



Reflectivity and New Building Design

In response to your recent enquiry BlueScope Steel sets out below some general information regarding the issue of glare and BlueScope Steel's building materials. You may wish to use this information in your interactions with your local council and other interested parties.

Please note that the information provided is general in nature and may not be appropriate to your individual situation. This information sheet does not constitute professional advice. We recommend that you seek professional advice if you have particular issues of concern.

What is glare?

Glare from buildings can result from the reflection of sunlight from any surface. New glossy surfaces are particularly prone to glare, including steel roofs, glazed terracotta tiles and concrete tiles. The degree of glare observed will depend, amongst other things, on the age and type of material used, its location, surrounding environment, position and gradient. The particular time of day and year also affect glare due to the constantly changing position of the sun.

Reflectivity numbers

Given the above factors, BlueScope Steel has no published data on reflectivity values of COLORBOND® steel or products manufactured from COLORBOND® steel that can sensibly be used on their own to ascertain the likelihood of glare from a potential building application. Simple individual assessments, such as recommended below, in our opinion offer a practical case-by-case solution.

Councils' policy considerations

Some local councils have introduced policies that concern reflectivity. The primary objectives of those policies appear to relate to controlling blending or glare. While these objectives in themselves are admirable, the application and outcome of these policies are often misunderstood and have been found to have numerous detrimental consequences.

Policies aimed at controlling blending

One objective of policies aimed at controlling blending is to restrict a homeowner's colour choice, with a view to encouraging a particular colour scheme within an area. This may be directed at achieving a perceived harmony between buildings and the surrounding environment or to minimise contrast.

Whilst we understand that there may be genuine aesthetic reasons for putting in place such a policy, such policies tend to differentially treat building materials. Such a policy may in practice also restrict colour choice to only dark materials. This consequence is at odds with good environmental policy, as discussed below.

Policies aimed at controlling glare

These policies are generally aimed at protecting views of importance and/or neighbourhood amenity. Problems can arise with these types of policies as they are typically:

- one-dimensional based on total reflectivity and ignoring the mirror-like properties of the building material,
- in the form of a blanket policy and are applied in cases where glare is of no concern, and
- drafted in such a way as to encourage the use of darker materials, which is at odds with good environmental policy.



General considerations

To reduce the negative consequences of the above types of policies, local councils should consider the following:

- Policies should not specify a specific material or brand. Rather than singling out a particular material or manufacturer, Councils should aim to establish performance-based policies.
- Arbitrary reflectivity limits should not be imposed on homeowners and builders. The limits do not take into consideration all significant variables that contribute to glare. Reflectivity limits are also inappropriate where they do not include reference to standards or other methods to demonstrate compliance..
- Consumer choice should not be restricted arbitrarily. Restricting choice to dark colours also contradicts National and State energy efficiency initiatives that encourage the use of light coloured roofs.
- Clear and accurate definitions regarding reflectivity should be adopted. It is inaccurate for council policy to refer to certain materials as “non-reflective” as all materials reflect light, even matte black surfaces.

Recommendation to council

Where control of glare is deemed appropriate, assessment should be considered on a case-by-case basis.

Most reflectivity policies are drafted in the form of a blanket statement (such as “the product used shall have a reflectivity not greater than X%”). This type of policy limits the ability to use building materials in the majority of cases where glare is not relevant. To take advantage of the significant thermal and environmental benefits of light coloured material, glare should be considered on a case-by-case basis and certain materials not excluded under a blanket exception.

When assessing whether a particular structure or roof should be allowed, consideration should be given, amongst other things to the local surroundings and environment (such as vegetation, aspect and surrounding structures) and the configuration, location and aspect of the structure. In many cases the assessment will be straightforward, as the roof will not be easily seen.

Where the roof can be seen then consideration of the mirrored reflection from the roof can quickly identify potential problems. Modelling has shown that the main potential position of concern is a viewing position located to the south and above a roof.

Gloss and glare in context

Problem glare is known to be associated with mirrored sunlight from new glossy surfaces. The mirror-like properties of glare mean that it will only ever occur in a particular position at a particular time of the day and only for a particular time of the year due to the constantly changing position of the sun.

An important point to note is that all new roofing materials (steel, concrete tiles, glazed terracotta tiles) have a glossier surface when first installed.

Over time the surface dulls, reducing the resulting glare. This means that once experienced in the year, the mirrored reflection will return in a year’s time. However, at that time the building material will have also aged a year, losing gloss and subsequently reducing the amount of glare.

Colour choice and the environment

One outcome of most reflectivity policy is that they encourage dark roofing material. This is not in line with a good environmental policy and the growing need to reduce greenhouse gas emissions.



Light coloured roofs can be 30°C cooler on the surface than dark coloured roofs. This can result in numerous benefits to the building owner and the environment. Some of the benefits of light coloured roofing include:

- Improved energy efficiency and thermal comfort. The Building Code of Australia now has insulation concessions to encourage the use of light coloured roofs on the basis of energy savings.
- Minimised peak summer energy loads and improved summertime insulation. Most Australian cities are struggling to meet peak summer electrical loads. Light coloured roofs have been part of Florida's program to curb spiralling summertime electrical demand. BASIX NSW encourages light coloured roofs for this reason.
- Reduced urban heat islands caused from dark materials warming local air temperatures. Lower local air temperatures can reduce summer energy loads on all buildings and the potential for smog.
- Improved roof lifespan due to less thermal stress. Reduced thermal stress improves roof durability through reduced temperatures and by causing less thermal movement resulting in less chance of air or moisture leaks.
- Cost and energy savings for the household.

Summary

It is clear that where a reflectivity policy exists, a balance must be met between its intent and the environmental benefits of light colours.

Reflectivity is a complex and subjective issue. Whilst the intent of the policy may be well intentioned, it must be balanced against the benefits that light coloured roofing offers. National and state regulations encourage the use of light coloured materials, due to their environmental benefits. Therefore good environmental local government policy should also encourage their use rather than eliminate them as a choice. Case-by-case assessment may be a way of balancing these concerns.

BlueScope Steel trusts that this information assists you in your dealings with council and other interested parties.

Thank you for using BlueScope Steel products and we wish you well in achieving a successful outcome.



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