Cool Roof Commercial..*heat reflective white*

Dulux®
Acra·Tex®

COOL ROOF™
With InfraCOOL® Technology

Cool Roof Commercial White from Dulux®

Reflects more of the Sun's radiation and can improve the cooling efficiency of existing buildings.

Total Solar Reflection (TSR)
Approximately 50% of the Sun's total light energy is invisible infrared. InfraCOOL® maximises reflection of infrared radiation to keep surfaces cooler.

Reflect Heat BEFORE
it can be absorbed.
By reflecting heat in the first instance surfaces don't super-heat and capture the heat load. Insulation is important but acts AFTER heat is absorbed.

COOL Roofs
Due to their large surface area and angle of exposure, Roof Surfaces can capture large amounts of the Sun's energy and COOL ROOFS can offer cooling & energy efficiency benefits.

COOL Roof Commercial
Dulux COOL ROOF Commercial White reflects up to 90% of the Sun's total light energy maximises reflection of both visible (colour) and invisible (infrared) providing maximum roof surface cooling efficiency.

The need for Cool Roofs

Roofs represent 20-25% of Urban Surfaces

" Cool Roofs.... can offset 24 billion tonnes of CO^2 "

" The offset provided by cooling urban surfaces affords us a significant delay in climate change "

Lawrence Berkeley National Laboratory Heat Island Group - White Roofs Cool the World 2008.

Roofs are Solar Radiators

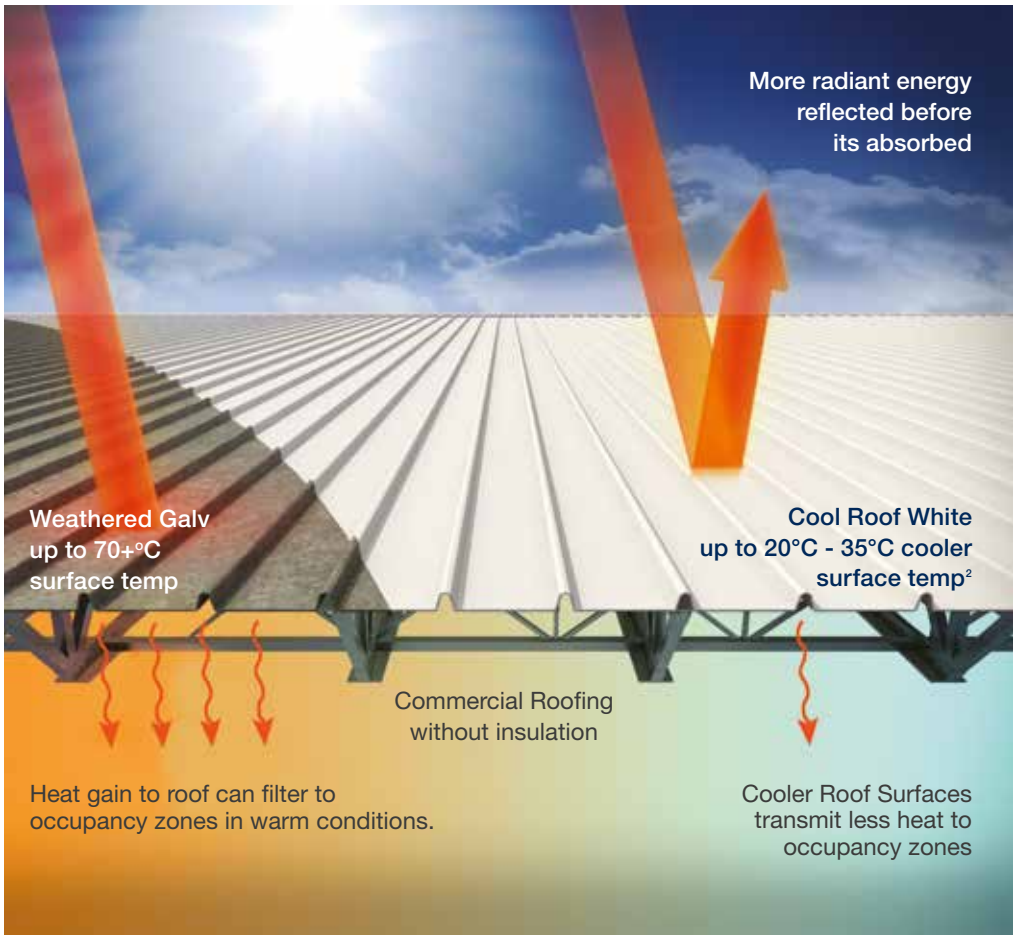
So much of the built environment includes large areas of roof space which absorb the Sun's radiation to act as solar radiators.

