Colour Classification in Accordance with the BCA and BASIX

Light coloured (low solar absorptance) roofing and wall materials remain cooler than darker coloured (high solar absorptance) materials. The cooler temperature has many benefits including the ability to reduce the energy costs for cooling a building. In order to recognise the cooling benefit of lower solar absorptance roofs and walls building regulations have incorporated absorptance as an energy efficiency design parameter.

Lower solar absorptance materials typically qualify for a roof space and or insulation concession under the BCA and or BASIX. Alternatively, absorptance values are input to BCA (Building Code of Australia), Compliant Building Verification software, such as, Accurate, and Energy Plus during energy efficiency compliance work.

As a result of their low absorbtivity, insulation, roof space, glazing and or shading concessions are achieved resulting in reduced cost to construction. Moreover, the long term benefit to the building owner, of greatly reduced cooling loads and energy consumption.

In some parts of Australia reduced absorptance means real savings in the amount of insulation that is required to meet building regulations.

Example: Under deemed-to-satisfy rules.

- Medium to light under BASIX. Reflective foil at roof is not required.
- Light colours under BCA. Drop of R0.5 for roof insulation.
- Very light colours under BCA. Drop of up to R1.0 for roof insulation.

Example: Under BCA alternate solution.

- In some climate zones, insulation to internal walls on tilt up concrete. Not required

Colour Classification in Accordance with the BCA

The Building Code of Australia (BCA) has classified colour as light, medium and dark on the basis of their solar absorptance.

Light colour SA – < 0.35 **Medium colour** SA – 0.35 – 0.55 **Dark colour** SA - > 0.5

Colour Classification in Accordance with the New South Wales BASIX

The New South Wales Building and Sustainability Index (BASIX) has also classified colour into light medium and dark on the basis of their solar absorptance.

Light colour SA – < 0.475 **Medium colour** SA – 0.475 – 0.7 **Dark colour** SA - > 0.7

Roof Colour or Solar Absorptance

The colour of the roof has an impact on the temperature of the roof space and the temperature inside the dwelling even with roof and/or ceiling insulation. The colour range is defined by solar absorptance (Abs) which is a measure of the amount of heat transferred through the roof.

A colour with the lowest absorptance value will reflect more heat and will keep the roof space and dwelling cooler on a hot day

How to accurately compare and optimize the thermal performance of the same colour from different suppliers.

Most people simply use the L, M or D symbols provided by manufacturers to determine the performance of the colour. However, these symbols do not accurately define the products absolute thermal performance.

It is only direct comparison of the solar absorbance values stated for two identical colours that truly defines the difference in their thermal performance.

When comparing the absorptance value of the same colours, the colour with the lowest value will provide a cooler surface for the same given colour.

The chart below compares Energy Star to factory finished metal in four identical colours and demonstrates that based on absorptance values Energy Star is the clear leader in thermal performance.

Table 1

Colour	Solar Absorptance	BCA Classification	BASIX Classification
ES C/B Slate Grey	0.597	D	M
CB Woodland Grey (new CB offset colour)	0.710	D	D
For the same colour Energy Star is Cooler	**16%**		
ES Merino	0.317	L	L
CB Paperbark (new CB offset colour)	0.420	M	L
For the same colour Energy Star is Cooler	**24%**		
ES C/B Rivergum	0.555	D	M
CB Widerness (new CB offset colour)	0.650	D	M
For the same colour Energy Star is Cooler	**15%**		
ES C/B Birch Grey	0.379	M	L
CB Dune (new CB offset colour)	0.470	M	L
For the same colour Energy Star is Cooler	**19%**		

Table 1 above shows that the absorptance values for Energy Star colours are between 15 % and 24% percent lower. These reduced absorptance values of Energy Star will translate into a significantly lower temperatures for the same colour.

Based on data obtained from test method ASTM E-1980-01, the following chart demonstrates the temperature reductions that will be achieved through selecting an Energy Star product of the same colour.

Table 2 *Data is based on a 37 deg C day with low wind conditions.*

Colour	Solar Absorptance	ASTM E 1980-01 Temp / Deg C
ES C/B Slate Grey	0.597	79
CB Woodland Grey	0.710	87
Temperature reduction for the same colour		**8 deg C**
ES Merino	0.317	58
CB Paperbark	0.420	66
Temperature reduction for the same colour		**8 deg C**
ES C/B Rivergum	0.555	76
CB Wilderness	0.650	83
Temperature reduction for the same colour		**7 deg C**
ES C/B Birch Grey	0.379	63
CB Dune	0.470	70
Temperature reduction for the same colour		**7 deg C**

Fact**: a 1ºC drop in temperature can provide a 10% power saving, and as such a considerable overall power savings for a property.* ***Macquarie University webpage Energy and Emissions – Sustainability

***Fact**: Research indicates that reducing the upper surface solar absorptance of 1m2 of a roofs area by 0.25 is equivalent to removing a one off amount of 64 kg of CO2 emissions from the atmosphere for the life of the roof. 14,080 kg / 220 m2 roof.* ***Department of climate change discussion paper**.*

Colour Classification in Accordance with the BCA and BASIX

Last updated 15/12/11

Energy Star Colour	Solar Absorptance	BCA Classification	BASIX Classification
8068 C/B Heritage Red	0.625	D	M
8069 Red Iron Oxide	0.610	D	M
8070Terracotta	0.576	D	M
8071 Clay Tone	0.533	M	M
8072 Warm Clay	0.405	M	L
8073 Tuscany	0.340	L	L
8074 C/B Ironbark	0.591	D	M
8075 Pioneer	0.712	D	D
8076 Regal Brown	0.614	D	M
8077 Yallara Brown	0.629	D	M
8078 C/B Weathered Copper	0.609	D	M
8079 Charcoal	0.673	D	M
8080 C/B Slate Grey	0.597	D	M
8082 Nimbus	0.646	D	M
8083 C/B Beige	0.457	M	L
8084 Merino	0.317	L	L
8085 Off White	0.253	L	L
8086 Sandalwood	0.233	L	L
8087 C/B Smooth Cream	0.215	L	L
8088 Mocca	0.425	M	L
8089 Stone	0.312	L	L
8098 Carraige Green	0.755	D	D
8099Bruns Green	0.741	D	D
8100 Mist Green	0.561	D	M
8101 C/B Rivergum	0.555	D	M
8102 Olive Green	0.607	D	M
8103 Blue Grass	0.641	D	M
8104 Botanic	0.722	D	D
8105 French Green	0.462	M	L
8108 C/B Mountain Blue	0.746	D	D
8081 C/B Birch Grey	0.379	M	L
8094 Quarry	0.403	M	L
8095 Mid Biscuit	0.306	L	L
8097 Light Latte	0.292	L	L
8106 C/B Saltbush	0.443	M	L
8107 Cobalt	0.663	D	M
8110 Pewter	0.394	M	L
8111 Autumn	0.392	M	L
8112 Chino	0.395	M	L
8091 Broken White	0.188	L	L
8092 Neutral White	0.216	L	L
8093 Pale Buscuit	0.247	L	L
8096 Light Cream	0.214	L	L
8109 Gull Grey	0.318	L	L