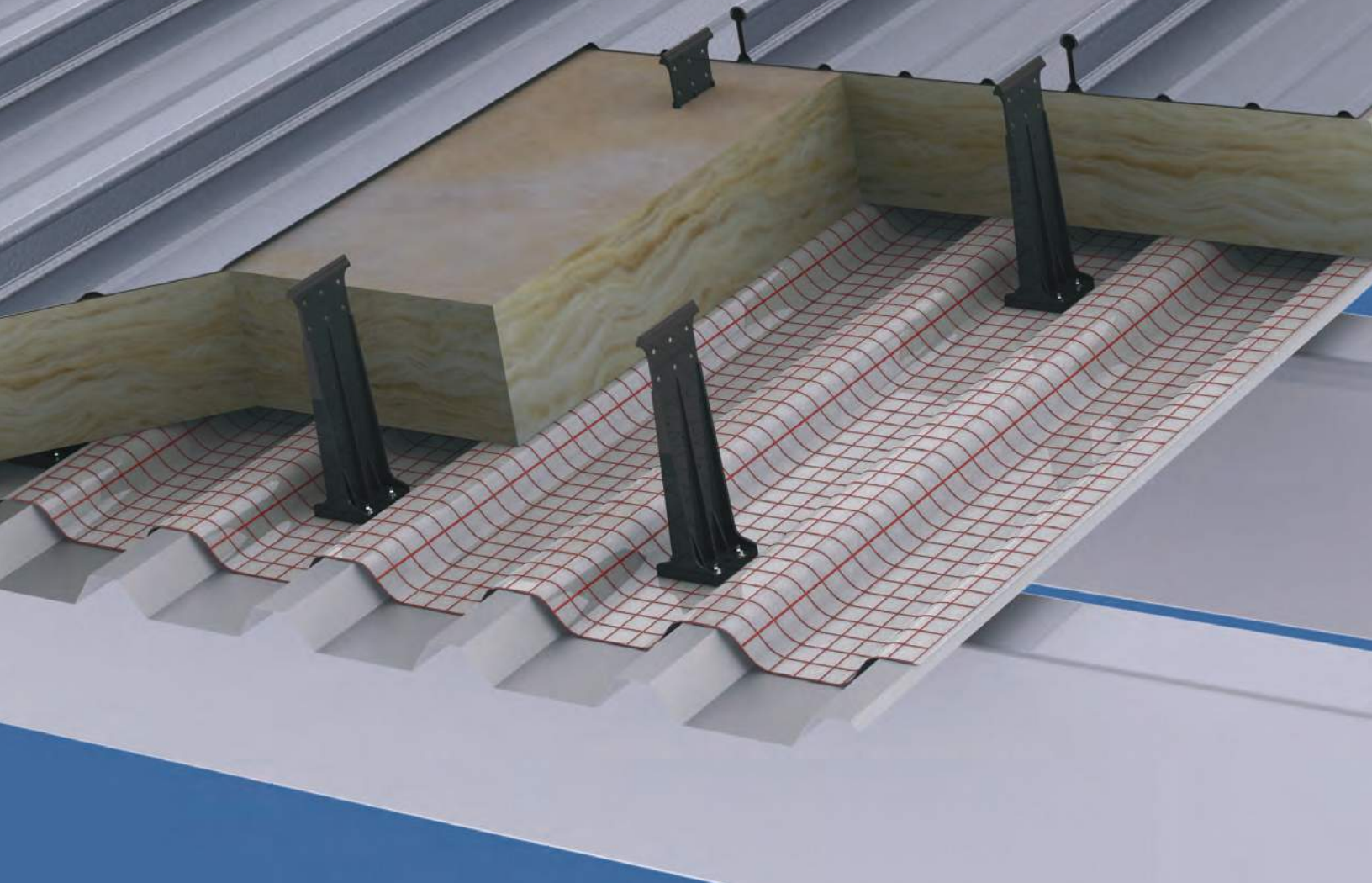


Kalzip Inc

Kalzip retrofit solutions

Metal over metal roofing



The reasons for retrofitting an existing roof are varied and plentiful but with Kalzip the outcome is always the same...



.....the elimination of existing problems and the provision of a long term maintenance free, durable solution which aesthetically enhances the building.

Kalzip – high performance, cost-effective retrofit roofing

You get more for your money so why settle for less?



