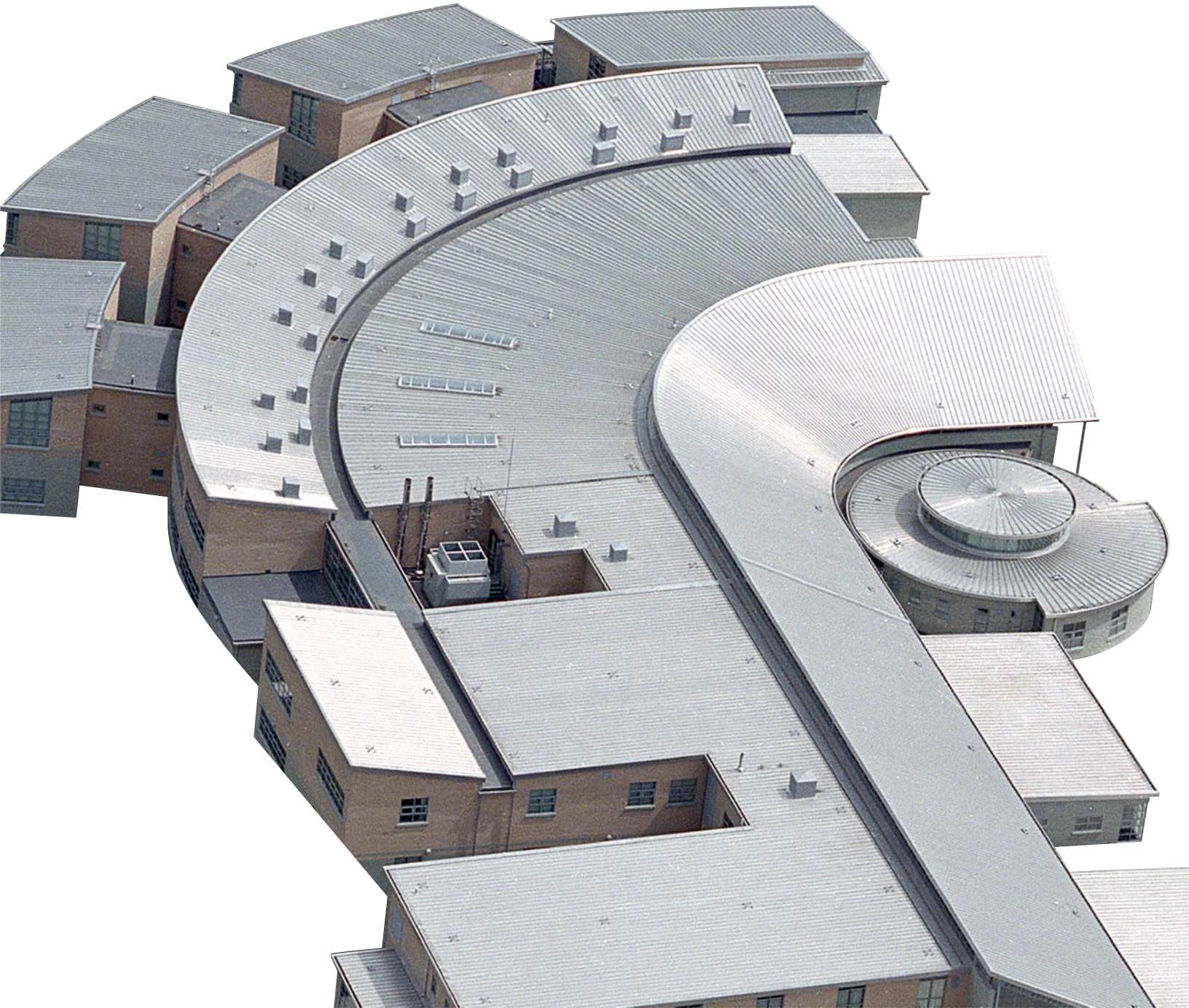
USA General 1-06

ENGINEERED ARCHITECTURALS™

Kalzip™

Kalzip™ systems

Roofing and cladding product information



BAA Heathrow Airport Terminal 5, London, England

Bringing ideas to life

Contents

Barajas Airport, Madrid, Spain

Kalzip

Kalzip aluminum standing system is a key brand within the multi-national group. During the past 35 years more than 800 million square feet of Kalzip roofing have been installed around the world – an enviable track record of performance that has firmly established it as the global market leader.

Combining international expertise with local service, Kalzip represents a mark of quality and strength, providing solutions for the external envelope of the building, encompassing the roof, walls and all the essential fabricated components.

Versatility

Whatever the building size or geometry, the innate versatility of both the material and the system allows for ever more adventurous architectural concepts to be executed with precision.

From new build to retro-fit - public to private sector Kalzip can offer the essential technical and commercial solutions to accomplish a high performance, low maintenance fully compliant, value for money, roofing system.

Proven performance

Kalzip provides a system bearing all the hallmarks of quality and performance underpinned by a manufacturing process capable of meeting the most exacting quality standards both in the factory or on-site.

The combined experience and knowledge of Kalzip's dedicated network of approved installers has helped to raise the standards of Kalzip and construction in general.

Accreditations

The Kalzip roof system in its entirety has successfully achieved third party certification by the BBA and RIA Hallmarking in the UK and is globally recognized by Factory Mutual, the German Zulassung and French Avis Technique.

These various bodies can confirm the roof system's performance in such areas as structural capacity, fire behavior, thermal transmittance, condensation risk avoidance, weather-tightness, acoustics, impact damage and outstanding durability. Most recently it has been successfully 'hurricane tested' in Singapore and China.

Albion Wharf, London, England

Shanghai Qizhong International Tennis Center, China

General data and characteristics

Kalzip has developed system design, specification and product innovation to guarantee compliance with latest building regulations without compromising the overall performance capabilities or aesthetic potential.

With proven durability and high performance, Kalzip has the capacity to meet the complex and rigorous requirements of the most challenging buildings. Being a multi-component built up system, Kalzip can be precisely tailored to meet the needs of the individual project – addressing prime concerns, such as corrosion resistance, sound reduction/absorption, thermal performance or condensation control – in addition to other fundamental performance requirements such as load span capability.

Kalzip's established and proud pedigree can be traced back to the late 1800's when the original concept of 'raised seam' was developed to prevent water ingress on church roofs. During the following century Patrick Schröter enhanced the product further and finally patented the system we know today as Kalzip.

Performance of the system was established by the unique 'zip' technology - ensuring a weather tight seam which also allows the roof to breathe naturally.

A non-penetrative, patented clip ensures smooth thermal cycling of the external sheet over the clip head while at the same time facilitating outstanding spanning capacity under high wind loading. Combined with Kalzip's pioneering on-site roll-forming capability we can provide continuous single sheet lengths in excess of 500 feet without end laps or surface penetration by fasteners.

Benefits

Light weight yet exceptionally strong

Aluminum Kalzip has a relatively low mass when compared with alternative options, such as steel, zinc and copper. This in turn enables project engineers to design lighter frames.

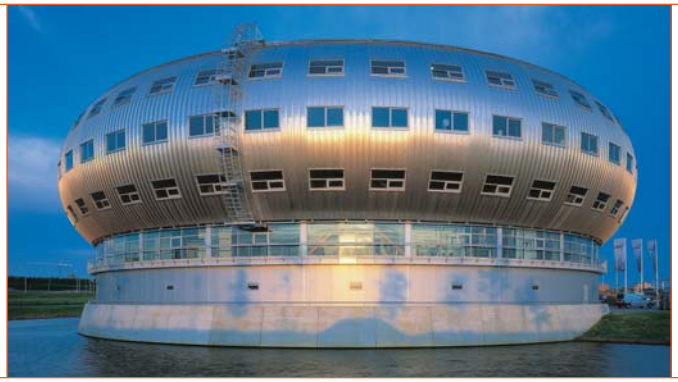
Durable

Aluminum is highly resistant to general corrosion and different alloy combinations can make it a versatile design option in aggressive environments. Its self-healing oxide layer suppresses corrosive attack and reforms spontaneously if damaged.

The statue of Eros in Piccadilly Circus, London erected in 1893 is an early example of the use of aluminum. In 1897, an aluminum sheet was used to cover the roof of San Gioacchino church in Rome. Still in excellent condition today, this building proves unquestionably the weathering properties and longevity of aluminum.

Versatile

Combinations of advanced roll-forming techniques and new profiles, widths and finishes have all extended Kalzip's flexibility and potential. From natural curving, smooth curving and tapering to advanced tailoring of individual sheets, Kalzip offers the ultimate in creative freedom by providing detailed solutions for the most ambitious architectural requirements.



Fashion Center, Almere, The Netherlands

BMW Leipzig, Germany

Appealing to the eye

Kalzip is available as standard in an aluminum stucco embossed finish. With access to some of the world's most advanced material and application technologies Kalzip can create exclusive architectural designs through the use of innovative material combinations, surface treatments, colors and finishes.

From a variety of standard quality coatings and special colors, including pre-weathered variations and the more traditional feel of AluPlusZinc (aluminum and zinc) to the striking effects of stainless steel and copper, Kalzip can provide the perfect finish to any building.