It makes sense...

... to design a barrier that combats the specific Heat Source - and that means reflecting the Sun's rays BEFORE they're absorbed and converted as heat.

Reflects Radiation Lessens Heat[A] | Can Help Reduce Cooling Costs[B] | Can Improve Occupancy Comfort[C] | Can Lower Carbon Footprint in warm climates[D]

The benefits of Dulux® Cool Roof Commercial White



A. Reflects Radiation, Lessens Heat

Weathered Galv/Zincalume and Dark Coloured roofs often absorb large amounts of solar radiation which can in-turn transmit heat into occupancy zones. Cool Roofs reflect light energy in the first instance - before heat is absorbed, meaning insulation & cooling efficiencies are maximised.

B. Can Help Reduce Cooling Costs

Less Heat penetration can lower cooling energy demand. Comparative Studies identify significant cooling energy savings are possible using Cool Roof Technology.[1]

C. Can Improve Occupancy Comfort

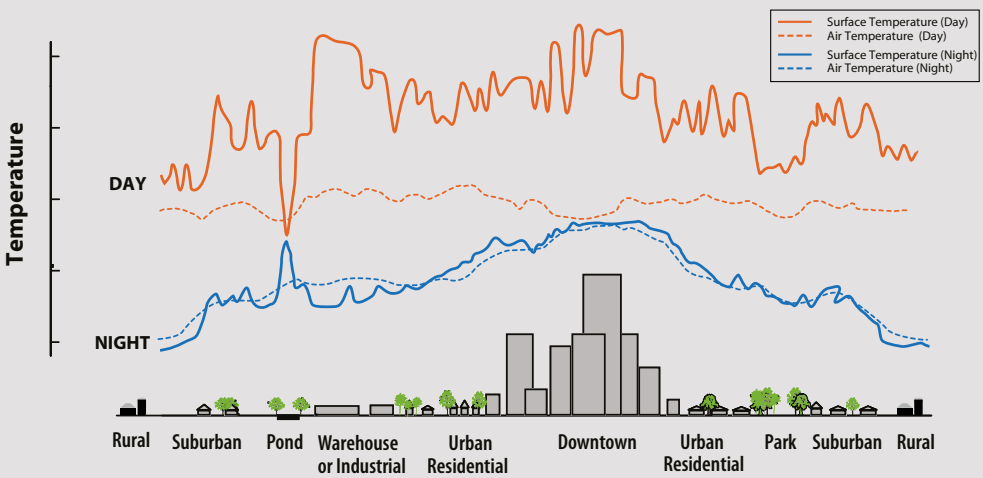
In non-air conditioned facilities such as workshops and warehousing, cool roofs can translate to cooler working and warehousing facilities.

D. Can Lower Carbon Footprint in warm climates

By lowering cooling energy demand, Cool Roofs have been identified as part of an effective mitigation strategy, to reduce global carbon emissions.

Urban Heat Island Effect

The term "urban heat island" describes built up areas (eg cities) that are hotter than nearby rural areas.



The annual mean air temperature of a city with 1 million people or more can be 1-3°C warmer than its surroundings.

In the evening, the difference can be as high as 12°C as the built environs' absorbed heat is released back as it cools.

Heat islands can affect communities in warm climates by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions.

COOL ROOF technology reduces HEAT ABSORPTION in the first instance, minimising the built environs stored heat energy and thus its ability to artificially increase surrounding air temperatures.

