

**COOL ROOF** ™  
With **InfraCOOL** Technology

**Dulux**®

**Acratex**®

Cool your roof with a  
heat reflective coating

Worth doing, worth Dulux.®



## Reflects radiation, lessens heat

Weathered galvanised/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.



## Can help reduce cooling costs

Less heat penetration can lower cooling energy demand. Comparative studies identify significant cooling energy savings are possible using Acratex Cool Roof Commercial White.<sup>1</sup>



## Can improve occupancy comfort

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



## Can reduce peak energy demand

Reduced heat penetration may translate to reduced peak energy demand in the middle of the day when the sun (and cooling energy demand) is highest.



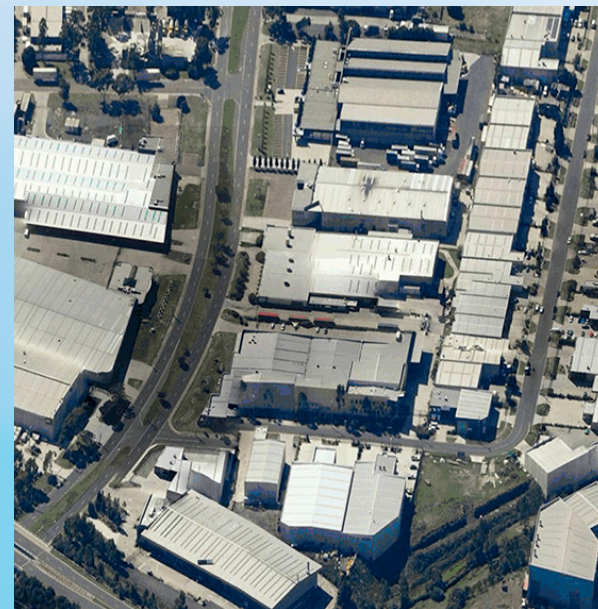
## Can lower carbon footprint in warm climates

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

# Roofs represent 20-25% of urban surfaces

### 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.

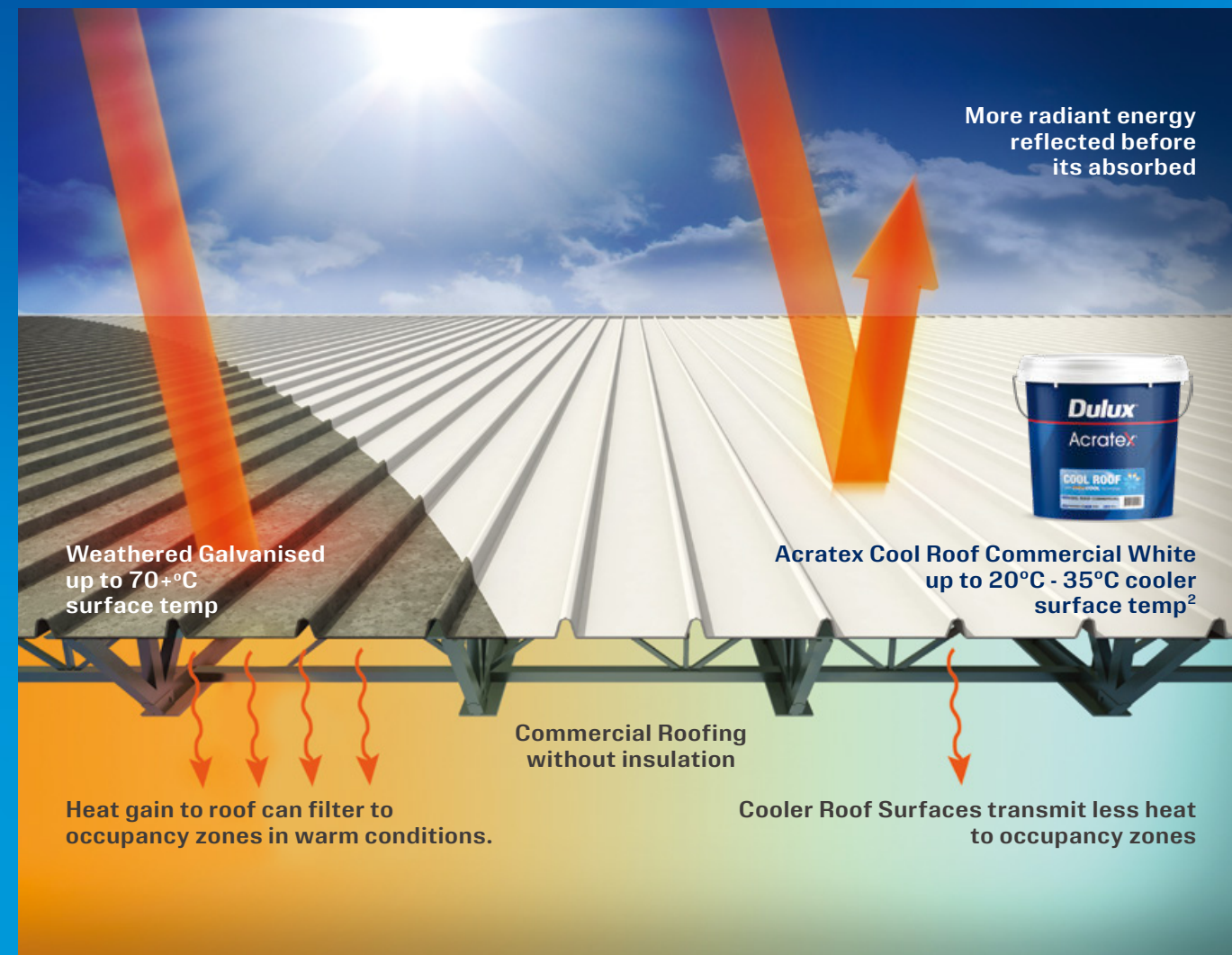
## “Cool Roofs... can offset 24 billion tonnes of CO<sup>2</sup>”