Recyclable

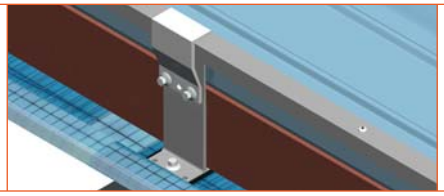
The inherent recyclability of aluminum offers many well-documented environmental benefits. Over 60% of all aluminum is produced using hydroelectric power, which is clean, CO_2 free and renewable. Its recognition of environmental responsibility has won the aluminum industry awards from the United Nations Environmental Programme (UNEP).

Aluminum is a closed loop process - it can be recycled infinitely with no loss of performance. The benefits of recycling aluminum lie within its high scrap value and the low energy requirements in the recycling process - only 5% of the energy required in the original primary process is required for repeated recycling.

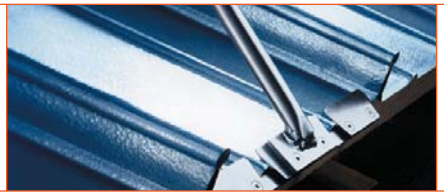
The raw material that contains aluminum - bauxite - is one of the most plentiful on our planet with at least 300 years of current reserves left at the present rates of usage – a figure that is improved by the increasing amount of aluminum that is being recycled.

Aluminum products enjoy a longer life than alternative building materials and thus conserve energy and resources. Kalzip is a fully demountable system which, at the end of the buildings life, can be unzipped and reused or recycled with no loss of quality or volume.

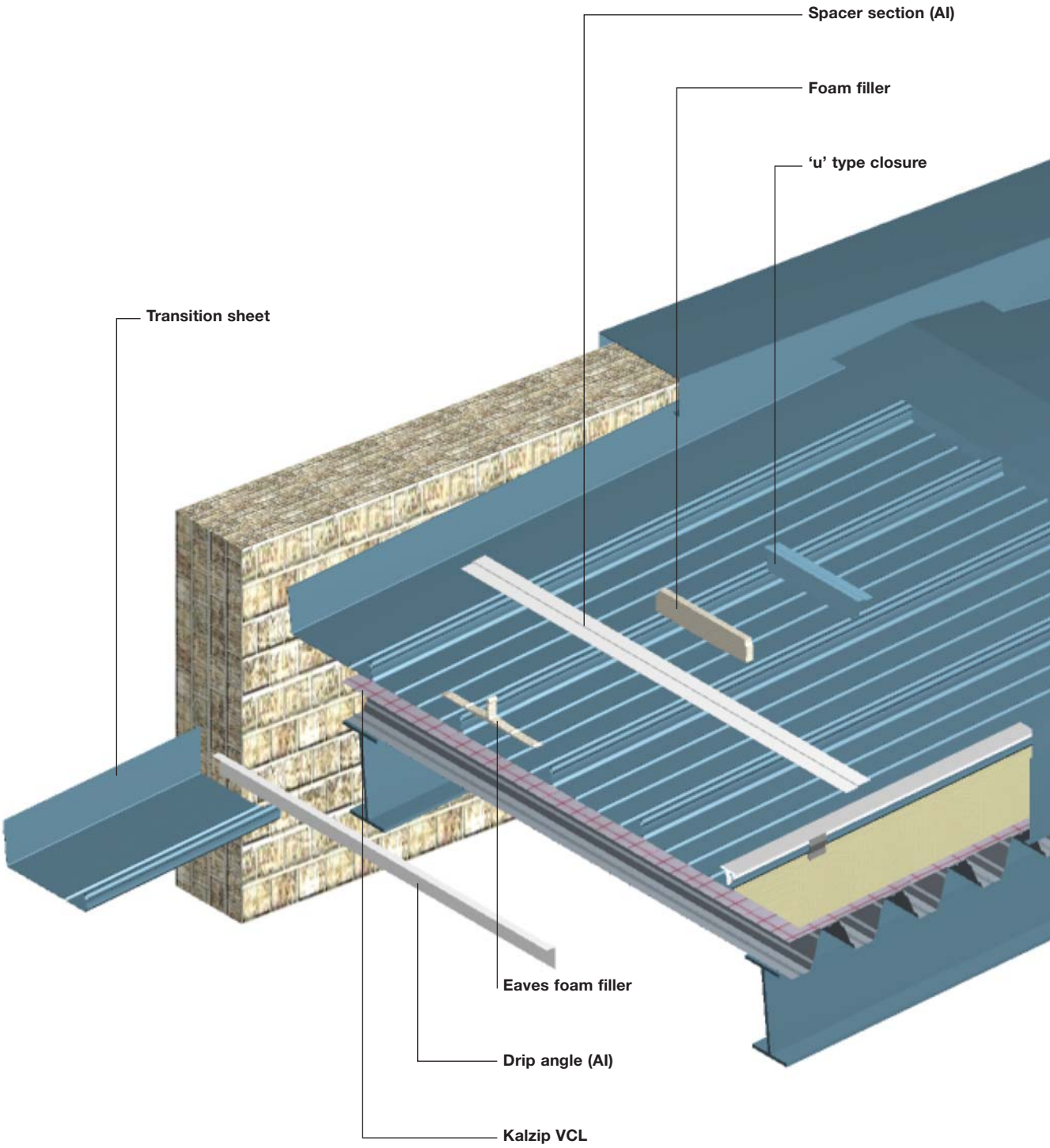
A study by Delft University, supported by the European Aluminum Association through the Aluminum for Future Generations programme, praised aluminum as a valuable resource in our programme of sustainability. The report found that the general collection rates of aluminum from individual buildings was between 93 and 98 per cent – almost total recovery. A copy of the report is available on request.



Gable

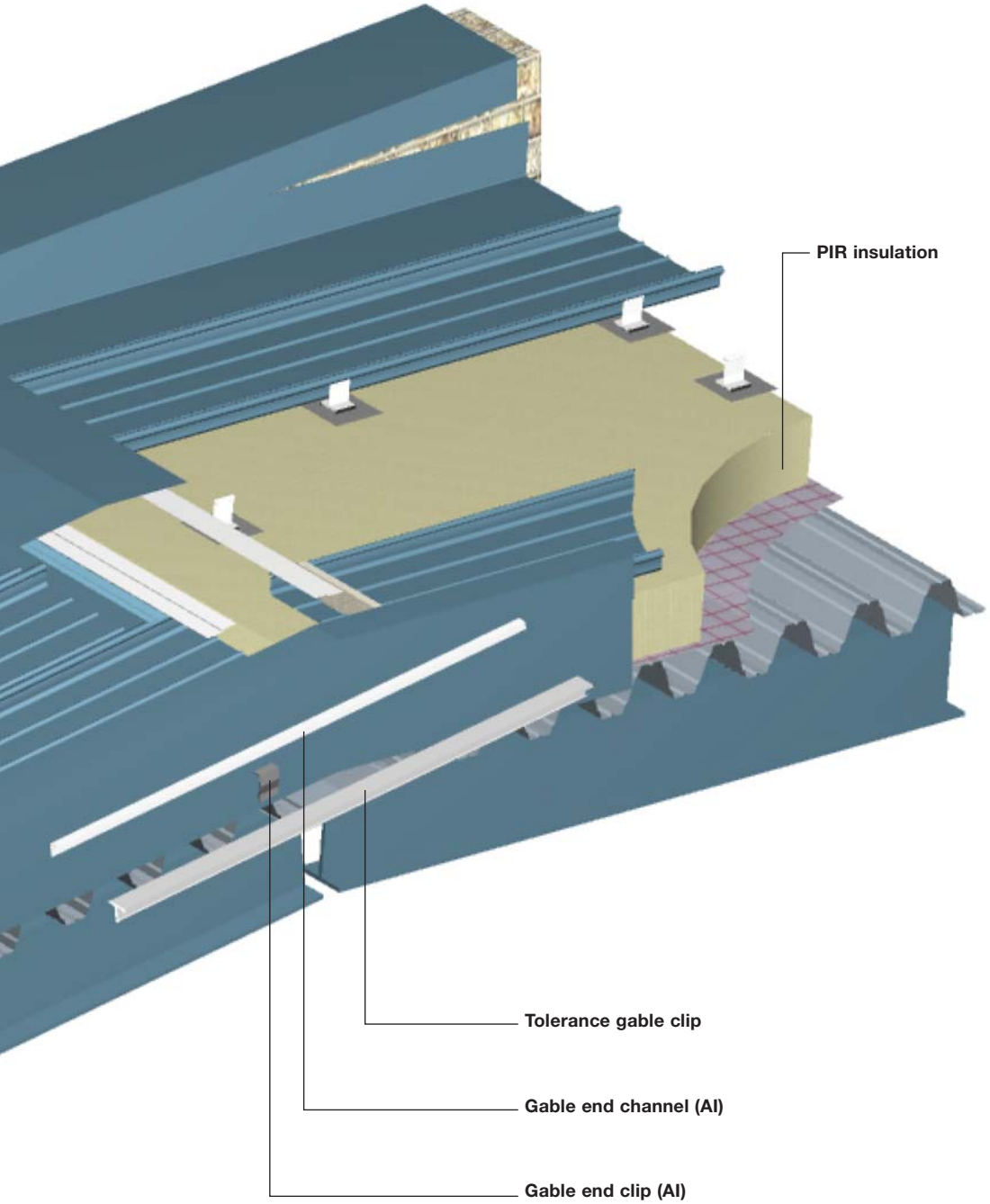


Eaves

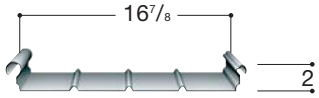
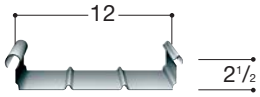
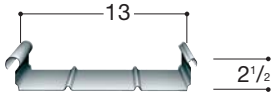
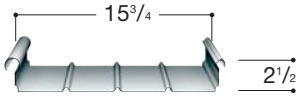
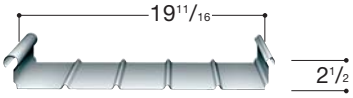
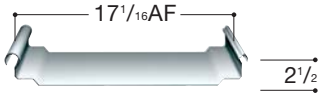

