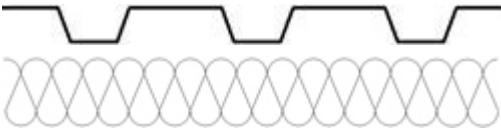
» Climate Information

Location:	Wausau, Wisconsin		
<u>Winter Condition</u>		<u>Summer Condition</u>	
Outside Design Temp. (°F):	-15	Cooling Degree Days (65 °F):	2182
Heating Degree Days (°F):	8427	Equivalent Operating Hours:	170

» **Building Information**

Construction Type:	Light	
Roof Class:	Metal Building	
Space Class:	Non-Residential	
<u>Heating</u>		<u>Cooling</u>
Fuel Type:	Natural Gas	Unit Energy Cost:
Fuel Value:	100000	
Appliance:	Gas designed unit	
Appliance Efficiency (%):	75	
Unit Energy Cost:	1.000	

» **Roofs: 1 of 4**

<u>System Description</u>			
Roof Name:	Existing Roof		
<u>R-Values</u>		<u>Annual Costs</u>	
Heating:	5.78	Heating:	\$11523.70
Cooling:	0.00	Cooling:	\$0.00
Minimum ASHRAE 90.1-2004:	15.38	Total:	\$11523.70
<u>Verify Vapor Retarder Design</u>			
Interior Design Temp (°F):	55	Dew Point Temp (°F):	16
Design Relative Humidity (%):	20	Temperature at Vapor Retarder(°F):	N/A *
Winter Design Dry Bulb (°F):	-15	Effective Vapor Retarder Placement:	N/A *
* No vapor retarder layer found.			
Description	Resistance	Roof Cross Section	
Metal Deck Thickness: N/A	R-value: 0		
Glass fiber batts, 3.5 inches Thickness: 3.5	R-value: 5		

» **Roofs: 2 of 4**

System Description**Roof Name:** Roof Base BidR-Values

Heating: 11.96
Cooling: 0.00
Minimum ASHRAE 90.1-2004: 15.38

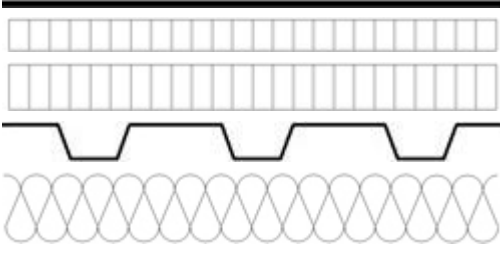
Annual Costs

Heating: \$5571.48
Cooling: \$0.00
Total: \$5571.48

Verify Vapor Retarder Design

Interior Design Temp (°F): 55 **Dew Point Temp (°F):** 16
Design Relative Humidity (%): 20 **Temperature at Vapor Retarder(°F):** N/A *
Winter Design Dry Bulb (°F): -15 **Effective Vapor Retarder Placement:** N/A *

* No vapor retarder layer found.

Description	Resistance	Roof Cross Section
PVC (unsurfaced: ρThickness: N/A	R-value: 0.24	
EPS (1.50 pcf density) Thickness: 0.5	R-value: 2.085	
EPS (1.00 pcf density) Thickness: 1	R-value: 3.85	
Metal Deck Thickness: N/A	R-value: 0	
Glass fiber batts, 3.5 inches Thickness: 3.5	R-value: 5	

» **Roofs: 3 of 4**System Description**Roof Name:** Roof with 2" EPS over corrugationsR-Values

Heating: 18.21
Cooling: 0.00
Minimum ASHRAE 90.1-2004: 15.38

Annual Costs

Heating: \$3657.72
Cooling: \$0.00
Total: \$3657.72

Verify Vapor Retarder Design

Interior Design Temp (°F): 55 **Dew Point Temp (°F):** 16
Design Relative Humidity (%): 20 **Temperature at Vapor Retarder(°F):** N/A *
Winter Design Dry Bulb (°F): -15 **Effective Vapor Retarder Placement:** N/A *

* No vapor retarder layer found.

Description	Resistance	Roof Cross Section
PVC (unsurfaced: ρ Thickness: N/A	R-value: 0.24	
EPS (1.50 pcf density) Thickness: 2	R-value: 8.34	
EPS (1.00 pcf density) Thickness: 1	R-value: 3.85	
Metal Deck Thickness: N/A	R-value: 0	
Glass fiber batts, 3.5 inches Thickness: 3.5	R-value: 5	