Our service

- No need to remove the existing roof
- No added sub-framing over the existing roof
- Light in weight yet incredibly strong
- Kalzip patented E clips
- Variable height clips give flexibility to customize thermal & acoustic enhancement
- Durable solution
- Full technical support and advice from concept to completion
- Installation is non-disruptive to the functionality of the building
- Weather-tight solution
- Range of sustainable materials and products
- High quality products and service
- Compliance with current Building Standards & Codes

Your benefit

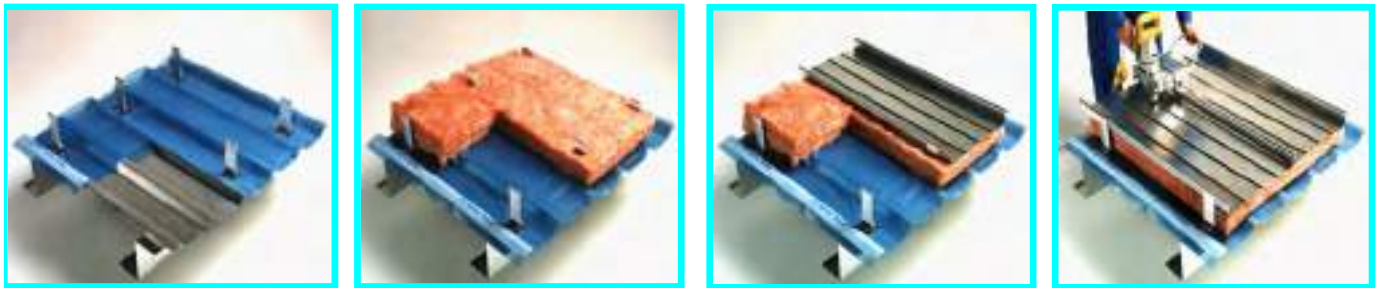
- **Reduces cost** and speeds up installation
- **Less** material and labor cost
- No secondary steel requirements mean **less cost** and reduced weight keeps the roof structure within code
- Help improve R values by reducing any thermal bridging through the roof build up
- The range of Kalzip clip heights mean that highly efficient thermal performance levels can be achieved helping maximize energy savings and minimize whole life cycle costs with R values of R30 and above. As components are standard this is obtained at **no extra cost**
- Highly resistant to corrosion (please refer to independent research into 'Kalzip corrosion and durability report') with limited long term maintenance requirements
- Including R value, wind load, acoustic and structural calculations verified by third party testing
- As the clips are applied through the existing roof and to the structure there is no disruption to the internal environment of the building
- The weather-tight seam keeps the elements out but allows any residual moisture in the insulating layer to evaporate through the seam allowing the roof to breathe naturally
- Kalzip aluminum and solar solutions provide truly sustainable features to the system and as Kalzip is a fully demountable system it can be unzipped and reused or recycled at the end of the building's life
- Consistently high standards achieved through a fully integrated, approved supply chain network
- Designed to not only meet but also exceed current standards and codes

The sophisticated, lightweight retrofit solution that can be precisely tailored to suit the requirements of the building

Kalzip is a built up system of standardized products and components whose light weight durable qualities, third party proven performance and full system integration make it the ideal sophisticated solution for both metal over metal retrofit and new build.

What makes it different is its comprehensive range of standard (and non standard) components and products that give it the flexibility to be precisely engineered to individual requirements, from stringent acoustic, structural or thermal performance to the inclusion of environmentally friendly elements like Kalzip's PV solar solutions.

This flexibility can also allow the system to accommodate all forms of metal substructure without the need for additional, custom and sometimes costly materials required by other systems - making it hugely cost effective.



Technically sound and proven to last

Proven to last in excess of 40 years (refer to Kalzip durability and corrosion testing report) and supported by outstanding technical competence and third party testing around the world, Kalzip's performance has exceeded expectations in some of the world's most hostile, demanding environments.

Providing unprecedented levels of technical support and advice, the Kalzip Technical Services department not only undertake project specific calculations (be they thermal, acoustic or structural) but also address other prime concerns, such as corrosion resistance, condensation control and other fundamental performance requirements such as load span capability to ensure high performance, robust detailing that won't let you down.



Project site support

Support on live projects is provided by the Kalzip site services department and includes site inspections, technical advice and site investigations.