Spacer section (Al)
Foam filler
'u' type closure
Transition sheet
Eaves foam filler
Drip angle (Al)
Kalzip VCL

Drip angle

Ridge



The system and its components

Product code		Gauge/thickness in.
Kalzip™ 50/429		0.047 0.040 0.035 0.032
Kalzip™ 65/305		0.047 0.040 0.035 0.032
Kalzip™ 65/333		0.047 0.040 0.035 0.032
Kalzip™ 65/400		0.047 0.040 0.035 0.032
Kalzip™ 65/500		0.047 0.040 0.035 0.032
Kalzip™ AF 65/434		0.047 0.040 0.035 0.032

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.

There are many variations in shape

straight

convex curved

concave curved

tapered

tapered-convex curved

elliptically curved

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

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.

The clip heads are designed to freely accommodate movement of the external sheet during thermal cycling, which enables the use of very long sheet lengths.

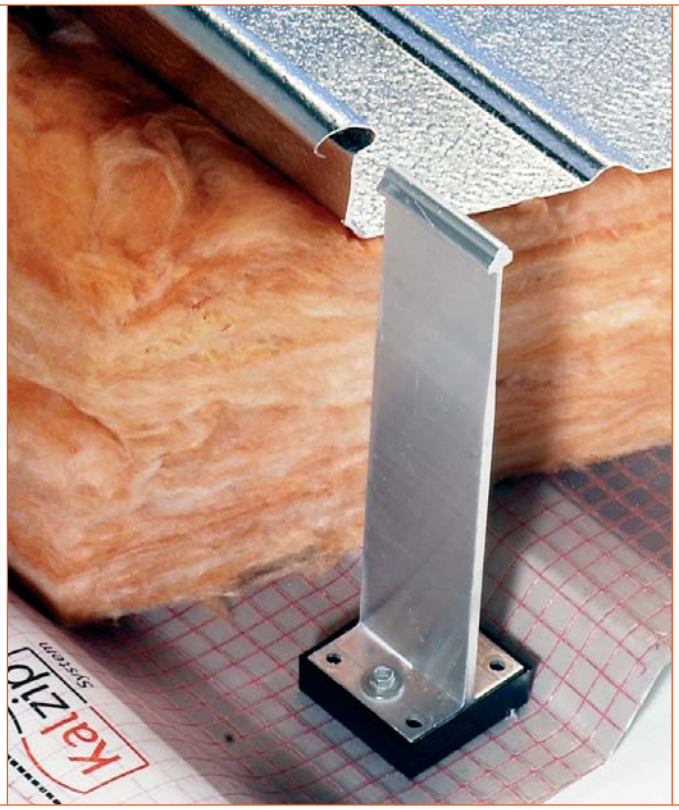
National, European and International regulations and standards gave rise to a dramatic increase in insulation thickness and the need for more thermally efficient clip/support elements.

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 in. 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.

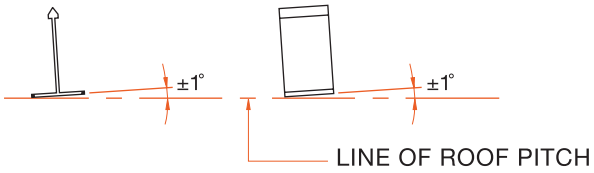
In addition to ensuring minimal thermal impairment - the clips also reduce the frictional forces generated during thermal cycling of the external sheet.

The benefit of reduced friction enables Kalzip to recommend that the E clip be used on roof areas with sheet lengths exceeding 130 feet. The thermal performance of the Kalzip E clips has been derived from hot-box testing carried out to EN ISO 8990:1996 - Thermal Insulation - Determination of steady-state thermal transmission properties – Calibrated hot box.

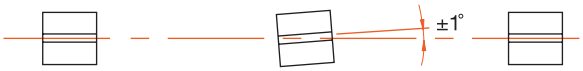


Variations in one line of clips

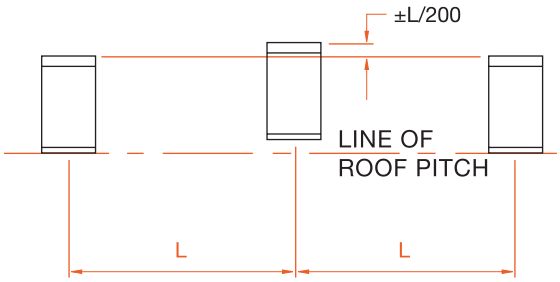
Clips must be vertical on the line of the roof pitch. Structural steelwork must allow for the installation of the clips within the stated tolerances.



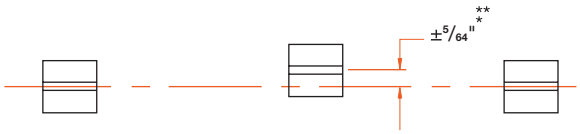
Clips must not be set-out skewed.



Vertical variation of clips heads in line (over any 3 purlins). Structural support must not vary in level between purlins.



Plan variations of clip heads in line (over any 3 purlins).

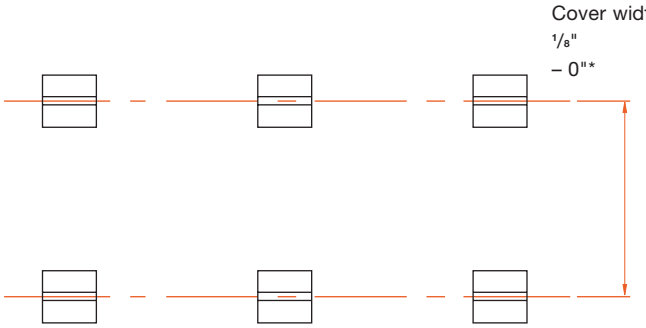


* ± 1/32" when the line of clips is set-out at the system dimension – 1/32"

** Under no circumstances should the distance between adjacent clips be less than the system dimension – 5/64"

Variations between lines of clips- plan variations

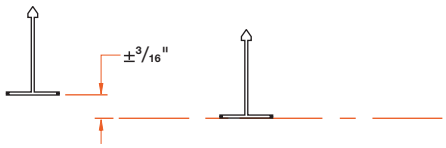
It is recommended that lines of clips are set-out to the system dimension.



* -1/32" will be acceptable if limited to a small area of Kalzip sheets, e.g. when "closing" to a predetermined finishing point, gable etc.

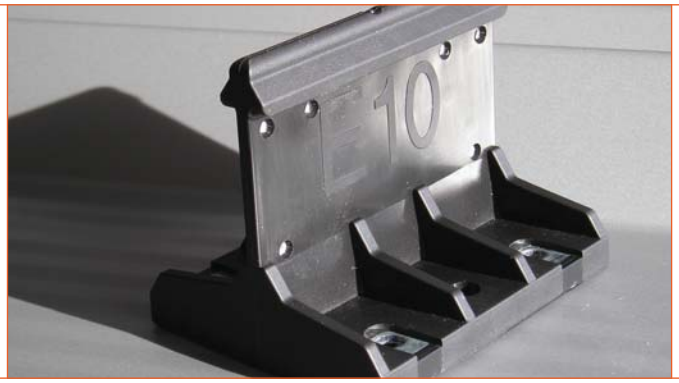
Vertical variations (i.e. step in purlin runs)

Structural support must be installed so as not to cause steps between clips.



NB Applies to complete line of clips only.