» **Roofs: 4 of 4**

System Description

Roof Name: Roof with 4" EPS over corrugations

R-Values

Heating: 25.91
Cooling: 0.00
Minimum ASHRAE 90.1-2004: 15.38

Annual Costs

Heating: \$2570.71
Cooling: \$0.00
Total: \$2570.71

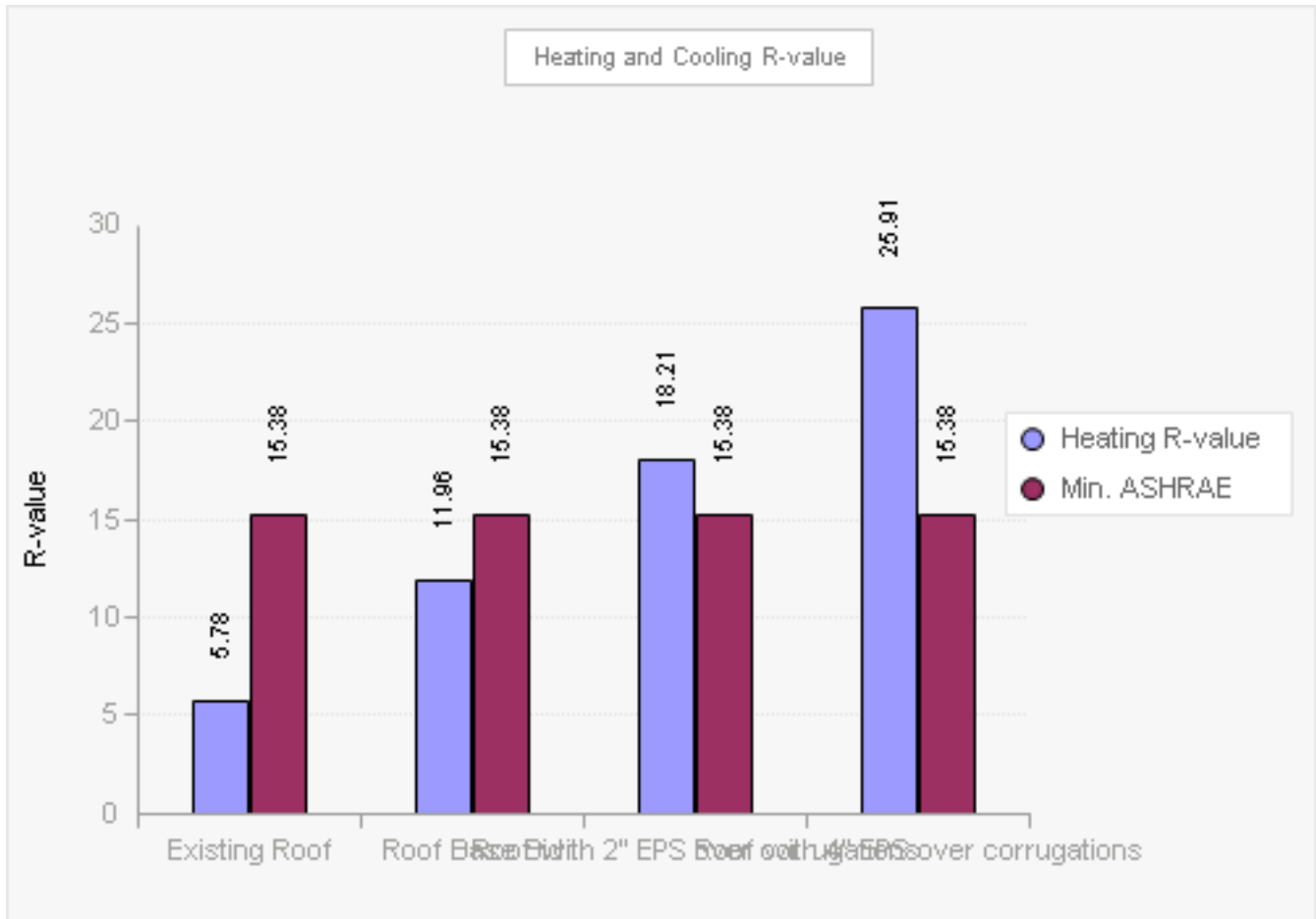
Verify Vapor Retarder Design

Interior Design Temp (°F): 55 **Dew Point Temp (°F):** 16
Design Relative Humidity (%): 20 **Temperature at Vapor Retarder(°F):** N/A *
Winter Design Dry Bulb (°F): -15 **Effective Vapor Retarder Placement:** N/A *

* No vapor retarder layer found.

Description	Resistance	Roof Cross Section
PVC (unsurfaced: $\rho \geq 0.70$, $\epsilon \geq 0.75$) Thickness: N/A	R-value: 0.24	
EPS (1.50 pcf density) Thickness: 2	R-value: 8.34	
EPS (1.00 pcf density) Thickness: 2	R-value: 7.7	
EPS (1.00 pcf density) Thickness: 1	R-value: 3.85	
Metal Deck Thickness: N/A	R-value: 0	
Glass fiber batts, 3.5 inches Thickness: 3.5	R-value: 5	





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