## “The offset provided by cooling urban surfaces affords us a significant delay in climate change”

This refers to the possible reduction in cooling energy usage. Lawrence Berkeley National Laboratory Heat Island Group - White Roofs Cool the World 2008.

## Dulux® Acratex® Cool Roof Commercial White reflects up to 90% of the sun's total light energy before it is absorbed and converted as heat into occupancy zones.

## Designed to improve the cooling efficiency of existing buildings with weathered galvanised or Zincalume® roof surfaces.



# TYPICAL PROJECTS

- Commercial
- Health & education
- Industrial
- Warehousing
- Retail
- Agricultural

Cool Roofs have been shown to offer benefits across a range of applications 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
- Climate conditions

<sup>†</sup>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 FAQs page for more information.

## Air-Conditioned Open Plan Retail/Warehouse

### OBJECTIVE:

Improve customer and employee comfort and to reduce energy consumption in keeping with Supercheap Auto's sustainability policies.

### SCOPE:

**External Roof:** Weathered Zinalume<sup>®</sup> flat deck with sisilation  
**Ceiling:** Suspended ceiling tiles

### SPECIFICATION:

**Roof:** Surface preparation and application of Acratex Cool Roof Commercial White

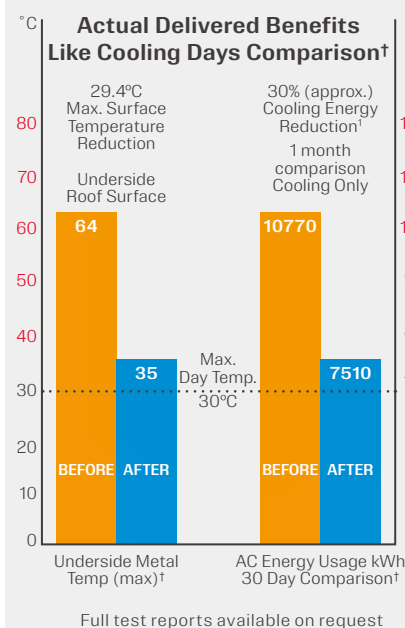
### COOLING ENERGY REDUCTION<sup>†</sup>:

#### 30 day comparison:

30% (approx.) through the summer cooling period tested

#### Annualised benefit:

20% (approx.) based on full year energy modelling study



## Air-Conditioned Lab/Office

### OBJECTIVE:

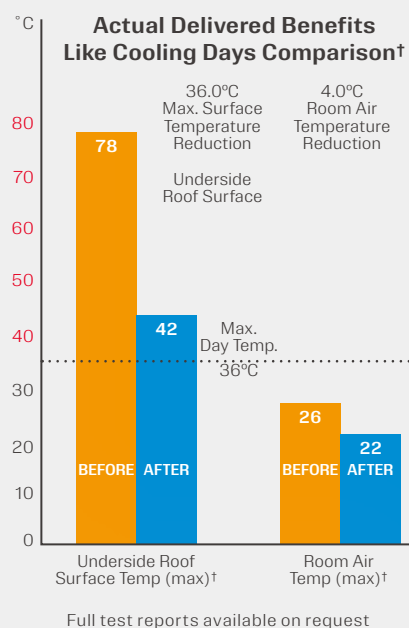
Improve efficiency of air-con not able to maintain set point temp.