On-site roll forming

Where site or access restrictions apply, Kalzip has the equipment, personnel and expertise to manufacture on-site. Kalzip's professional team produces an operations document, detailing requirements, safe working procedures and risk assessment.



System design and performance

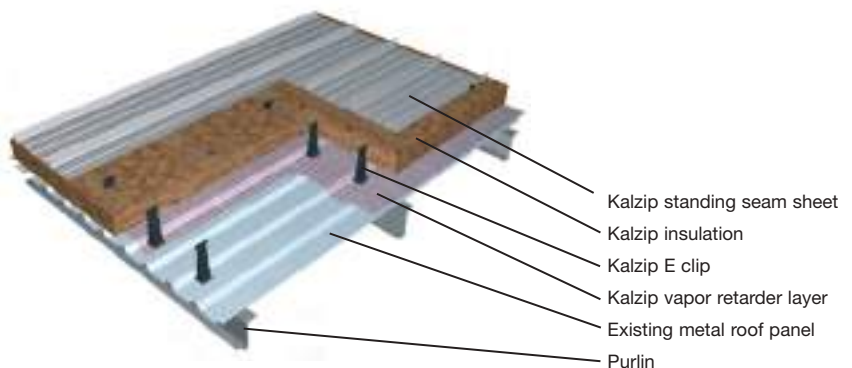
The Kalzip retrofit system is ideal where speed of installation is paramount and has been designed to cater for a multitude of configurations and applications including the refurbishment of failed roofing systems or building enhancements.

The flexibility of the Kalzip retrofit system enables it to be installed onto any existing corrugated or standing seam roof.

Kalzip standard roof configuration

The Kalzip standing seam roof sheets are supported directly off the steel rafters via the support clips/halters (E clips) and therefore act independently of the existing metal roof panel.

When light weight quilt type insulation is used, the external loads (wind suction, snow, access etc.) are transferred directly to the support rafters and not the existing roof.



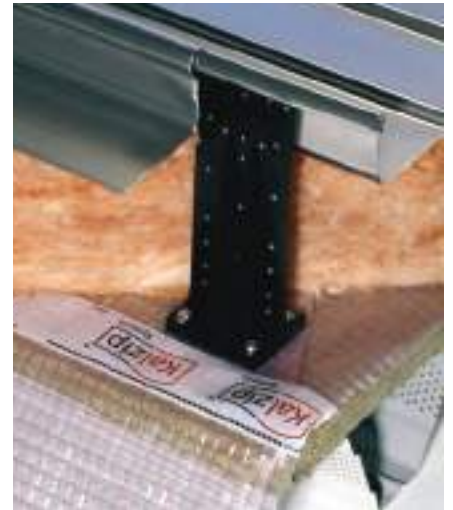
Vapor retarder

It is good practice to enhance the performance of a roofing system by incorporating a suitable vapor control layer (VCL).

A VCL will reduce the movement of water vapor from inside the building through the roof construction (thereby reducing the risk of condensation) and also assists in limiting air permeation through the system.

Kalzip VCLs are available as standard in either a clear 3 layer membrane for mid range applications (with humidity classes of 4 or below) or a foil encapsulated 5 layer membrane suitable for high humidity applications where a greater vapor resistance performance is required.

The VCL should always be installed on the warm side of the construction and should be continuous across its surface. It must be fully sealed at all laps, perimeters and penetrations in order to ensure its effectiveness. The type of VCL to be specified would be dependent upon the use of the building and therefore the condensation risk.



Kalzip aluminum and reinforced polyamide E clips



Kalzip profiled sheets are secured to the substructure of the roof construction by the use of extruded Kalzip aluminum clips (with associated polyamide thermal barrier pads) or the range of Kalzip reinforced polyamide E clips. As aluminum has a high conductivity of heat, a series of tests were carried out to determine the true thermal bridging effect of the Kalzip aluminum clips and the effectiveness of various thermal barrier pads.

The results lead to the introduction of a more efficient 0.6 inches deep thermal barrier pad (TK15) and the development of the reinforced polyamide clips (Kalzip patented E clips), which offer a fixing mechanism with no significant thermal bridging while still retaining structural capability similar to the extruded aluminum clip. Kalzip E clips act as an insulation spacer within a Kalzip insulated system. This gives minimal thermal impairment allowing improved thermal performance roofing constructions to be built that will meet current building codes and standards with ease.

