COLORSTEEL®

COLORSTEEL® & Reflectivity

LIGHT REFLECTANCE & SOLAR REFLECTANCE

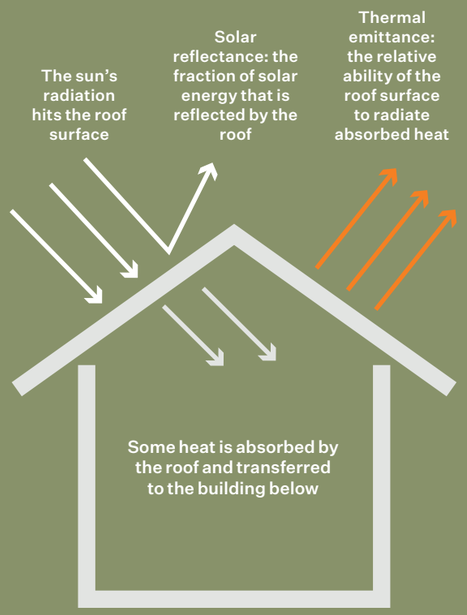
A reflection of our exacting standards

There are two measures of light or solar reflectance that, on the surface, appear to refer to the very same thing. On closer inspection, however, it's clear they are used for quite different purposes.

Total Solar Reflectance (TSR) measures the amount of solar energy across the entire spectrum that is reflected away from an object. This correlates closely to the temperature that the object will reach on a hot summer's day.

Light Reflectance Value (LRV) on the other hand, focuses solely on the total quantity of visible light that, when illuminated by a light source, is reflected by a surface in all directions and at all wavelengths. LRV runs on a scale from 0% (absolute black) to 100% (perfectly reflective white), with all other colours fitting within these extremes. With LRV of 0%, black absorbs all light. Pure white, conversely, has a light reflectance of 100% and absorbs no light. LRV is an indicator of how the human eye sees a colour and of that colour's brightness.

It's possible, therefore, to have colours that look the same and have the same or similar Light Reflectance Values, but which reach quite different temperatures in the sun. Equally, you could have two colours where one appears darker than the other, but both reach the same temperature when exposed to the sun.



The power of infrared reflectance technology

To determine the TSR of COLORSTEEL® colours, research laboratories exposed a sample of each colour to a full range of wavelengths between 250nm and 2500nm and then measured the reflectance at each 0.5nm step.

To obtain the LRV of pre-painted steel colours, a full range of wavelengths, between 400nm and 800nm, was measured with a spectrophotometer.

This data was used to develop a range of pigments that reflect a larger proportion of the sun's energy in the near-infrared region.

This cutting-edge infrared technology was then incorporated into COLORSTEEL® paint systems to deliver durability and measurable energy savings in both domestic and commercial situations[1].

IR technology now enables popular COLORSTEEL® colours such as Karaka and Ironsand to remain visually identical, while providing a cooler roof surface on hot summer days.

Cost-effective in summer

In summer, when the sun is at its most intense for greatly increased periods, extreme levels of solar energy land on a roof. Depending on the nature of the structure, this can produce a high level of heat within the building itself. This, in turn, often requires the near constant use of power-hungry electric cooling systems.

The IR technology present in COLORSTEEL® enables a reduction in roof temperature, particularly in darker colours. This can moderate the temperature of the internal environment and reduce required cooling costs when compared to roofing materials of a similar colour with low solar reflectance[2].

Of course, depth of colour has a major impact on a roof's heat levels. Specifying lighter colours undeniably reduces temperatures. However, building design and appropriate insulation can also affect this.

The Metal Roofing Manufacturers' (MRM) Code of Practice provides the following approximate temperatures that a lightweight metal roof can be expected to reach on a hot summer's day in New Zealand.

COLOUR DEPTH / INSULATION	DEGREES CELSIUS
Insulated dark colour	80°
Insulated light colour	60°
Uninsulated dark colour	65°
Uninsulated light colour	50°

In areas where aesthetic preference or local regulations dictate a darker colour, the use of COLORSTEEL® with IR reflectance can successfully lower roof temperatures by up to 8 degrees Celsius, depending on the colour.

Temperature-neutral in winter

In New Zealand's winter months, with the sun lower in the sky, greater cloud cover and shorter daylight hours, the effect of IR reflectance technology is reduced. Providing suitable design features (particularly around insulation) are in place, internal heat retention should not be an issue.

With an eye on the environment

Reduced LRV values may also prove helpful when meeting local authority guidelines in relation to the reflectivity of roofing and cladding materials. These restrictions are generally applied to coastal locations or other visually attractive or significant landmarks, with the aim of preserving the natural amenity and character of the area. In these instances, LRV will provide the best measure of visible reflectance.

Reflectance Measures of COLORSTEEL®

COLORSTEEL® COLOUR	TOTAL SOLAR REFLECTANCE* %	LIGHT REFLECTANCE VALUE* %
CLOUD	69	74
EBONY	5	5
EBONY LOW GLOSS	5	5
FLAXPOD®	21	7
FLAXPOD® LOW GLOSS	22	7
FLAXPOD® MATTE	20	6
GREY FRIARS	26	10
GREY FRIARS LOW GLOSS	27	11
GULL GREY	57	51
IRONSAND	25	8
IRONSAND LOW GLOSS	25	8
KARAKA	24	8
LICHEN	42	28
MIST GREEN	39	25
NEW DENIM BLUE	24	11
PERMANENT GREEN	25	10
PIONEER RED	35	12
SANDBAR™	48	34
SANDSCAPE®	66	66
SANDSTONE GREY	41	27
SANDSTONE GREY LOW GLOSS	42	27
SCORIA	30	10
SLATE	25	9
STONEPEAK™ MATTE	53	48
THUNDER GREY	29	12
TIDALDRIFT® MATTE	29	13
TITANIA	66	68
TUITUFT®	66	68
WINDSOR GREY LOW GLOSS	20	7

[1] Due to their pigment composition, Ebony and FlaxPod® cannot be produced with solar reflectance technology. Figures are also available for Non-Standard Colours. Please contact **info@colorsteel.co.nz** for more information.

[2] Results depend on level of insulation, building shape and function.

* The TSR and LRV percentages listed above are accurate at the time of printing. Please note that these values are subject to a tolerance of ±5%. Factors such as production tolerances, natural weathering and environmental conditions may impact the quoted TSR and LRV values. For the most up-to-date values, we recommend referring to our website, where any revisions or updates will be reflected. It is important to verify the current values prior to making any decisions or selections based on these metrics.

MADE LOCAL

MADE FOR YOU

MADE TO PROTECT

UP TO 50 YR WARRANTY

ENSURE IT'S GENUINE

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New Zealand Steel