### SCOPE:

**External Roof:** Uncoated weathered Zinalume<sup>®</sup>  
**Ceiling:** Insulated with no ceiling cavity

### SPECIFICATION:

Surface preparation and application of Acratex Cool Roof Commercial White



## Broad Span Roofing Shopping Centre

### OBJECTIVE:

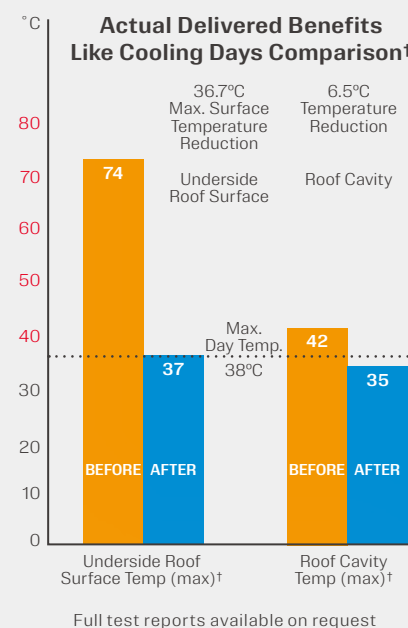
Improve customer comfort to the upper food court level which was not air conditioned - relying on ceiling fans for cooling.

### 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 Commercial White



## Workshop Environment Crash Repairer

### OBJECTIVE:

Improve worker comfort and workshop productivity.

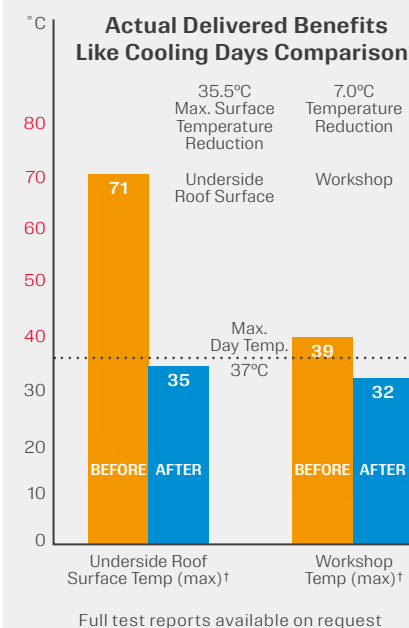
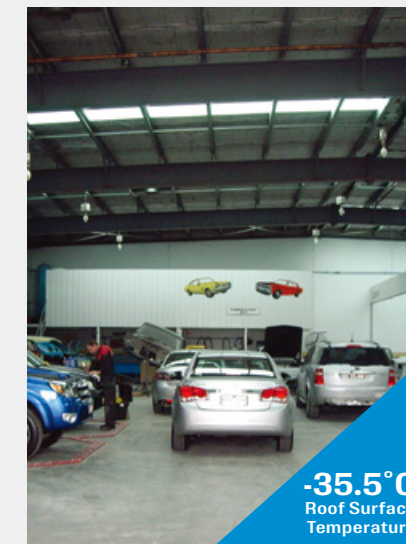
**Workshop environment:** High activity, no air conditioning

### SCOPE:

**External Roof:** Galvanised metal roof  
**Ceiling:** Sisilation, no cavity

### SPECIFICATION:

Surface preparation and application of Acratex Cool Roof Commercial White



# TYPICAL PROCESS

## 1. 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?)

## 2. SURFACE PREPARATION

- High pressure wash to remove surface contaminants
- Remove surface rust by power wire brushing
- Spot prime light rust with Dulux Protective Coatings Luxaprime<sup>®</sup> ZP Primer
- Heavy rust requires full coat of Dulux Protective Coatings Durebild<sup>®</sup> STE
- Allow overnight cure

## 3. ACRATEX COOL ROOF COMMERCIAL WHITE APPLICATION

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

**For galvanised iron and Zinalume<sup>®</sup>**

**Step 1:** Acratex Roof Bond GI

**Step 2:** Acratex Cool Roof Commercial White 75 um DFT

**Factory coated or aged/ weathered Colorbond<sup>®</sup>**  
 2 x Acratex Cool Roof Commercial White 75 um DFT

Refer Dulux DuSpec+ Specification for substrate specification. For previously painted substrates contact customer service for more information.



# COOL ROOF FAQs

## 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 temperature.

## 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.<sup>3</sup>

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 led the U.S. to adopt Cool Roof Standards<sup>4</sup> and why existing Models developed for U.S. climates are routinely referenced worldwide.

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<sup>5</sup> and Isolated State Initiatives.<sup>6</sup>

## 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 Acratex Cool Roof Commercial 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 Reflection (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 galvanised iron or Zinalume<sup>®</sup> low slope roof in hot weather and medium wind with a roof coated in Acratex Cool Roof Commercial White is estimated between 20 and 40°C.

## Q. CAN COOL ROOFS REDUCE COOLING COSTS?

- A.** The direct effect is lowering roof surface temperature 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, e.g. typical commercial buildings.<sup>6,7</sup>

#### 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.<sup>6,7,8</sup>

#### Other Factors include

Colour choice, building design (including roof pitch, materials & window placement), occupancy use, shading & climate.

#### REFERENCES:

- [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, Acratex Cool Roof Commercial White as qualified by product TSR and Emissivity data.
- [2] 24-36°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.
- [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.

Learn more at [acratex.com.au](http://acratex.com.au)  
or call Acratex Customer Service **13 23 77**

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