

Ever thought a house or building would look great painted in a sleek, dark colour – then had to shelve plans for fear of the heat damaging the substrate or the building getting unbearably hot in summer?

Resene CoolColour™ technology makes painting exterior surfaces in dark colours both easier and safer. It can be used on all sorts of exterior materials and applications, from weatherboards and concrete to windowsills. A Resene CoolColour looks like a normal colour but thanks to special pigment technology it reflects more heat, so it doesn't get as hot as a standard colour would.

When looking at the role paint can play in temperature control in buildings it comes down to colour. The ability of white to reflect visible light extends through the infra-red and, because of this, white surfaces remain relatively cool to touch, even in direct sunlight. The opposite is true of black and dark colours, which absorb light in this infra-red area, resulting in significant heat build-up in the surface. As the emissivity of paints is not particularly good, the surface heat is conducted into the substrate and then radiated into the building.



Adidas Head Office, Resene Sonyx 101 CoolColour™ custom tinted to Adidas Black.



Tasman residence, Resene Waterborne Woodsman CoolColour™ tinted to Resene Pitch Black.



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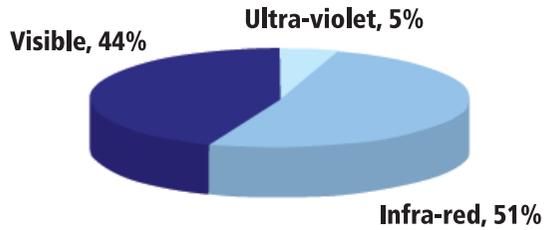
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Keep your place
cooler with a
Resene CoolColour™

Resene
the paint the professionals use

Energy distribution of sunlight

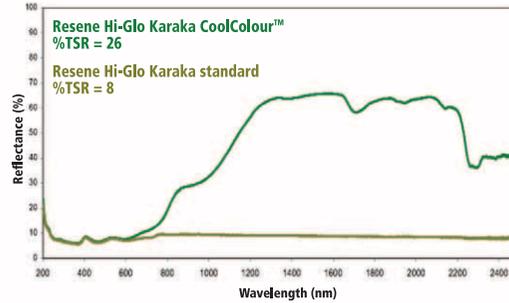


Sunlight energy is made up of 44% visible light, 5% ultra-violet light and 51% infra-red light.

Traditionally light reflectance values have been used to define what colours are suitable for heat prone substrates, however visible light reflectance values only measure a proportion of the light and ignore the effects of ultra-violet and infra-red light. Total Solar Reflectance (TSR) values take into account all three forms of light to give a better measure of the reflectance of the colour. A Resene CoolColour™ uses pigments that reflect more of the sun's energy resulting in the same visible light reflectance value as the standard colour but a considerably higher Total Solar Reflectance value.

The solar spectrum includes infra-red radiation that Resene CoolColour pigments are designed to reflect. Replacing the standard black pigment that absorbs all infra-red with a Resene CoolColour black pigment reduces the heat absorption. Some blues, greens and reds are transparent to infra-red radiation so are best used with a Resene Quick Dry or Resene Galvo-Prime to reflect infra-red that passes through these hues.

Reflectance spectral curves for Resene Karaka CoolColour™ versus Resene Karaka



In terms of technology, the Resene CoolColour effect can also be seen in plants. Most plants have leaves of a very high chroma green. If those leaves reached the same temperature when exposed to solar radiation as those of a similarly coloured paint they would shrivel and die. The fact they don't is because that pigment - chlorophyll - absorbs what it needs from the visible range to photosynthesise but reflects the infra-red range, keeping the plant cool.

Over the past decades, there have been vigorous efforts to create heat resistant pigments in the ceramics industry, as most tints break down at the very high temperatures under which ceramics are fired. Novel ways were discovered of doping refractory metal oxides of titanium, zirconium, chromium, and so on, with other metal ions to produce a wide selection of high temperature colours. The behaviour of these mixed oxides were examined under infra-red and the results showed an ability to withstand a range of very high temperatures. Focusing on this aspect, further refinements were made to maximise this for use in various commercial applications.

Using these findings Resene took the very popular roofing colour Karaka and incorporated into it these new infra-red reflecting pigments. Comparing the new blend against traditional coatings over a five minute standard Resene test revealed a 12°C drop in temperature. The 12°C difference can make a tremendous difference to the stresses exerted on the substrate and can have a telling effect on its stability and heat gain.

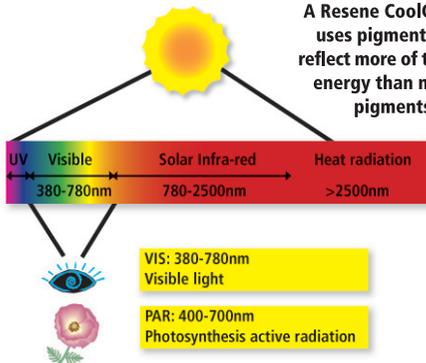
When it comes to roofs, having a darker shade in winter will not make much difference to how hot your roof – and home or building will get – as when it is cold they will be cold too, however in summer it will make a difference as to how hot your home or building will get by reflecting heat away from the building.

First developed for high gloss roof coatings, Resene CoolColour technology is now available in a range of paints and stains. These include Resene Lumbersider waterborne low sheen, Resene Sonyx 101 waterborne semi-gloss, Resene Hi-Glo waterborne gloss, Resene Summit Roof waterborne satin, Resene Enamacryl waterborne gloss enamel, Resene Lustacryl semi-gloss waterborne enamel, Resene SpaceCote Flat waterborne enamel, Resene X-200 waterproofing membrane, Resene AquaShield mineral effect, Resene Waterborne Sidewalk paving paint and Resene Waterborne Woodsman wood stain.

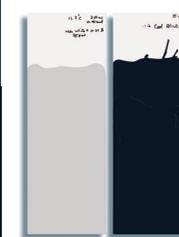
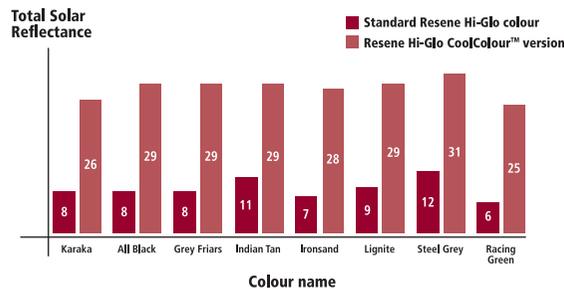
Resene CoolColour technology works best in dark shades most prone to heat build-up, including popular colours such as Resene Nero, Resene Karaka and Resene Napa. A wide range of Resene CoolColour hues are now available – see colours marked with a CC on Resene colour charts or view the list on the Resene website in the Resene colour library. Check with your Resene ColorShop or representative to see if a Resene CoolColour is right for your project.



A Resene CoolColour™ uses pigments that reflect more of the sun's energy than normal pigments.



Total Solar Reflectance for Resene Hi-Glo CoolColour™ versus standard colours



Although it may be hard to believe, these two colours behave the same in test procedures. The test procedure involves fixing thermocouples onto the backs of these panels (ensuring a good thermal contact); shining an infra-red light onto the painted side of the panels and plotting the temperature rise of the panels on the thermocouples.

The grey panel is a standard coating. The black panel uses Resene CoolColour pigments. The black Resene CoolColour panel has the same infra-red (heat) absorption as the standard paint finish on the grey panel, demonstrating the reflective benefits of Resene CoolColour technology.