The steel reinforced polyamide clips are designed to further enhance the performance of the overall Kalzip system by also improving its acoustic and thermal movement performance. The clip heads are designed to freely accommodate movement of the external sheet during thermal cycling, enabling the use of very long sheet lengths where required. The range of E clips has also been fully tested for structural performance in relation to wind suction attachment and load compression as well as durability.

Clip dimensions and heights

The Kalzip advanced E clip is a steel reinforced GFRP clip that is available in 0.787 inches height increments, up to a maximum of 7.086 inches (see table 1).

Component mass and height

The table gives the mass and height of different E clip combinations. The overall clip height (H) includes the height of the spacer pad where used. The cavity depth (W) created with different Kalzip standing seams is also given.

Table 1

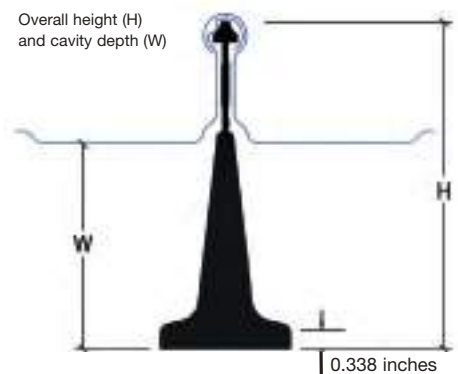
Clip type	Combination	Mass	Overall clip height (inches)	65/*	50/*	Kalzip AF
E-5	-	0.260	2.598	N/A	0.787	0.196
E-20	-	0.286	3.188	0.787	1.377	0.787
	E-20 + Spacer 10	0.346	3.582	1.181	1.771	1.181
E-40	-	0.321	3.976	1.574	2.165	1.574
	E40 + Spacer 10	0.381	4.370	1.968	2.559	1.968
E-60	-	0.365	4.763	2.362	2.952	2.362
	E60 + Spacer 10	0.425	5.157	2.755	3.346	2.755
E-80	-	0.392	5.551	3.149	3.740	3.149
	E80 + Spacer 10	0.415	5.944	3.543	4.133	3.543
E-100	-	0.427	6.338	3.936	4.527	3.936
	E-100 + Spacer 10	0.487	6.732	4.330	4.921	4.330
E-120	-	0.469	7.125	4.724	5.314	4.724
	E-120 + Spacer 10	0.529	7.519	5.118	5.708	5.118
E-140	-	0.502	7.913	5.511	6.102	5.511
	E-140 + Spacer 10	0.562	8.307	5.905	6.496	5.905
E-160	-	0.542	8.700	6.299	6.889	6.299
	E-160 + Spacer 10	0.601	9.094	6.692	7.283	6.692
E-180	-	0.579	9.488	7.086	7.677	7.086
Spacer 5	-	0.037				
Spacer 10	-	0.059				

Note: The values quoted for W do not take account of any reduction in the cavity as a result of fixing in the troughs of trapezoidal liner sheets.

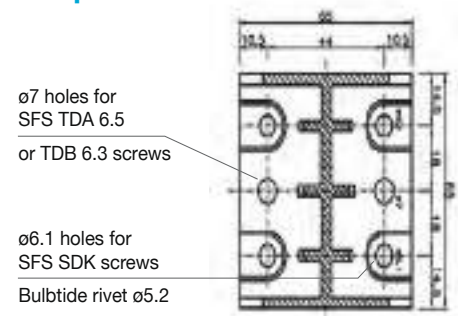
Spacer pads

In addition, there are two thicknesses of spacer pads available which can be added either individually to the base of the clip giving height increments of 0.196 and 0.393 inches respectively, or combined to give an overall maximum 0.590 increment. The spacer pads are not supplied pre-fitted, they are site-applied only. The spacer pads can be used to provide tolerance for minor discrepancies in the underlying sub-structure.

Note: When using two spacers, the 0.393 inch pad must be fitted to the clip before the 0.196 inch and a maximum of two spacer pads only is permitted to increase the height of the clips.



E clip base details



Kalzip insulation; delivering superior performance levels

Kalzip insulation products are rot-proof, non-hygroscopic, do not sustain vermin and will not encourage the growth of fungus, mould and bacteria. They are dimensionally stable under varying conditions of temperature and humidity.

