

## ALUMINIUM ROOFING SELECTION GUIDE

An aluminium roof in Color-Tech G4 or even as bare mill finish sheet, Mill-Tech, will outlast and outperform a galvanized steel or a zinc/aluminium coated steel roof.

The reason is simple: 100% of the substrate is corrosion resistant aluminium. Compare this to a substrate of steel in steel based roofs – sooner or later the steel will be exposed and will corrode.

Coatings on metal roofs do prolong the life of the roof but in the case of aluminium the coating is mainly applied for aesthetic reasons.

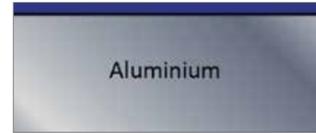
Aluminium roofs are therefore ideally suited to building owners who want peace of mind and the lowest lifecycle cost.

An aluminium roof will last and last.

*Rust - Iron oxide - soft, fragile, progressive corrosion*

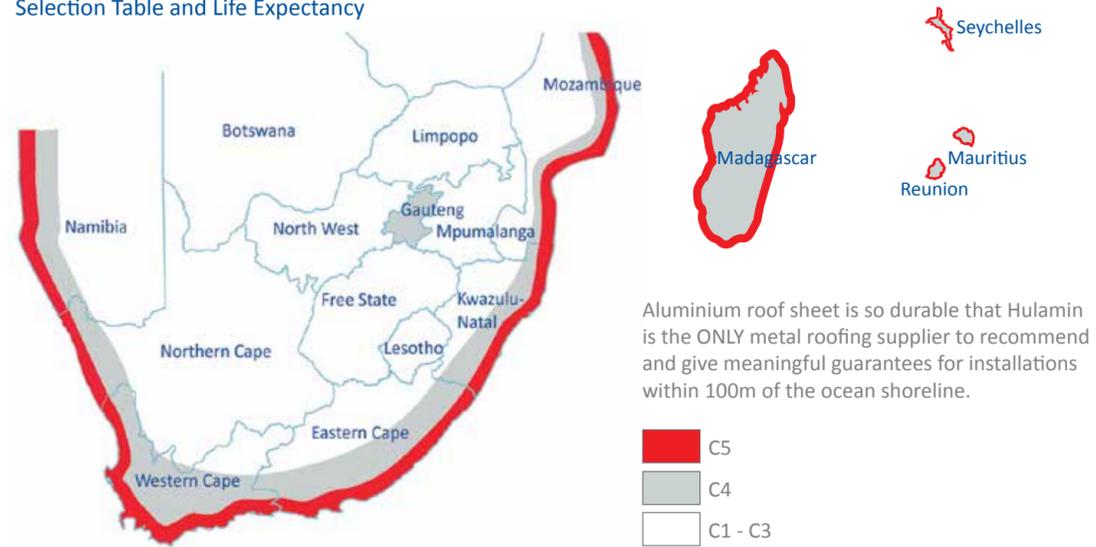


*Aluminium oxide - quick forming, hard, inert, tenacious, thin passive film*



*Aluminium develops a protective oxide layer. Iron oxide or rust keeps rusting on the exposed steel surface.*

### Selection Table and Life Expectancy



Corrosion Zone	Inland C1-C2	Inland C3	Coastal C4	Coastal C5	Coastal C5 +
Environment	Dry Interior	Inland Urban & Industrial	5km to 40km from the coast; Polluted inland areas	<5km from the shore	<1km from the shore; West Coast and Namibia
Corrosivity * classification	Low	Medium	High	Very High	Extremely High
Reasonable Life Expectancy of Aluminium Roof Sheet in Years					
Color-Tech G4	>35	>30	>25	>20	>15
Mill-Tech	>30	>25	>25	>20	>15

\* Corrosion zones after ISO 9223 / SANS 10 400L

Notes:

- This is a summarised table. Specific reference should be made to the CSIR corrosion zone map of South Africa.
- Fixtures and fittings which secure the roof or are attached to it must be of a suitable material. A professional engineer should be consulted on the specification of fittings for the determined corrosion zones.