Studies in regions of the USA such as California and Florida (with similar climate patterns to parts of Australia) identify significant potential benefits that Cool Roofs may offer: • Energy Savings • Lower Peak Energy Demand • Improved Health & Comfort • Greenhouse Emission Reductions

Information & Graphic from US EPA: Reducing Urban Heat Island – Compendium of Strategies. Further data and information: Heat Island Group – Lawrence Berkeley National Laboratory, California.
[1] Significant cooling energy saving potential based on Dulux Case Study: Open Plan Retail Warehouse on like day cooling energy demand & Studies by Lawrence Berkeley Heat Island Group with comparable high solar reflectance (TSR), high emissivity, Cool Roof White as qualified by product TSR and Emissivity data. [2] 20-35°C cooler surface example based on typical Dulux Case Study results to Oct 2012. Winter heating offsets may apply. Cooling Energy Savings will be influenced by choice of colour, Building Design (including roof pitch, materials & window placement), Insulation & Ventilation, Occupancy Use, Shading, Location, Climate, Roof Pitch & ratio of exposed roof area to floor area.

Cool Roof Commercial Facts and Questions

Q. What is a Cool Roof?

A. "A cool roof reflects and emits the Sun's heat back to the sky instead of transferring it to the building below. 'Coolness' is measured by two properties, solar reflectance (TSR) and thermal emittance. Both properties are measured from 0 to 1 (or in % terms 0-100%) and the higher the value, the 'cooler' the roof."
Source : Cool Roof Rating Council, U.S.A.

In simple terms, a Cool Roof is one that reflects more sunlight to stay cooler. Light from the Sun that is not reflected is absorbed as heat which is how surfaces can heat well above daytime air temp.

Q. Why is there so much U.S. Cool Roof Data referenced?

A. The U.S. Department of Energy (DOE) began research into the benefits of cool roofs for energy savings and reducing the summer urban temperatures in the 1980s[3].

Increased urban density and focused research investment by the U.S. Govt. for the purpose of mitigation of Cooling Energy Demand and Heat Island Effects has lead the U.S. to adopt Cool Roof Standards[4] and why existing Models developed for U.S. climates are routinely referenced world wide.

In Australia Cool Roof development has to 2012 largely been initiated by industry with now some links to policy development through the Building Code of Australia[5] and Isolated State Initiatives[6].

Q. How much cooler is a Cool Roof?

A. In hot weather, Dulux has measured in actual case studies, roof surface temperature reductions in the range of 24-36°C matching like day conditions before and after coating on projects upgraded from weathered zinc coated metal roofing to Dulux Cool Roof White.

The degree of surface temperature reduction will vary depending on the colour and condition of the existing surface, site location, roof pitch and weather factors.

ASTME1980 Estimation Method

(ASTME1980) is commonly used to provide estimates based on actual measurements of surface Total Solar Refection (TSR) and Emissivity.

This methodology is useful as it assumes constants for weather conditions to provide direct comparisons of surface temperature under identical conditions.

ASTME1980 calculated surface temperature reductions comparing a weathered Galv Iron or Zincalume low slope roof in hot weather and medium wind with a roof coated in Dulux Cool Roof Commercial White is estimated between 20 and 40°C.

Dulux Case Studies

Actual Cases study reports are available at coolroofcommercial.com.au

Q. Can Cool Roofs reduce Cooling Costs?

A. The direct effect is lowering roof surface temp. which can reduce heat gain and reduce cooling demand.
"A cool roof transfers less heat to the building below, so the building stays cooler and more comfortable and uses less energy for cooling." Source: Reducing Urban Heat Islands: Compendium of Strategies - Cool Roofs

Factors to consider in valuing Cool Roofs:

Roof Surface area to Occupancy Area

Cool Roof benefits are more direct in single storey or low rise buildings due to the higher ratio of roof area to floor area.

Insulation & Ventilation

Insulation and ventilation are important energy efficiency measures. High levels of insulation will reduce Cool Roof internal benefit. Cool Roofs reflect sunlight before absorption as heat to reduce heat load on insulation and other aspects.