All Kalzip insulation products conserve energy through their use by reducing the requirement to heat or cool buildings, limiting CO₂ emissions.

As they are HCFC and HFC free and do not contain any of the gases that have been identified as having global warming potential (GWP) their ozone depletion potential (ODP) is zero and taking into consideration both manufacture and composition their GWP rating is less than five.

Kalzip's range of insulation products includes fiber glass blanket insulation with ECOSE™ Technology and mineral wool slab insulation.

At the heart of the range is Kalzip Plus 43 insulation, which is a high performance mineral wool quilt offering extremely efficient thermal performance.

To complete the range further, mineral wool insulants are available offering:

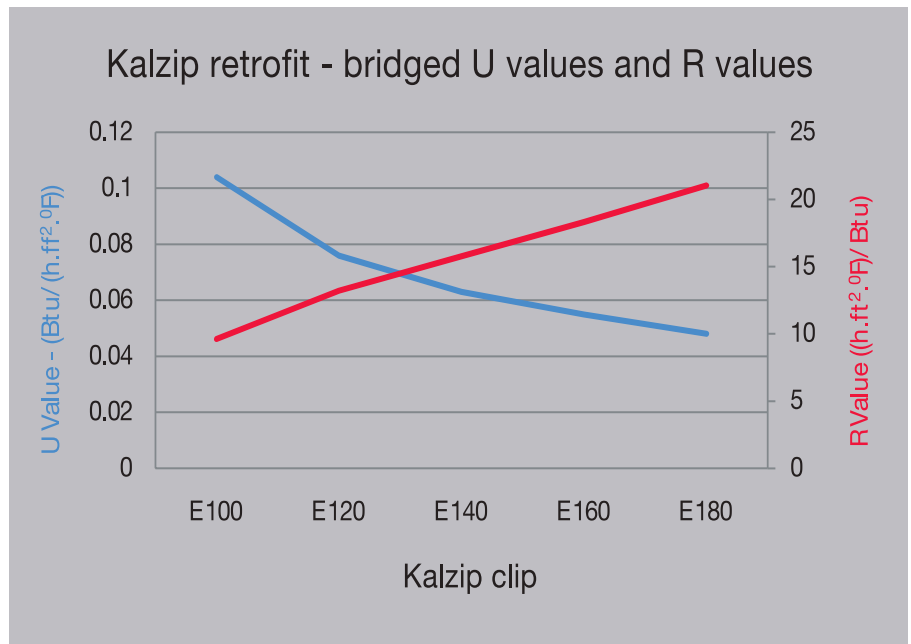
- a wide variety of thermal performance values
- the flexibility of use where additional acoustic performance is required
- or, where a rigid insulation material is necessary, to support the forming of details and interfaces at soaker positions, welded laps and ridge position of curved sheets.

Three dimensional Kalzip retrofit thermal model

The thermal image shown opposite is taken from a 3 dimensional thermal model of a Kalzip retrofit construction with 6 inches Kalzip Plus 43 insulation.

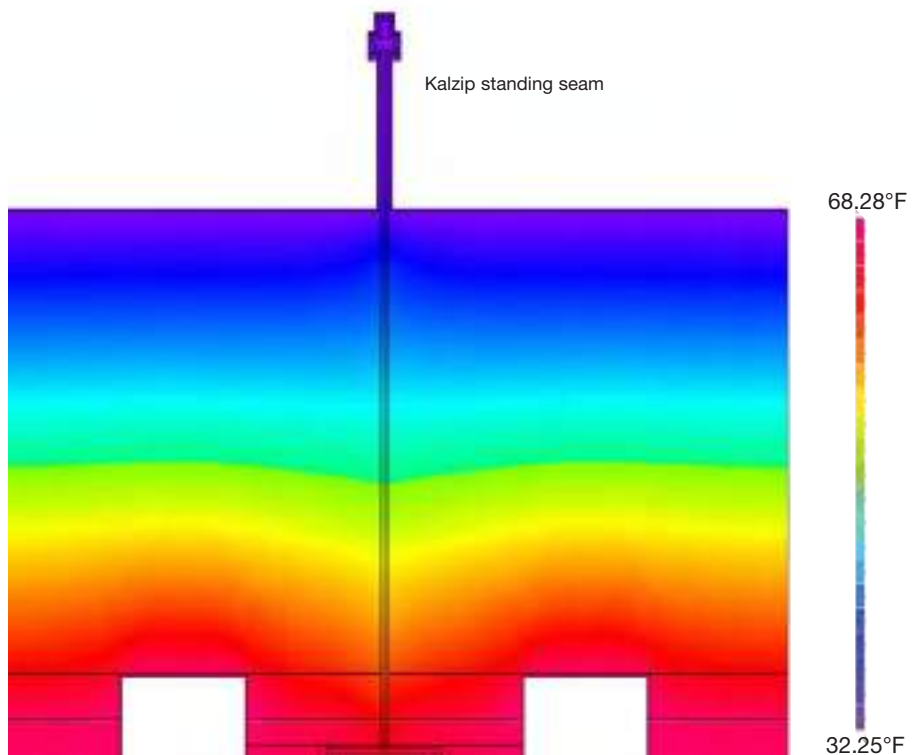
U and R values for a typical Kalzip construction

