

BUILDING MATERIALS, THERMAL EFFICIENCY & REFLECTIVITY



Material selection and use of materials require prudent planning. While reflective building materials mainly benefit its occupants, it could also cause some displeasure to immediate neighbours.

The challenge, therefore, is to develop a well-rounded understanding of requirements from occupants, neighbours and the environment in order to obtain a balanced material choice list.

A BRIEF ON ENERGY EFFICIENT BUILDING DESIGNS - BY CHOICE OF APPROPRIATE MATERIALS



Regulation on Daylight Reflectance of Materials Used On Exterior of Buildings

In the case of materials being applied on the roof of the building, the roof, inclined at an angle of not exceeding 20 degrees from the horizontal plane of the building has a specular reflectance not exceeding 10%.

In the case of materials being applied on the roof of the building, the roof, inclined at an angle of more than 20 degrees from the horizontal plane, of the building has a daylight reflectance not exceeding 20% and a specular reflectance not exceeding 10%.

For more information on BLUESCOPE [COLORBOND®](#) colours and corresponding specular and daylight reflectance please send inquiries to lysaght.singapore@bluescope.com.

To read more on the regulation, please download the Circular from BCA Singapore [HERE](#).



Thermal Efficiency

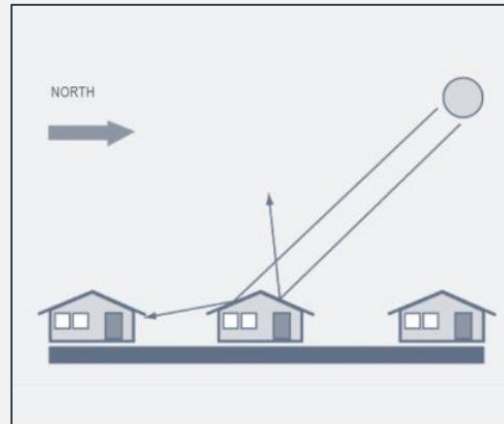
In general, the use of materials which are high in solar reflectivity will result in a building with greater thermal efficiency. With the roof being the most prominent element of a building that is constantly subjected to solar exposure, choice of roof material, therefore, plays a crucial part in energy-efficient building design.

During hot sunny weather, the temperature of a light-coloured roof can be up to **35°C cooler** than a dark coloured roof.

In Singapore's warm climate, the choice of light colours for roofs can translate into energy savings and improved thermal comfort for no additional cost. Outdoor exposure testing has shown that heat reflective properties of [COLORBOND®](#) steel and [COLORBOND®](#) steel Matt Series, both with [THERMATECH®](#) solar reflectance technology, are maintained. In addition, on hot summer nights a steel roof radiates less heat into your home due to steel's low thermal mass. This enables our [LYSAGHT®](#) roof to cool down fast once the sun has set.

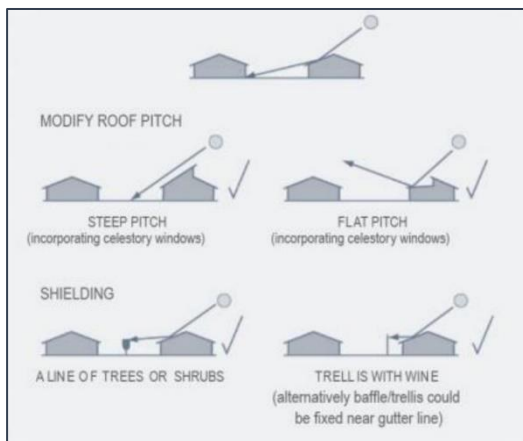
Assessing Building Orientation

A simple sketch of the house in relation to the typical position of the sun and the position of any neighbouring dwellings can be a great help in determining whether any neighbours could be affected by directly reflected sunlight. Other considerations will include roof pitch and site topography.



Possible Use of Trees and Vegetation

Any vegetation or screens that are present that could be used to shield glare from the roof should be considered.



Choice of Colour and Finish

Choosing darker colours over a lighter colour can reduce the brightness of material, however, may not have the desired effect of reducing glare. More often than not, directly reflected sunlight often causes problem glare.

Choice of colours therefore has a much smaller secondary impact on direct reflection. [COLORBOND®](#) steel colours all have a standard finish while the [COLORBOND®](#) steel Matt colours have a matt finish - a preferred choice for more diffused reflection.



Environmental Benefits

Light coloured roofs may offer benefits to the environment through good thermal efficiency by reducing energy use and greenhouse gas emissions due to lesser energy used in cooling down buildings. Light coloured roofs also help to mitigate Urban Heat Islands (UHI) effects as the choice of dark building materials in built-up areas contributes to increased local temperatures.

Increased temperature from UHI, especially in Singapore's tropical climate, can affect a community's quality of life.

Conclusion

Reflectivity limits can restrict the opportunity to use thermally efficient light colours. Benefits such as reduced energy use, reduced greenhouse gas emissions and mitigation of UHI should therefore be considered.

Given the benefits of choosing solar reflective building material and the various effective ways to manage glare issues, it is recommended that building owners should be encouraged in their use, rather than discouraged.

ASK LYSAGHT!
If you have any questions, please email us at
lysaght.singapore@bluescope.com



LYSAGHT IS BIM READY!

Click [here](#) to visit our BIM Library for all BIM objects that are available for download.

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