Roof Pitch

Cool Roof benefits are more direct on low rise flat & low slope roofs[6,7]. (Typical Commercial)

Air Conditioning Duct placement

Cool roof benefits may be more direct where ducts run in roof spaces or when exterior ducts are also coated.

Cooling benefit vs Heating penalty

Winter heating penalties may apply. For low rise commercial buildings in warm climates, the decrease in cooling load is typically greater than the increase in heating load[6,7,8].

Other Factors include: Colour choice, building design (including roof pitch, materials & window placement), occupancy use, shading & climate

Dulux® Cool Roof Installation

Dulux Cool Roof Commercial is installed by professional applicators using high pressure airless spray processes.

Typical Process..

Roof Inspection

- Assess for leaks & other issues
  - Inspection & Review with Facility Manager
  - Fixings: Missing/Rusted?
  - Flashings/Protrusions: Sealed & intact?
  - Surface Condition (No Rust/Light Rust/Heavy Rust?)

Surface Preparation

- High Pressure Wash to remove surface contaminants
- Remove surface rust by power wire brushing
- Spot prime light rust with Dulux Luxaprime Zinc Phosphate
  - Heavy rust requires full coat of Dulux Durabuild STE
- Allow overnight cure

Dulux Cool Roof Commercial Installation

Two Coat Application over Zincalume

Cool Roof Commercial 75 um DFT**Cool Roof Commercial**75 um DFT

(Refer Dulux Duspec Specification for substrate specification)

[3] US Dept of Energy Build Technologies Program : Cool Roofs. [4] Evolution of Cool Roof Standards in the US, R. Levinson H. Akbari., 2008. [5] BCA NCC Vol 1 J1.3a Roof and Ceiling - Minimum Total R-Value (Surface Solar Absorption). [6] South Australia Cool Roofs Regulation Discussion Paper, 2010. [7] City of Melbourne Cool Roofs Research Report, 2011. [8] Potential Benefits of Cool Roofs on Commercial Buildings, R. Levinson H. Akbari, 2010.

Commercial Project Examples

Cool Roofs have been shown to offer benefits across a range of installations including air-conditioned and non air-conditioned low rise commercial buildings. Benefits are more direct in single storey or low rise buildings with low pitch roofs due to the higher ratio of exposed Roof area to Floor area and where insulation levels are low. In each situation, internal benefits will be influenced by factors including Colour Choice, Building Design (including roof pitch, materials & window placement), Insulation & Ventilation, Occupancy Use, Shading, Location and Climate conditions†.

Dulux Case Study project summaries across various building use categories are shown.
Full Case History Reports are available at coolroofcommercial.com.au

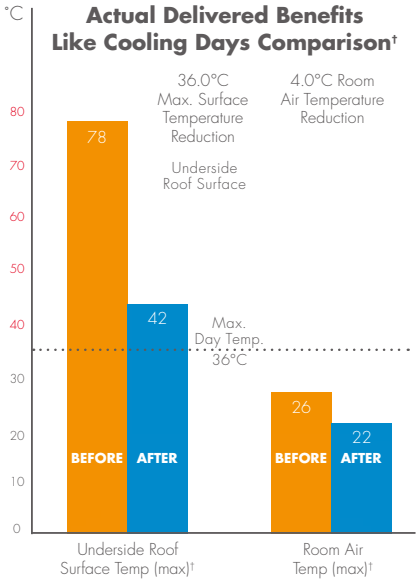
Air-Conditioned Lab/Office

OBJECTIVE:
Improve efficiency of Air-Con not able to maintain set point temp.