The following graph represents bridged values based on a Kalzip 35/200 liner and Kalzip Plus 43 insulation.



Thermal model cross section of Kalzip system

The 3D modelled steady state calculations output indicate the temperature difference through the construction and the ability of the Kalzip construction and insulation to minimise heat loss through the roof.



Kalzip profiled sheets


Product code		Gauge/thickness in.	There are many variations in shape
Kalzip™ 50/429		0.047 0.040 0.035 0.032	straight 
Kalzip™ 65/305		0.047 0.040 0.035 0.032	convex curved 
Kalzip™ 65/333		0.047 0.040 0.035 0.032	concave curved 
Kalzip™ 65/400		0.047 0.040 0.035 0.032	concave curved 
Kalzip™ 65/500		0.047 0.040 0.035 0.032	tapered 

An additional profile Kalzip AF 65/537 also exists specifically for AluPlusSolar. This 0.040 in. thick product can only be used by prior agreement with the Kalzip Technical Department.

Minimum roof pitch

Continuous sheet ridge to eaves	1.5°	(1/3 : 12) *
Continuous sheet eaves to eaves	1.5°	(1/3 : 12) *
Welded lap joints	1.5°	(1/3 : 12)
Welded roof penetrations	1.5°	(1/3 : 12)
Mastic and rivet sealed lap joints	3°	(2/3 : 12)
Mastic and rivet sealed roof penetrations	8°	(2/3 : 12)

*Minimum pitch requirement of 1.5° (1/3 : 12) must be maintained at sheet ends

tapered-convex curved


elliptically curved


Product parameters and flexibility



Long sheet lengths

Kalzip sheets are commonly used in long lengths with continuous lengths of over 490 feet being achieved. Key to the successful functionality of the roof structure when using long length sheets is the understanding and control of thermal movement.

Curving and tapering with retrofit

The ductility and flexibility of aluminum makes Kalzip the perfect roofing sheet for beautifully, naturally curved and tapered shapes and designs.

Natural curved

- Minimum convex radii 130 feet to 170 feet subject to gauge and cover width
- Minimum concave radii 147 feet to 196 feet subject to gauge and cover width

Tapered sheets

- Minimum and maximum widths are between 8.8 inches and 24.4 inches
- Tapered sheets must be installed in line with the precise instructions in the relevant installation plan

Materials and finishes

Kalzip roofing and cladding is available in a host of finishes and materials from an almost unlimited choice of colors and coatings to special finishes including AluPlusZinc and AluPlusPatina (pre weathered aluminum appearance). Stainless steel and copper are also available as alternatives to aluminum.

Perimeter detailing and roof penetrations

Kalzip retrofit roofing easily facilitates a range of rooflights and perimeter detailing and solutions including gutters, fascias and deep soffit returns as a fully coordinated package that interfaces with the existing building.

A comprehensive range of walkways and fall arrest systems are also available.