Clarks Village, Somerset, England



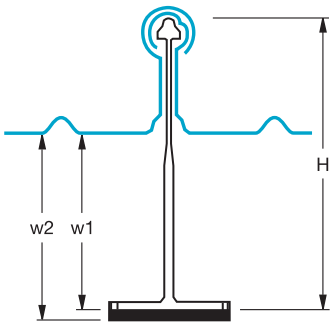
E10 Clip

Clip dimensions and base details

Aluminum clip dimensions

Kalzip self-supporting sheet

		Kalzip 65		Kalzip 50	
Clip type	**Clip height H**	**W1**	**W2 (TK 5)**	**W1**	**W2 (TK 5)**
L10	2.598"	Not possible		0.787"	0.984"
L25	3.189"	0.787"	0.984"	1.181"	1.575"
L50	4.173"	1.772"	1.969"	2.362"	2.559"
L60	4.567"	2.165"	2.362"	2.756"	2.953"
L80	5.354"	2.953"	3.150"	3.543"	3.740"
L90	5.748"	3.346"	3.543"	3.937"	4.134"
L100	6.142"	3.740"	3.937"	4.331"	4.528"
L110	6.535"	4.134"	4.331"	4.724"	4.921"
L120	6.929"	4.528"	4.724"	5.118"	5.315"
L130	7.323"	4.921"	5.118"	5.512"	5.709"
L140	7.717"	5.315"	5.512"	5.906"	6.102"
L150	8.110"	5.709"	5.906"	6.299"	6.497"
L190	9.685"	7.283"	7.480"	7.874"	8.071"

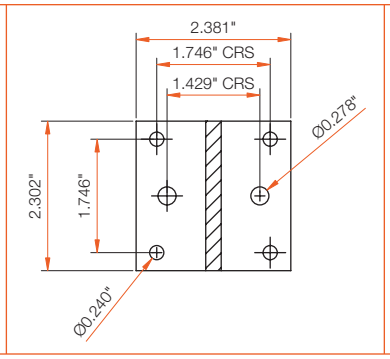


H = height of clip without thermal barrier pad

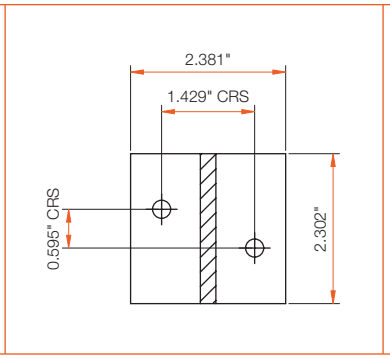
w1 = distance between underside of Kalzip sheet and underside of the aluminum clip

w2 = distance between underside of Kalzip sheet and underside of the aluminum clip with thermal barrier pad

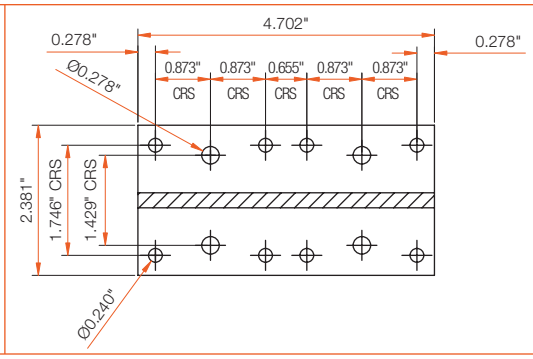
Aluminum clip base details



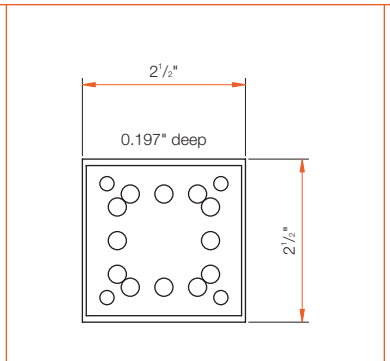
Standard clip base detail



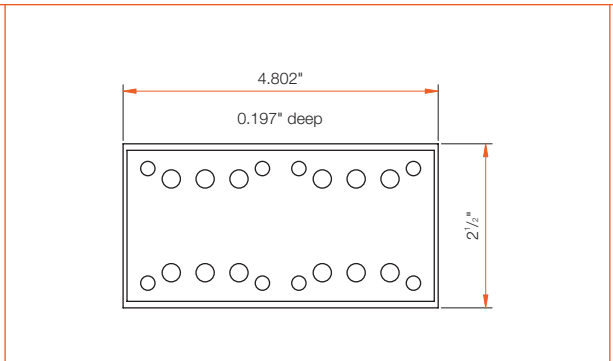
Clip base detail
(for fixing to min. 3" wide timber purlins



Double length clip base detail



Thermal barrier pad TK5

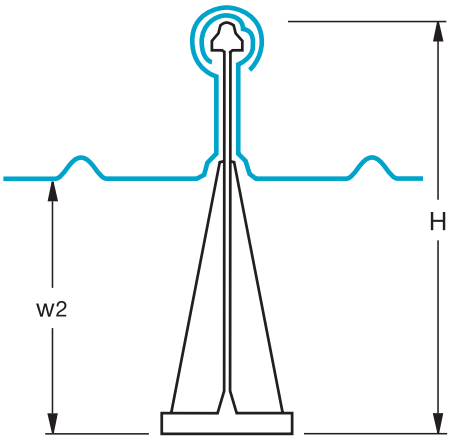


Thermal barrier pad TK5 for double length clip

E clip dimensions

The range of E clips is E10, E25, E140, E160 and E180 with clip heights and working dimensions as shown in the table below.

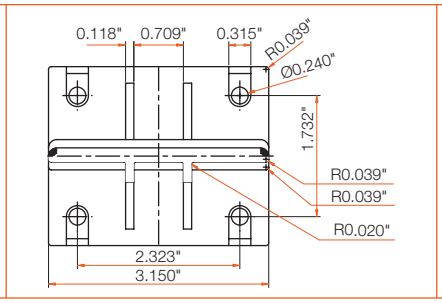
All clips can be installed to structural decking and top-hat sub-purlins. The E180 has a different holing arrangement making it also suitable for fixing direct to thin-gauge cold-rolled purlins. The E10 is only suitable with the Kalzip 50 and AF profiles.



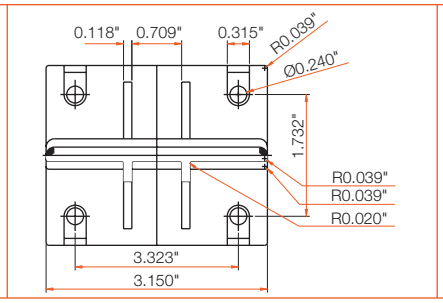
		Kalzip 65	Kalzip 50	Kalzip AF
E clip type	**Clip height H**	**w2**	**w2**	**w2**
E10	2.598	N/A	0.787	0.197
E25	3.386	0.984	1.574	0.984
E140	7.913	5.512	6.102	5.519
E160	8.701	6.299	6.890	6.299
E180	9.488	7.086	7.677	7.086

Dimensions in in.

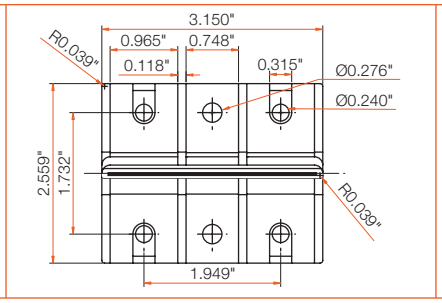
E clip base details



Base dimensions for E140 and E160



Base dimensions for E180 clips



Base dimensions for E10 and E25

Setting-out tolerances

Kalzip is manufactured to high engineering tolerances because of the critical nature of the side lap arrangement and engagement over the head of the clip.

The tolerances outlined are recommended to enable Kalzip elements to accommodate full thermal movement over the clips without locking and introducing unwanted ‘fixed points’. It is assumed that the Kalzip element when fixed in place will follow a straight line or single curve over their entire length. Multiple curves resulting in dips or sudden changes in slope may cause a transfer of ‘fixed point’, thus making redundant the normal designed ‘fixed point’.

Leuven Railway Station, Belgium

Beihai International Airport, China

Kalzip VCL

It is good practice to enhance the performance of a roofing system by incorporating a suitable vapor retarder.

A vapor retarder 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 VCL is 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 Kalzip 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 Kalzip VCL to be specified would be dependent upon the use of the building and therefore the condensation risk.

Recommended Kalzip VCL for Kalzip roofing and cladding systems

Humidity class[3]	Typical building type	Kalzip VCL[1] Liner/decking configuration	
		Solid liner or perforated decking	Perforated liner sheet and solid
1 Very low	Storage areas	Kalzip VCL clear with one row of Kalzip VCL sealing tape[2]	Kalzip VCL clear with one row of Kalzip VCL sealing tape
2 Low	Offices, shops	Kalzip VCL clear with one row of Kalzip VCL sealing tape	Kalzip VCL clear with one row of Kalzip VCL sealing tape
3 Medium	Dwellings with low occupancy	Kalzip VCL clear with one row of Kalzip VCL sealing tape	Kalzip VCL foil with one row of Kalzip VCL sealing tape
4 High	Dwellings with high occupancy, sports halls, kitchens, canteens: buildings heated with unflued gas heaters	Kalzip VCL foil with one row of Kalzip VCL sealing tape	Kalzip VCL foil with one row of Kalzip VCL sealing tape
5 Very high	Special buildings, e.g. laundry, brewery, swimming pool	Kalzip VCL foil sealed with two rows of Kalzip VCL sealant tape	Kalzip VCL foil sealed with two rows of Kalzip VCL sealant tape

Notes:
1. The Kalzip VCL must be fully sealed at all side and end laps, penetrations and perimeter details to ensure the required level of air-tightness for the building envelope.
2. On humidity class 1 (very low) buildings where there is limited flashing details and penetrations it may be feasible to omit the Kalzip VCL. The Kalzip liner sheet should be fully sealed at all side and end laps, penetrations and perimeter in this instance.
3. Humidity Class of buildings taken from BS EN ISO 13788:2002 – Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – calculation methods.

System configurations and details

There are a number of Kalzip systems available with the Kalzip standing seam outer roof sheet, which may also comprise of insulation, Kalzip vapor retarder (VCL) to reduce the risk of condensation and an internal liner tray or structural deck. All of these systems incorporate the variable depth patented extruded aluminum or reinforced polyamide E clips.