SCOPE:
External Roof: Uncoated Weathered zincalume
Ceiling: Insulated with no Ceiling cavity

SPECIFICATION:
Surface preparation and application of AcraTex® Cool Roof White

Full Case History Test Reports available on request



Airconditioned Open Plan Retail/Warehouse

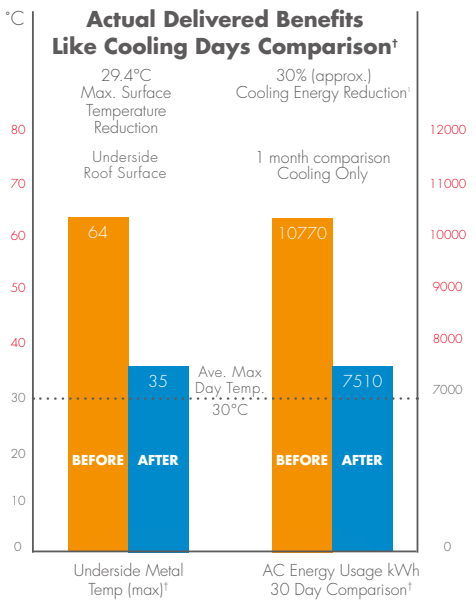
OBJECTIVE:
Improve customer and Employee comfort and to reduce energy consumption in keeping with Supercheaps sustainability policies.

SCOPE:
External Roof: Weathered Zincalume flat deck with sisilation.
Ceiling: Suspended Ceiling Tiles

SPECIFICATION:
Roof: Surface preparation and application of AcraTex® Cool Roof White

COOLING ENERGY REDUCTION†:
30 day comparison: 30% (approx.) through the summer cooling period tested
Annualised benefit: 20% (approx.) based on full year energy modelling study

Full Case History Test Reports available on request



† Case Studies shown are specific to client projects comparing before and after results through cooling intensive periods. In some climates heating offsets may occur through winter potentially reducing annualised energy savings - see Factors to consider in valuing Cool Roofs on the Facts and Questions page for more information.

COOL ROOF™
With InfraCOOL® Technology

Commercial Project Examples

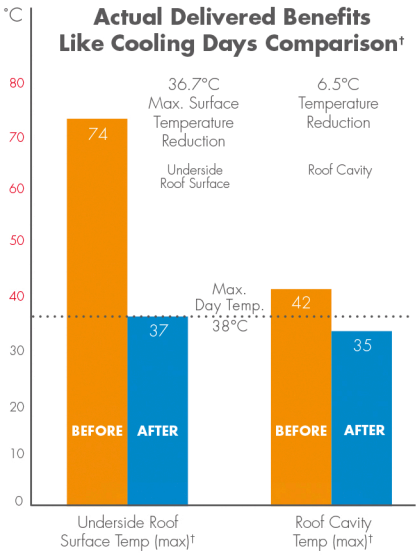
Broad Span Roofing - Shopping Centre

OBJECTIVE:
Improve customer comfort to the upper food court level which was not air conditioned - relying on ceiling fans for cooling.

SCOPE:
External Roof: Weathered zinc & aluminium flat deck with sisilation
Ceiling: Various: Corrugated sheet or Plasterboard.

SPECIFICATION:
Surface preparation and application of AcraTex® Cool Roof White with InfraCOOL® Technology

Full Case History Test Reports available on request



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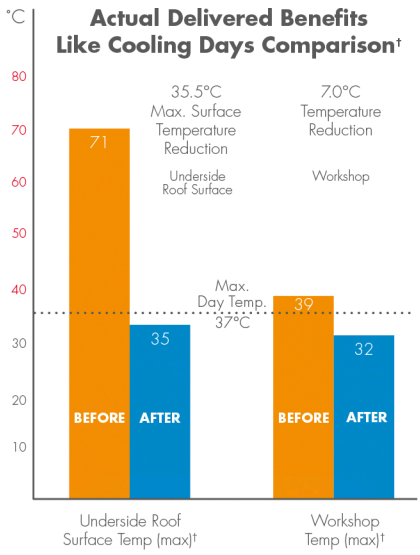
Workshop Environment - Crash Repairer

OBJECTIVE:
Improve Worker Comfort and Productivity Workshop Environment - high activity, no air conditioning

SCOPE:
External Roof: Galvanised metal roof
Ceiling: Sisilation, No cavity

SPECIFICATION:
Surface Preparation and application of AcraTex® Cool Roof White with InfraCOOL® Technology

Full Case History Test Reports available on request



Ideal for • Commercial • Health & Education • Industrial & Warehousing • Retail

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