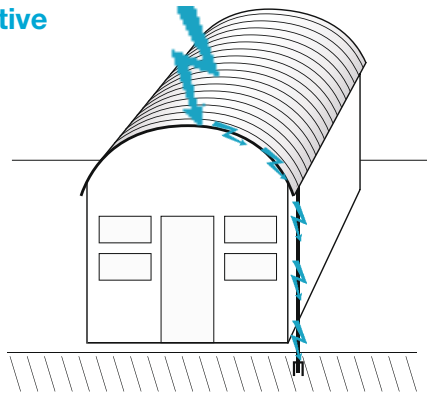
Fire performance

A variety of Kalzip roof system configurations are covered by FM Approvals certification for which various tests and assessments relating to fire performance have been carried out. Information on how Kalzip roofing systems and products can comply with the requirements of NFPA 5000 is available in Kalzip technical information sheet TIS-BLA-KALZIP-349 – which is available on request.

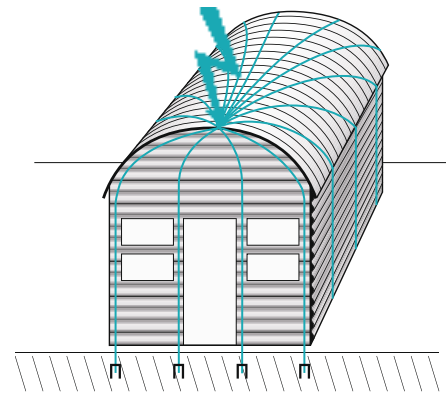
Lightning conduction and protective screening of buildings

The Kalzip system offers safe and effective protection against lightning strikes and their electro-magnetic effect on both plant and equipment, by acting as:

- A lightning arrest or conducting device to prevent lightning strikes affecting the structure
- A protective screen to counter the electromagnetic effect of lightning strikes



Kalzip as a conductor of lightning



Kalzip as protective screening

Sustainable design

The flexibility of the Kalzip system means that it can incorporate individual safety and design requirements into the roofing structure including:

- Solar PV solutions
- Cool roof (heat island solutions)
- Seam clip (specially designed to aid roof mounted plant/platforms without the need to penetrate the outer skin of the roof)
- Fully integrated access and safety systems



Environmental performance

Kalzip products conserve energy and therefore assist in reducing demand for fuels for the heating and air conditioning of buildings. An insulated Kalzip roof structure contributes significantly to emissions reduction.

Aluminum is a closed loop process; once produced - it can be recycled infinitely with no loss of performance and as a fully demountable system it can, at the end of the buildings life, be unzipped and reused or recycled without limitation. Aluminum is one of the longest lasting roofing materials; in 1897 aluminum sheet was used to cover the roof of San Gioacchino Church in Rome which is still in excellent condition today, evidence of the exceptional weathering properties and longevity of aluminum roofing.

Life-cycle considerations

- Aluminum is easy to recycle
- Aluminum can be recycled many times over
- Aluminum building products have a very long life
- Aluminum is a light weight material, reducing the mass of the supporting building structure (material & energy saving)
- Aluminum has one of the highest strength to weight ratios of known metals
- The high value of aluminum “post consumer” scrap will not be a waste issue
- All Kalzip products are easily demountable and fully recyclable

Further supporting the integration of ecological concepts Kalzip aluminum sheets can be produced with:

- recycled content of 75% - 100%
- fully recycled content from external scrap
- Kalzip’s advanced photovoltaic solar solutions AluPlusSolar and Solar Clad

Further information and support on recycled material and the full range of Kalzip products is available on request.

www.kalzip.com

www.roofway.com

Care has been taken to ensure that this information is accurate, but Tata Steel Europe Limited – including its subsidiaries – does not accept responsibility for information which is found to be misleading.

Copyright 2011

Corus Bausysteme GmbH
August-Horch-Str. 20-22 · D-56070
Koblenz P.O. Box 1003 16 · D-56033 Koblenz
T +49 (0) 2 61 - 98 34-0
F +49 (0) 2 61 - 98 34-100
E kalzip@corusgroup.com

Roofway Coberturas e Fachadas
1095 Viamão Street - Grajaú
Zip Code: 30.431-253
Belo Horizonte City/MG
Tel.: +55(31) 3297-7110
Fax: +55(31) 3297-7114
www.roofway.com.br

The product information and technical details contained in this brochure are accurate, according to our research and technical programme, at the point of going to press. They do not refer to any specific application and cannot give rise to claims for compensation. We reserve the right to make any changes to the construction or product range which seem technically appropriate, in view of our high standards for product advancement and development.

Copyright 2004