A basic Kalzip system is simply Kalzip sheets directly over open purlins secured with Kalzip clips with (fig. 2) or without (fig. 1) draped foil backed insulation. This type of roof construction can be used on metal building constructions, water reservoir covers or over space framing, such as for arenas, carports or canopies.

One of the most common types of roofing system used in North America consists of the Kalzip standing seam outer sheet, PIR insulation, Kalzip clips on plates, VCL and liner sheet or structural deck (fig. 3). This type of Kalzip system is suitable for a variety of buildings such as schools, warehouses, offices and commercial buildings. Another typical system that is often used in condos, apartments or schools is when the outer sheets are fixed with Kalzip clips on timber insulated deck (fig. 4).

For projects where speed of installation is vital a Kalzip low profile liner roof system is ideal. This system comprises of the Kalzip standing seam outer sheet, insulation, Kalzip clips, VCL and a liner sheet (fig. 5). This system is predominantly used for new build construction, although it is also suitable for retro-fit especially where the existing roofing system has been completely removed.

The Kalzip deck roof system consists of a Kalzip standing seam outer sheet, insulation, clips, VCL and a Kalzip

Key to illustrations:

1. Kalzip outer standing seam sheet
2. Insulation
3. Kalzip extruded aluminum or reinforced polyamide E clips
4. Kalzip vapor retarder (VCL)
5. Liner tray
6. Structural decking
7. Top-hat sub-purlin

* AF profile

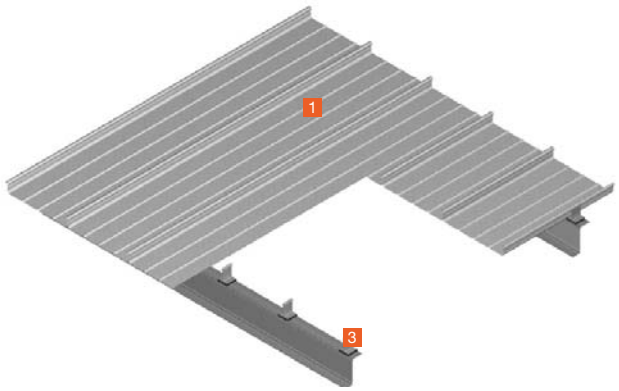


fig. 1

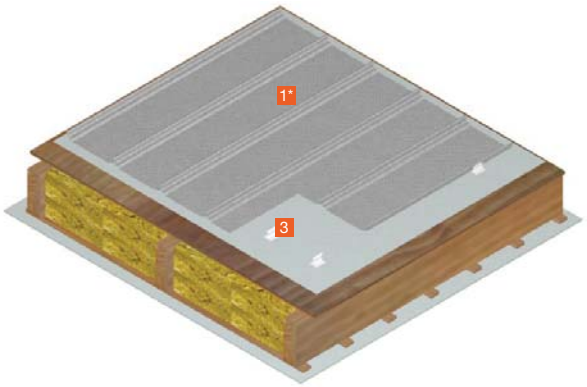


fig. 4

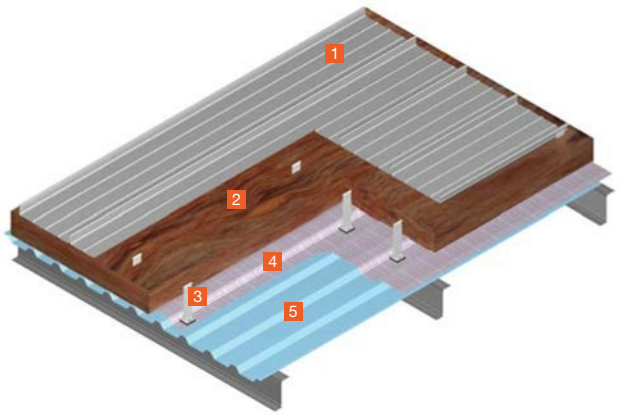


fig. 5

structural decking sheet (fig. 6). The Kalzip standing seam outer sheet is supported off Kalzip clips and fixed directly or indirectly to the structural decking sheet. This system provides an economical solution for all types of industrial, commercial, leisure, retail and residential buildings where a long-spanning rafter-to-rafter roof construction is required.

Another suitable system for when speed of installation is required consists of a Kalzip standing seam outer sheet, insulation, Kalzip clips, VCL and a liner-deck sheet (fig. 7). The Kalzip standing seam outer sheet is supported off Kalzip clips which in turn are supported off a top-hat sub-purlin fixed direct to the Kalzip liner-deck sheet. This system is predominantly used for new build construction where purlin centers are greater than normal.

Kalzip roof systems can be modified to accommodate various acoustic performance requirements by incorporating other layers such as high density insulation, acoustic boards and flexible membranes to provide increased sound reduction performance. The liner can also be perforated to provide increased sound absorption performance.

Kalzip liners and structural decks are available as standard in high grade steel or aluminum. Standard finishes include a galvanized finish or white polyester coating for a more aesthetically pleasing appearance. A full range of alternative colors and coatings is also available on request.

For assistance in the selection of the most appropriate Kalzip roof system contact the Kalzip Technical Department.

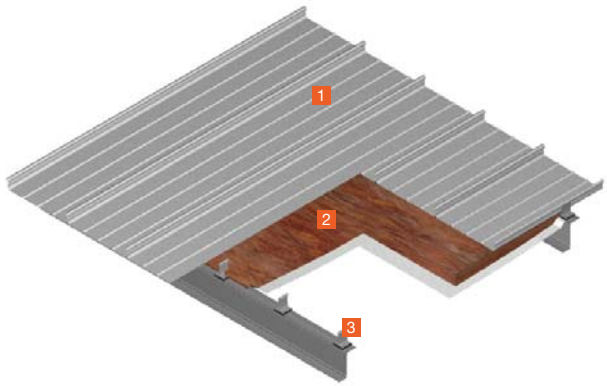


fig. 2

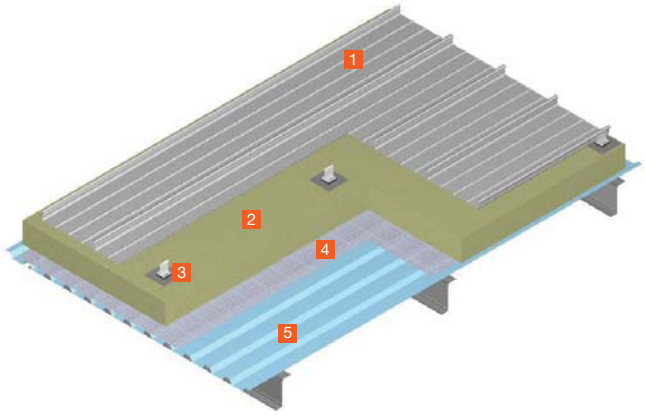


fig. 3

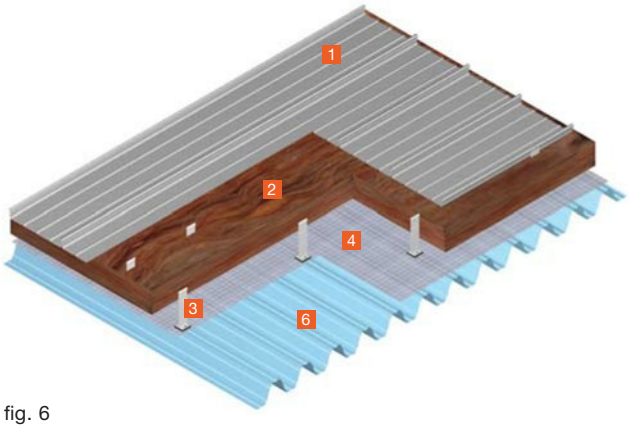


fig. 6

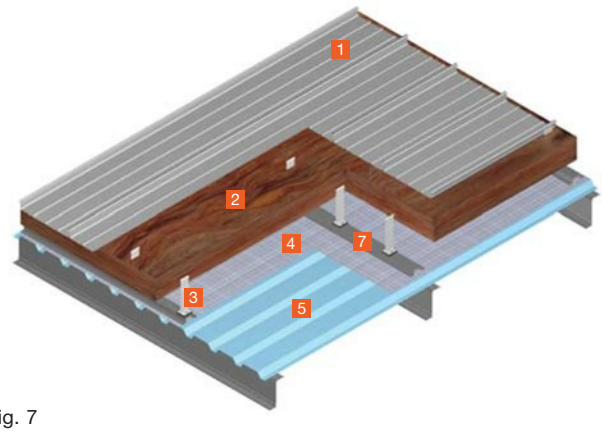


fig. 7

Design flexibility

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

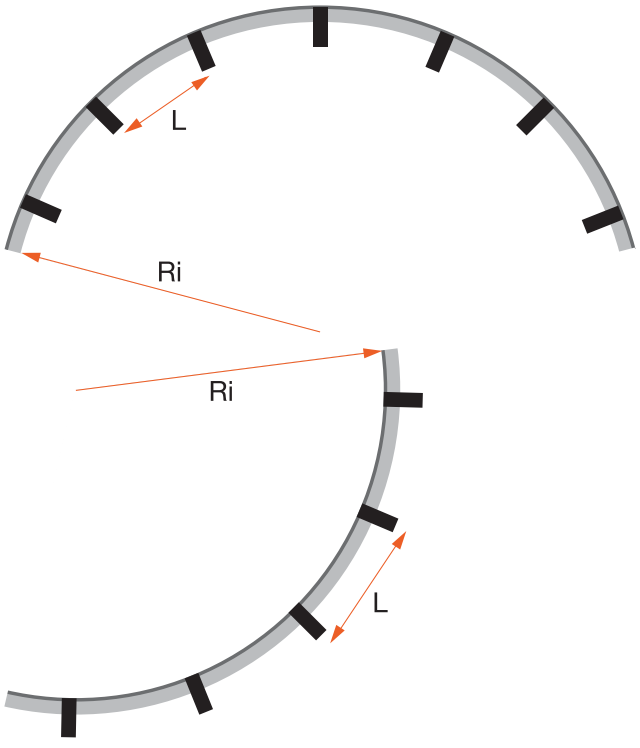
Kalzip roof sheets can be produced with a convex or concave radius utilizing 3 methods:

- **Natural curved**
  - minimum convex radii 131' to 170' subject to gauge & cover width
  - minimum concave radii 147' to 196' subject to gauge & cover width
- **Machine curved** (smooth curved)
  - minimum radii 5' to 131', subject to gauge and finish
- **Crimp curved**
  - minimum radii 1½' – convex only

Natural curving

Parameters

Kalzip profile	Gauge in.	Support spacing L	Convex radius Ri	Concave radius Ri
305	0.035	5' 2"	131'	147'
up to	0.040	5' 10"	147'	164'
500	0.047	6½'	170'	196'



Factory curved

The following applies to all forms of machine curved profiles:

- Curves can be produced with, one or two straight legs – min leg 16".
- Maximum sheet length subject to handleability/transportation
- Minimum sheet length 5'

Concaved curving

Kalzip profile	0.035"	0.040"	0.047"
65 std profiles	53'	40'	26'
50 std profiles	40'	30'	26'
AF std profiles	53'	40'	33'
AS std profiles	66'	59'	46'

Convex curving

Kalzip profile	0.035"	0.040"	0.047"
65 std profiles	20'	10'	5'
50 std profiles	20'	6½'	6½'
AF std profiles	33'	20'	17'
AS std profiles	66'	46'	33'

Waveform - Concave / Convex or Convex / Concave

Kalzip profile		0.035"	0.040"	0.047"
65/305		66' + 66'	53' + 53'	33' + 33'
65/333		66' + 66'	53' + 53'	33' + 33'
65/400		66' + 66'	53' + 53'	33' + 33'
65/500		66' + 66'	53' + 53'	33' + 33'
50/429		66' + 66'	53' + 53'	33' + 33'
65/434	AF	66' + 66'	53' + 53'	33' + 33'

NB - For radii outside the above parameters please contact the Kalzip Technical Department.

Tapering

Tapered convex

Kalzip profile	0.035"	0.040"	0.047"
50 std profiles	33'	20'	17'
65 std profiles	33'	23'	23'

Tapered concave

Kalzip profile	0.035"	0.040"	0.047"
50 std profiles	40'	33'	33'
65 std profiles	33'	27'	27'

Site curving

Site curving is also possible subject to space availability. Please contact the Kalzip Technical Department for further details.

Tapered sheets

Tapered Kalzip profile sheets have become increasingly significant for roofing applications as they can be formed into a diverse range of shapes. A roof can offer more than just protection: it can give the building architectural perfection. For a perfect construction some fundamental aspects have to be observed. The minimum and maximum cover widths are between 9 in. and 23 in.

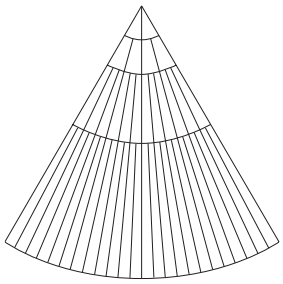
Tapered Kalzip sheets have to be installed on the roof by following the precise instructions laid down in the relevant installation plan.

It is advisable to check the actual dimensions of the substructure against the dimensions on the installation plan before the production is started.

The bottom sheet must be supported by an insulation material of sufficient compressive strength if the taper size exceeds 16 in. To achieve the required stiffness of the bottom sheet at the eaves end of the sheet, the incorporation of an eaves angle is essential. The sheets are delivered with a standard extra length of 2 in. on both ends and have to be cut to the required actual length on site.

	Kalzip 65 and 50	Kalzip AF
Minimum construction width	9"	6½"
Maximum width	23"[1]	23"[1]
Minimum length	59"	59"
Maximum length	Dependent on transport	Dependent on transport
Gauge	0.035" – 0.047"	0.035" – 0.047"
Curved and tapered	Possible for construction widths of 9" to 25" max. Only following approval from the Kalzip Technical Department.	

[1] Applies only to stucco-embossed and color-coated Kalzip profile sheets. Other material combinations are available on request.

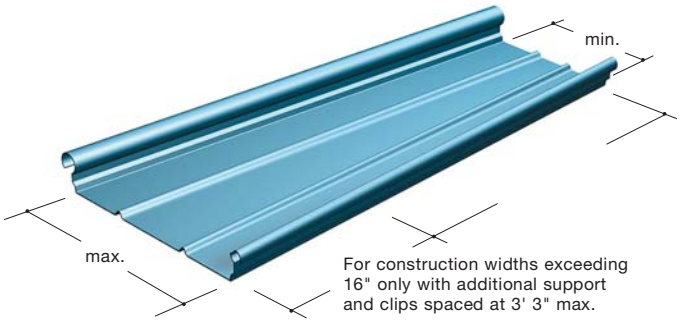


Sheet layout example with joints
Self-supporting up to a pan width of 16"

Spatio, The Netherlands

Finishes

- Stucco-embossed
- AluPlusPatina
- Coated material (with protection foil)
- AluPlusZinc (with protection foil)
- Stainless Steel
- Copper



For construction widths exceeding 16" only with additional support and clips spaced at 3' 3" max.

Materials and finishes

Natural aluminum

Kalzip standing seam and profiled cladding sheets are available as standard in a stucco embossed finish which is achieved by processing the natural mill finish material through embossing rollers. This provides a surface which diffuses light reducing reflectivity and glare. As aluminum is both stable and durable, it provides excellent service as a roofing or cladding material without the need for any protective coating.

After exposure to the elements, the original highly reflective surface of aluminum will dull down to a uniform patina finish and changes in appearance will be consistent along any elevation. The weathering effect is particularly well illustrated below on the City of Manchester Stadium, England. In the space of just 12 months the original roof had dulled down. The new north stand will lose much of its high reflectivity and tone down to match the original Kalzip material.

For specifications that can not wait for nature to take its course and want an instant matt grey appearance, a pre-weathered finish – AluPlusPatina is available. Furthermore, Kalzip is available in other materials and finishes including zinc, stainless steel, copper and color, providing the specifier with unrivaled aesthetic and performance options.

AluPlusPatina

Kalzip AluPlusPatina provides an attractive metallic design option with a high quality, matt appearance. The pre-weathered profile sheets are made from resistant stucco embossed aluminum with additional surface treatment. With this treatment, the aluminum surface loses its natural shine and significantly reduces reflection – by up to 20% in some cases.

AluPlusZinc

Kalzip AluPlusZinc offers all the performance benefits of traditional aluminum together with the aesthetic appeal of zinc. The unique patented PEGAL process produces a highly durable fusion between the aluminum substrate and the thin zinc layer eliminating most of the corrosion problems associated with zinc roofing and allowing simpler and more cost effective roof constructions to be created.

Stainless steel

The Kalzip standing seam roofing and cladding system can be supplied in austenitic stainless steel - a long life, low maintenance and corrosion resistant building material available in more than one finish. A wide range of stainless steel fabrications is available to fully support a roof or wall specification.

Weathered aluminum, 12 months variation

AluPlusPatina

AluPlusZinc

Stainless steel

Copper

Copper Kalzip combines the aesthetic and durable properties of copper with the added benefit of low costs over the material's lifespan.

It is an exceptionally strong, anti-corrosive and virtually maintenance-free material with an initial bright appearance that weathers gradually to mellow bronze tones through to a rich green patina in roofing and anthracite brown in vertical applications. Copper Kalzip can also be offered partially or fully pre-weathered.

Color coated

Although, in the majority of cases, aluminum provides excellent service without the need for any protective coating, there are applications where the metal requires protection against a particularly aggressive environment or the client simply requires color.

A user may choose to specify a coating in color to match existing buildings, to comply with building requirements or to conform with the customer's visual expectations, or the use of infra-red paint may be required to aid reflectivity.