## QUALITY

Hulamin's quality control systems extend to every aspect of the production process: from casting and alloying the aluminium ingot, through the rolling process and to the final coil coating operation.

The on-site laboratory, one of the finest in the country, backs up the quality system with regular quality control tests of painted material, the retention of samples from every coil and the management of exposure testing at selected sites around South Africa.

Relevant quality systems and standards:

EN573-3 Aluminium and Aluminium Alloys  
 EN1396: 2007 Coil Coated Aluminium Sheet and Coil  
 SABS ISO 9001: 2008 Quality Management System  
 ISO 14001: 2004 Environmental Management Systems

## HULAMIN

Hulamin is South Africa's premier aluminium rolling and extrusion company. Hulamin's modern plant in Pietermaritzburg supplies a wide range of products across many industry sectors. The company has a 75 year track record of supplying building and architectural markets in South Africa and around the world.

### HULAMIN ROLLED PRODUCTS

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This brochure is available online on the Hulamin website

Think future. Think aluminium.



HULAMIN

ALUMINIUM ROOFING

COLOR-TECH G4 AND MILL-TECH

Think future. Think aluminium.

## WHY AN ALUMINIUM ROOF?

Aluminium roofs have a significant advantage over alternatives in that they last ...and last.

The intrinsic anti-corrosion properties of aluminium ensure a superior lifespan, which means that for optimal lifecycle cost, the choice is clear:- Specify an aluminium roof.

Advantages of Aluminium include:

Lightweight and Strong	Corrosion Resistant	Aesthetics
Aluminium is 1/3 the density of steel – a great structural material	Naturally generates a protective oxide coating	Available in Mill-Tech or with a wide range of Color-Tech finishes
Recyclable	Safe	Reflective
100% recyclable meaning only 5% of the energy requiring to create it	No hazard to occupants or the surrounding environment	Good reflector of visible light and heat. Ideal shield against sunlight and for saving energy

### COOL ROOFS – HOW ALUMINIUM HELPS

We are living on a warming planet and the carbon footprint of our built environment needs to be reduced significantly.

**Fact 1:** An aluminium roof will comfortably outlast a steel substrate roof and the roof is ultimately 100% recyclable requiring just 5% of the energy consumption needed to produce the original primary metal.

**Fact 2:** Aluminium roofs, painted or mill finish, have great heat reflection capability. This keeps your building cool and prolongs the life of the roof even further.

### ABOUT COOL ROOFS AND SOLAR REFLECTANCE:

A Cool Roof is one that has been designed to reflect more sunlight and absorb less heat than a standard roof. Hualamin’s aluminium contributes to Cool Roof design through the material characteristics and its Color-Tech G4 coating.

A Cool Roof using Hualamin aluminium will reduce:

- The “Urban Heat Island” effect
- Air conditioning demand in the building
- Total building ownership cost

and increase:

- Occupant comfort
- The life of the roof and the roof coating

The Solar Reflectance Index (SRI) is the recognised measurement system for the design of a Cool Roof. It combines into a single index, the heat dissipation effects of reflectivity and emissivity. The higher the rating the cooler the roof will be. Designers need to be aware that as a roof ages so its SRI reduces – this is as a result of the reduction in gloss through UV penetration as well as from dirt build-up. Contact Hualamin for more details and methods to calculate the SRI value at different life stages of the roof.

The LEED (Leadership in Energy and Environment Design) standard for a Cool Roof is a SRI of 78 or greater for a roof with a low pitch (less than 17%).

Hualamin’s standard colour SRI’s are calculated in accordance with ASTM E1980-01. Non-standard SRI’s are available on request and on the Hualamin website.

