

16. June 2010

Astec Paints

Energy Star Paints

Preliminary Energy Assessment Simulation Results

We have run these research simulations using the 'Sustainability House' House Base Design in one orientation in all AccuRate Climate zones within Queensland BCA climate zones 1 & 2. The building has been assessed based on the following data.

Base Design Specification :

Colour to Roof, Walls & Window frames:	Medium
Wall Construction:	Brick Veneer + R1.0 Bulk Insulation + 10mm plasterboard
Floor:	CSOG
Windows:	Generic 01: Aluminium standard single-glazed: clear glass

Assumptions :

Reflective Foil :	40 mm reflective air gap using antiglare facing up under roof
Energy Star Paint :	Applied to one side only of the roof surface facing up
Tiled Roof :	Assumed unsarked /ventilated (except when foil applied)
Metal Roof :	Assumed sealed / unventilated
Energy Star Paint Used:	Broken White (Absorbance: 0.187)

The initial results indicate that the performance of the Energy Star paint is most effective on a tiled roof where climate zones have a nil or very minimal heating load.

The data also demonstrates that this particular paint colour selection slightly increases the heating load when compared to a medium colour paint applied to the roof.

The results for the simulations have been grouped together based on Climate Zones defined in the Building Code of Australia (BCA).

BCA Climate Zone 1

AccuRate Climate Zone: 5 Townsville (4810)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	7.4	329.6	337.0	0.5
Metal Roof Foil Only	1.7	196.6	198.3	3.6
Metal Roof Energy Star Paint	9.6	191.8	201.5	3.4
Tiled Roof No Roof Insulation	7.2	298.5	305.7	1.1
Tiled Roof Foil Only	2.8	188.5	191.3	3.8
Tiled Roof Energy Star Paint	9.0	182.3	191.2	3.8
Equivalent Total Load requirements: 153MJ/m ² = 5-Stars, 127MJ/m ² = 6-Stars, 103MJ/m ² = 7-Stars				

AccuRate Climate Zone: 29 Weipa (4874)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	0.0	811.7	811.8	0.6
Metal Roof Foil Only	0.0	526.9	526.9	2.9
Metal Roof Energy Star Paint	0.0	539.4	529.4	2.7
Tiled Roof No Roof Insulation	0.0	758.8	758.8	0.9
Tiled Roof Foil Only	0.0	521.2	521.2	2.9
Tiled Roof Energy Star Paint	0.0	523.2	523.1	2.9
Equivalent Total Load requirements: 384MJ/m ² = 5-Stars, 326MJ/m ² = 6-Stars, 266MJ/m ² = 7-Stars				

AccuRate Climate Zone: 31 Willis Island (4876)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	0.0	399.1	399.2	0.9
Metal Roof Foil Only	0.0	254.6	254.6	3.6
Metal Roof Energy Star Paint	0.0	253.6	253.6	3.7
Tiled Roof No Roof Insulation	0.0	369.5	369.5	1.3
Tiled Roof Foil Only	0.0	247.1	247.1	3.9
Tiled Roof Energy Star Paint	0.0	244.8	244.8	3.9
Equivalent Total Load requirements: 207MJ/m ² = 5-Stars, 176MJ/m ² = 6-Stars, 146MJ/m ² = 7-Stars				

AccuRate Climate Zone: 32 Cairns (4870)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	0.7	331.2	331.9	0.0
Metal Roof Foil Only	0.2	193.9	194.0	3.6
Metal Roof Energy Star Paint	1.0	194.2	195.2	3.6
Tiled Roof No Roof Insulation	0.7	299.2	300.0	1.0
Tiled Roof Foil Only	0.3	188.2	188.4	3.8
Tiled Roof Energy Star Paint	0.9	187.1	188.0	3.8
Equivalent Total Load requirements: 153MJ/m ² = 5-Stars, 128MJ/m ² = 6-Stars, 105MJ/m ² = 7-Stars				

BCA Climate Zone 2

AccuRate Climate Zone: 7 Rockhampton (4700)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	31.7	337.2	368.9	0.0
Metal Roof Foil Only	11.8	173.0	184.6	2.7
Metal Roof Energy Star Paint	40.0	175.6	215.5	2.1
Tiled Roof No Roof Insulation	31.4	299.6	335.9	0.6
Tiled Roof Foil Only	16.7	168.9	185.6	2.7
Tiled Roof Energy Star Paint	38.5	167.3	205.8	2.3
Equivalent Total Load requirements: 110MJ/m ² = 5-Stars, 90MJ/m ² = 6-Stars, 90MJ/m ² = 7-Stars				

AccuRate Climate Zone: 9 Amberly (4306)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	114.8	274.0	388.8	0.6
Metal Roof Foil Only	61.6	125.2	186.7	2.5
Metal Roof Energy Star Paint	135.7	131.1	266.8	1.6
Tiled Roof No Roof Insulation	115.9	241.6	357.4	0.8
Tiled Roof Foil Only	79.9	122.5	202.4	2.3
Tiled Roof Energy Star Paint	134.2	123.3	257.5	1.7
Equivalent Total Load requirements: 85MJ/m ² = 5-Stars, 67MJ/m ² = 6-Stars, 52MJ/m ² = 7-Stars				

AccuRate Climate Zone: 10 Brisbane (4000)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	84.2	126.6	210.9	0.9
Metal Roof Foil Only	45.9	56.8	102.7	2.8
Metal Roof Energy Star Paint	98.0	55.3	153.4	1.7
Tiled Roof No Roof Insulation	83.7	109.8	193.5	1.1
Tiled Roof Foil Only	57.6	54.4	112.0	2.6
Tiled Roof Energy Star Paint	96.0	53.2	149.2	1.7
Equivalent Total Load requirements: 55MJ/m ² = 5-Stars, 43MJ/m ² = 6-Stars, 34MJ/m ² = 7-Stars				

AccuRate Climate Zone: 35 Mackay(4740)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	9.9	292.0	301.9	0.0
Metal Roof Foil Only	3.6	157.1	160.7	3.1
Metal Roof Energy Star Paint	12.6	157.4	169.9	2.9
Tiled Roof No Roof Insulation	9.9	264.7	274.6	0.5
Tiled Roof Foil Only	5.5	151.2	156.7	3.3
Tiled Roof Energy Star Paint	12.3	147.7	160.0	3.2
Equivalent Total Load requirements: 112MJ/m ² = 5-Stars, 92MJ/m ² = 6-Stars, 75MJ/m ² = 7-Stars				

AccuRate Climate Zone: 36 Gladstone (4680)	Heating MJ/m²	Cooling MJ/m²	Total MJ/m²	Star
Metal Roof No Roof Insulation	14.8	205.3	220.1	0.0
Metal Roof Foil Only	5.9	101.9	107.8	3.2
Metal Roof Energy Star Paint	19.1	103.2	122.3	2.7
Tiled Roof No Roof Insulation	15.0	178.4	193.4	0.9
Tiled Roof Foil Only	8.8	97.7	106.5	3.3
Tiled Roof Energy Star Paint	18.8	96.9	115.6	2.9

Equivalent Total Load requirements: $73\text{MJ/m}^2 = 5\text{-Stars}$, $59\text{MJ/m}^2 = 6\text{-Stars}$, $48\text{MJ/m}^2 = 7\text{-Stars}$