Decorative and ultimate life spans

System	Decorative life*	Ultimate life
Polyester	10	30 +
Polyester powder	15	30 +
ARS	15	30 +
PVdF	20	30 +

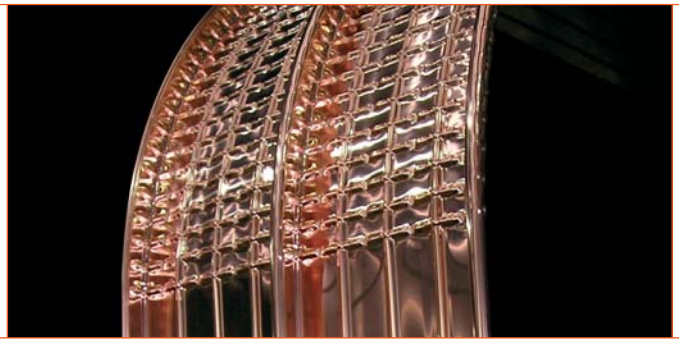
*Decorative life is given for typical industrial environments; these figures may be extended for rural applications

Performance	PVdF	ARS	Polyester
Scratch resistance	G	E	G
Stain resistance	E	G	G
Color fastness	E	G	G
Weathering	E	G	G
Chalking resistance	E	G	M

E = Excellent G = Good M = Moderate

Special effects

Modern coil coating techniques can produce a variety of special effects, these can include patterns and tonal variations. Such effects are normally only possible for large areas of cladding. Any such requirements and for further information and details on the care and maintenance of coated aluminum, contact the Kalzip Technical Department.



Copper

Color

Restaurant d'Enterprise Filhet Alliord and Cie, France

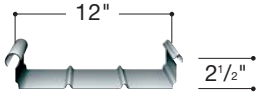
Hobbayne Primary School, London, England

Load span tables

Aluminum Kalzip with aluminum clips

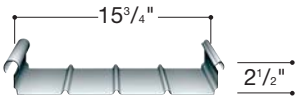
The following tables give the allowable loading of various aluminum Kalzip profiles with Kalzip extruded aluminum clips. All values are for multiple span conditions and are given in psf.

Kalzip 65/305 with aluminum clips



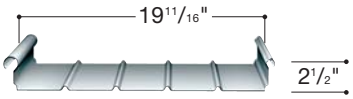
Gauge (in)	Span (ft.in)									
	3' 0"	3½'	4' 0"	4½'	5' 0"	5½'	6' 0"	6½'	7' 0"	7½'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	103	89	78	69	58	49	43	37	33	29
0.035	143	123	108	96	86	75	64	55	48	43
0.040	183	157	138	122	110	97	82	71	62	54
0.050	214	183	161	143	129	117	107	93	80	70
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	171	147	128	114	102	85	71	61	52	45
0.035	171	147	128	114	102	93	85	73	63	55
0.040	171	147	128	114	102	93	85	79	73	63
0.050	171	147	128	114	102	93	85	78	73	68

Kalzip 65/400 with aluminum clips



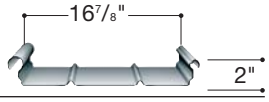
Gauge (in)	Span (ft)									
	3' 0"	3½'	4' 0"	4½'	5' 0"	5½'	6' 0"	6½'	7' 0"	7½'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	84	72	63	56	49	42	36	31	28	25
0.035	116	99	87	77	70	63	55	47	41	36
0.040	148	127	111	99	89	81	70	60	53	46
0.050	174	149	130	116	105	95	87	79	69	60
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	130	112	98	87	78	71	59	51	44	38
0.035	130	112	98	87	78	71	65	60	53	46
0.040	130	112	98	87	78	71	65	60	55	51
0.050	130	111	97	86	78	71	65	60	55	52

Kalzip 65/500 with aluminum clips



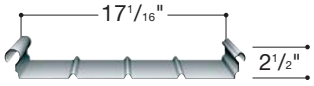
Gauge (in)	Span (ft)									
	3' 0"	3½'	4' 0"	4½'	5' 0"	5½'	6' 0"	6½'	7' 0"	7½'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	63	54	47	42	38	34	29	25	23	20
0.035	87	75	66	58	53	48	44	38	34	30
0.040	112	96	84	75	67	61	56	49	43	38
0.050	131	113	99	88	79	72	66	61	57	50
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	104	89	78	69	62	53	45	38	33	28
0.035	104	89	78	69	62	57	52	48	42	37
0.040	104	89	78	69	62	56	52	48	44	41
0.050	104	89	78	69	62	56	52	48	44	41

Kalzip 50/429 with aluminum clips



Gauge (in)	Span (ft)									
	3' 0"	3 1/2'	4' 0"	4 1/2'	5' 0"	5 1/2'	6' 0"	6 1/2'	7' 0"	7 1/2'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	65	55	48	43	39	35	31	27	23	20
0.035	89	76	67	59	52	44	37	32	28	25
0.040	114	97	85	76	68	61	51	43	34	28
0.050	123	106	92	82	74	64	55	48	43	38
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	122	104	83	67	55	45	38	32	26	21
0.035	122	104	91	81	66	55	47	36	29	24
0.040	122	104	91	81	73	65	52	40	32	26
0.050	121	104	91	81	72	66	60	48	39	31

Kalzip AF 65/434 with aluminum clips



Gauge (in)	Span (ft)									
	3' 0"	3 1/2'	4' 0"	4 1/2'	5' 0"	5 1/2'	6' 0"	6 1/2'	7' 0"	7 1/2'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	46	40	35	31	28	25	23	22	20	19
0.035	68	59	51	46	41	37	34	32	30	27
0.040	92	79	69	61	55	50	46	42	38	33
0.050	111	95	84	74	67	61	56	52	48	45
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	120	103	90	75	62	52	44	38	33	29
0.035	120	103	90	80	72	62	53	46	40	36
0.040	120	103	90	80	72	63	55	48	43	38
0.050	120	103	90	80	72	65	60	54	48	42

Notes:

1 All loads are in psf (lbf/ft²), and are assumed to be applied uniformly.

2 The following shading denotes the limiting criteria:

support clips deflection stress

3 The self-weight of the Kalzip sheeting has been taken into account in the above loadings

4 The following load factors have been taken into account in the design capacity of the sheeting:

Dead load = 1.4

Dead load (restraining wind uplift) = 1.0

Snow load = 1.5 (1.65 total load and material factor)

Wind load = 1.5 (1.65 total load and material factor)

Attachment resisting wind uplift = 2.0 (total load and material factor)

5 All spans are assumed to be equal or within 15% of largest span

6 The above snow loadings are applicable for Kalzip sheets with aluminum L.190 clips or below.

7 The characteristic values (section properties) of aluminum alloy Kalzip standing seam sheets, on which these load span tables have been derived, have been determined by testing and analysis and are contained within Zulassungbescheid Nr. Z-141.1-181 issued by Deutches Institut für Bautechnik, Berlin.

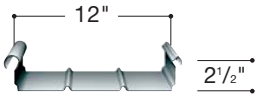
8 All imperial dimensions, units and values given have been derived from their original metric format and should be treated as being nominal only.

9 For loading conditions outside of the above and for any other queries please contact the Kalzip Technical Department.

Aluminum Kalzip with E clips

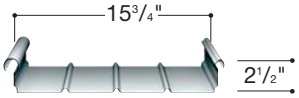
The following tables give the allowable loading of various aluminum Kalzip profiles with Kalzip reinforced polyamide E clips. All values are for multiple span conditions and are given in psf.

Kalzip 65/305 with E clips



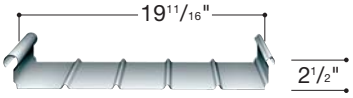
Gauge (in)	Span (ft.in)									
	3' 0"	3½'	4' 0"	4½'	5' 0"	5½'	6' 0"	6½'	7' 0"	7½'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	69	59	52	46	42	38	35	32	30	28
0.035	96	82	72	64	58	52	48	44	41	38
0.040	122	105	92	81	73	67	61	57	53	49
0.050	163	140	122	109	98	89	82	76	70	66
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	68	58	51	45	41	37	34	31	29	27
0.035	68	58	51	45	40	37	34	31	29	27
0.040	68	58	51	45	40	37	34	31	29	27
0.050	68	58	51	45	40	36	33	31	28	26

Kalzip 65/400 with E clips



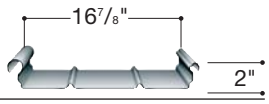
Gauge (in)	Span (ft)									
	3' 0"	3½'	4' 0"	4½'	5' 0"	5½'	6' 0"	6½'	7' 0"	7½'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	53	45	40	35	32	29	27	25	23	21
0.035	73	63	55	49	44	40	37	34	31	29
0.040	93	80	70	62	56	51	47	43	40	37
0.050	124	107	93	83	75	68	62	58	54	50
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	52	44	39	34	31	28	26	24	22	20
0.035	52	44	39	34	31	28	26	23	22	20
0.040	52	44	39	34	31	28	25	23	22	20
0.050	51	44	38	34	31	28	25	23	22	20

Kalzip 65/500 with E clips



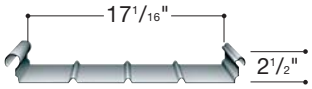
Gauge (in)	Span (ft)									
	3' 0"	3½'	4' 0"	4½'	5' 0"	5½'	6' 0"	6½'	7' 0"	7½'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	42	36	32	28	26	23	21	20	18	17
0.035	58	50	44	39	35	32	29	27	25	24
0.040	75	64	56	50	45	41	37	35	32	30
0.050	100	85	75	67	60	55	50	46	43	40
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	41	35	31	27	25	22	20	19	17	16
0.035	41	35	31	27	24	22	20	19	17	16
0.040	41	35	31	27	24	22	20	19	17	16
0.050	41	35	31	27	24	22	20	18	17	16