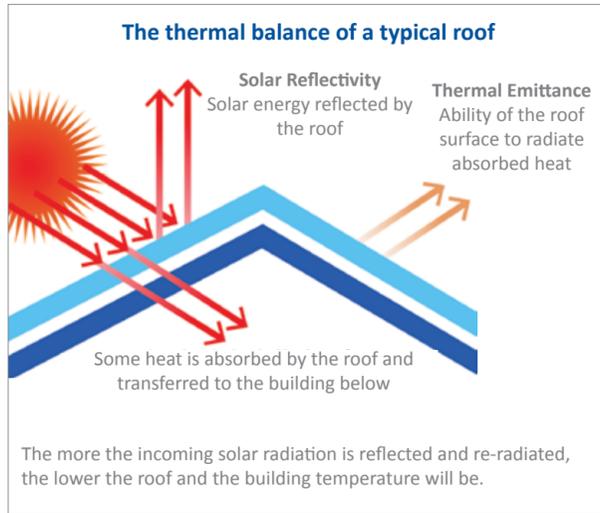


Table of Hualamin’s standard colour SRI’s

Material and Paint Colour	SRI
Mill-Tech aluminium	50
Color-Tech G4 Marble White	71
Color-Tech G4 Charcoal Grey	11
Color-Tech G4 Hazy Grey	40
Color-Tech G4 Sandy Beige	51
Color-Tech G4 Forest Green	22
Color-Tech G4 Azure Blue	30

## COLOR-TECH G4

Hualamin’s G4 painted coil is designed with South Africa’s harsh environmental conditions in mind:

- An aluminium substrate with superior corrosion resistance
- A polyester paint surface applied to the most stringent quality standards

Together with the leading global supplier of G4 Polyester based paint systems Hualamin has refined the paint specifications to meet the region’s demanding exposure conditions.

Hualamin offers 6 standard colours



The standard colour for the reverse side coat is Mountain Mist (RAL 7035)

Colours in this brochure are reproduced as accurately as possible. We recommend that the selected colour be checked against a colour swatch on an aluminium substrate – available on request from Hualamin.

Other colours, including a colour matching service, are available on request. Paint formulations to reduce the heat gain of dark roofs as well as high durability paint for highly corrosive regions are also available.

### Mill-Tech

Hualamin’s Mill finish aluminium roof sheeting, Mill-Tech, has been in use in South Africa and Namibia for many years. The life of the product in the harshest of environments - such as the shore of the West Coast – is impressive.

Mill-Tech offers:

- Superior corrosion resistance
- High reflectivity (heat is reflected)
- Low emissivity (reduces heat gain in the roof space)



## GUARANTEES

Hualamin offers guarantees of up to 25 years depending on the building location, paint system, colour and end-use of the building.

The guarantee period commences from the date of installation and is transferable from one building owner to another.

A typical guarantee will cover the paint performance as well as guarantee against perforation of the substrate. Depending on the installation location, maintenance procedures may be stipulated.

A guarantee period does not denote the life-span of the product. In most cases the expected life of a roof extends well beyond the guarantee period, often by 10 years or more.

Contact Hualamin for reference buildings in your area to confirm real life performance.

## TECHNICAL SPECIFICATIONS

### MECHANICAL AND OTHER PROPERTIES

Properties	Alloy 4017 (Temper H46)	Alloy 3004 (Temper H44)
Yield (Proof) Strength	150 MPa	180 MPa
Ultimate Tensile Strength	175 – 225 MPa	210 – 265 MPa
Density	2 720 kg/m <sup>3</sup>	2 720 kg/m <sup>3</sup>
Thermal Expansion Coefficient	23 X 10 <sup>-6</sup> /°C	23 X 10 <sup>-6</sup> /°C
Modulus of Elasticity (Youngs Modulus)	70 GPa	70 GPa

Refer to the alloy data sheets for additional detail

### G4 PAINT COATING

Coating Location	Type and Thickness
Top Coat	23 µm ± 3 µm Polyester
Reverse side coat	9 µm ± 1 µm Mountain Mist (RAL 7035)

### COIL WIDTHS AND GAUGES

Alloy	Width Range	Gauge Range
4017	900mm to 1250mm	0.35mm to 1.00mm
3004	900mm to 1250mm	0.50mm to 1.00mm

### COLOUR FASTNESS AND ADHESION OF PAINTED SURFACES

Colour	Max Fade Δ E	Gloss % retention	Physical
Light: L>60	≤6	>50	Will not crack, peel or chip
Dark: L<60	≤15	>60	

Note: Fade measurement per CIELab ASTM D2244 standard; measurements are at maximum 10 years.