Kalzip 50/429 with E clips



Gauge (in)	Span (ft)									
	3' 0"	3½'	4' 0"	4½'	5' 0"	5½'	6' 0"	6½'	7' 0"	7½'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	42	36	32	28	26	23	21	20	18	17
0.035	61	52	46	41	37	33	31	28	26	25
0.040	79	67	59	53	47	43	39	36	34	28
0.050	116	100	87	78	70	63	55	48	43	38
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	48	41	36	32	29	26	24	22	20	19
0.035	48	41	36	32	29	26	24	22	20	19
0.040	48	41	36	32	29	26	24	22	20	19
0.050	48	41	36	32	29	26	24	22	20	19

Kalzip AF 65/434 with E clips



Gauge (in)	Span (ft)									
	3' 0"	3½'	4' 0"	4½'	5' 0"	5½'	6' 0"	6½'	7' 0"	7½'
Wind suction load case (maximum deflection = span/120) – maximum unfactored load (psf)										
0.032	49	42	37	33	29	27	25	23	21	20
0.035	71	61	53	47	43	39	36	33	31	27
0.040	93	80	70	62	56	51	47	43	38	33
0.050	119	102	89	79	71	65	60	55	51	46
Snow load case (maximum deflection = span/180) – maximum unfactored load (psf)										
0.032	48	41	36	32	28	26	24	22	20	19
0.035	48	41	36	32	28	26	24	22	20	19
0.040	48	41	36	31	28	26	23	22	20	19
0.050	47	41	35	31	28	25	23	21	20	18

Notes:

1 All loads are in psf (lbf/ft²), and are assumed to be applied uniformly.

2 The following shading denotes the limiting criteria:

support clips deflection stress

3 The self-weight of the Kalzip sheeting has been taken into account in the above loadings

4 The following load factors have been taken into account in the design capacity of the sheeting:

Dead load = 1.4

Dead load (restraining wind uplift) = 1.0

Snow load = 1.5 (1.65 total load and material factor)

Wind load = 1.5 (1.65 total load and material factor)

Attachment resisting wind uplift = 2.0 (total load and material factor)

5 All spans are assumed to be equal or within 15% of largest span

6 The above snow loadings are applicable for Kalzip sheets with E180 clips.

7 The characteristic values (section properties) of aluminum alloy Kalzip standing seam sheets, on which these load span tables have been derived, have been determined by testing and analysis and are contained within Zulassungbescheid Nr. Z-141.1-181 issued by Deutches Institut für Bautechnik, Berlin.

8 All imperial dimensions, units and values given have been derived from their original metric format and should be treated as being nominal only.

9 For loading conditions outside of the above and for any other queries please contact the Kalzip Technical Department.

Acoustics

Kalzip roof constructions can be modified to accommodate various acoustic performance requirements, by incorporating other layers such as high density insulation, acoustic boards and flexible membranes to provide increased sound reduction performance and by perforating the liner to provide improved sound absorption performance.

Acoustic performance is an important consideration in the design of buildings, especially within the education sector. Multi-layer forms of construction achieve better results and the built-up Kalzip system allows for many combinations to address various acoustic requirements within a building. By using its different system variations Kalzip can assist in achieving the right sound reduction and/or absorption levels required for specific applications.

Over 80 tests have been conducted on Kalzip roof constructions for air-bourne sound reduction and sound absorption levels.

Sound absorption

Sound absorption is achieved by perforating the metal liner sheet and incorporating a 'soft' absorbing material behind it. Different combinations of perforations and levels of insulation will give varying results of sound absorption.

Air-bourne sound reduction

A standard insulated Kalzip roof construction will have an approximate weighted sound reduction (Rw) of 33 dB with an aluminum trapezoidal liner and 36 dB with a steel trapezoidal liner.

The Rw can be increased by varying the number and the densities of the insulation layers as well as adding additional mass into the construction e.g. through the incorporation of high density Kalzip insulation, Kalzip acoustic board or Kalzip acoustic membrane etc.

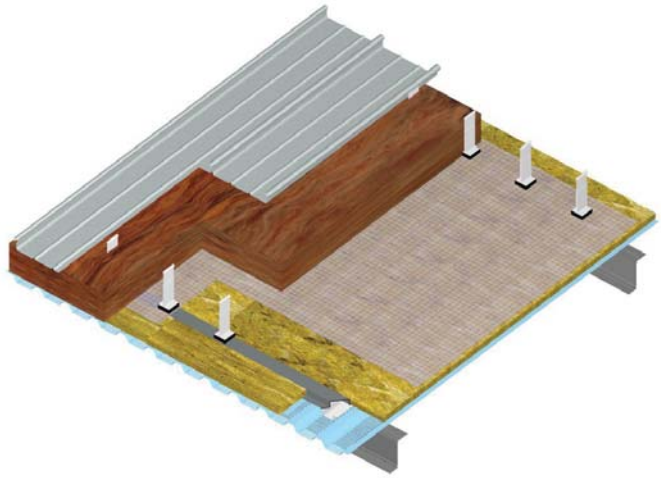
In situations with overt external noise – near a railway or airport, for instance – there is high density Kalzip acoustic board to help reduce incoming sounds.

Recent tests carried out incorporating varying types and levels of mass have recorded sound reduction rates of between 33dB and 52dB depending on the product combinations applied.

A valid consideration is Kalzip Nature Roof which adds weight and therefore 'mass' to a Kalzip system build up especially when fully saturated. This solution can be a natural way of providing dB reduction and a number of additional benefits, please refer to page 40.

Impact noise due to rainfall

In all Kalzip roof constructions the top-layer of insulation is typically a low density mineral fibre insulation which is slightly compressed to the underside of the Kalzip outer sheet. The Kalzip anti-drumming membrane is highly effective and inhibits the build up of resonant vibrations.



Kalzip roof system with high density insulation

Manchester Aquatic's Center, England

Long length Kalzip

Kalzip sheets are commonly used in long lengths (with continuous lengths in excess of 500 feet being achieved) therefore the understanding and control of thermal movement is a prime consideration.

Thermal movement

The color and finish of a roof will also play an important role in determining the anticipated thermal movement. As a rule of thumb the following thermal movement rates are adopted for aluminum.

Anticipated thermal movement in aluminum

Finish	Approx. temp attained	Movement per foot length in.
Stucco/mill	104° – 122°F	1/64
Light color	104° – 122°F	1/64
Dark color	158° – 176°F	1/32

It is recommended that on roof areas with sheet lengths exceeding 130 feet the Kalzip reinforced polyamide E clip is used.

Kalzip E clips

The Kalzip reinforced polyamide Clips (E clip) which connect the Kalzip standing seam sheets direct to a support structure and act as an insulation spacer within a Kalzip insulated system, gives minimal thermal impairment allowing thermal-bridge free roofing and wall cladding constructions to be built and necessary regulations to be met with ease.

The range of Kalzip E clips are manufactured and reinforced with a galvanized steel core and have been fully tested for structural performance in terms of wind suction attachment and load compression as well as durability.

Benefits of the Kalzip E clip include:

- Minimal heat transfer allowing thermal-bridge free roofing and cladding constructions
- Complies with the requirement of National, European and International energy conservation regulations and standards
- Excellent properties in the accommodation of thermal movement, which is particularly important where very long sheet lengths are used
- Improved sound reduction performance
- Fully tested and proven for long life durable performance
- Guaranteed to withstand the rigors of UV, live and dead loads, thermal cycling etc
- Safe load transmission from the Kalzip standing seam sheeting to the structure or sub-structure
- Quickly and simply installed using SFS intec SDK fastener system

When reinforced polyamide E clips are used within a Kalzip roof system the in-plane forces (friction forces) at the head of the clip resulting from thermal movement of the Kalzip standing seam sheet are dramatically reduced when compared with extruded aluminum clips.

This more efficient accommodation of thermal movement is particularly relevant when designing the structure, sub-structure and fasteners to accommodate long lengths of standing seam sheets potentially allowing thinner structural material and fewer fasteners to be used.

The Kalzip E clip is the standard recommendation for use on roof areas with effective sheet lengths over 130 feet (length from the fixed point).

Fixed points and clip tolerances

To control thermal movement and avoid creepage of the sheet down-slope, a ‘fixed-point’ is introduced into the system.

Fixed points are usually installed at the ridge position, thus allowing thermal movement to take place at the eaves position. According to the design there will always be exceptions to this rule, and instances of ‘fixed points’ occurring at the eaves position or mid-slope are not uncommon.

The design of the fixed point is based on a number of given criteria, such as intensity of snow loading, roof pitch and length, width and weight of sheeting.

By using standard formulae with the above criteria, the in-plane forces can be determined and the correct ‘fixed point’ can be adopted.

For further details on clip tolerances please refer to pages 9 to 12.

Fire performance

The Kalzip roof system meets the requirements for Class 1 panel roofs as per FM Approvals Standard 4471 (1995). As part of the FM Approvals process the Kalzip roof system passed the ASTM E108-93 Class A spread of flame tests. The type of construction utilising a metal liner or deck is deemed to satisfy the requirements of FM Approvals Standard 4880 for below deck combustibility without the requirement for testing.

For specific information regarding to the fire resistance performance of the Kalzip roofing and cladding systems please refer to the Kalzip Technical Department.

Durability

Kalzip aluminum roofing and cladding systems have been used extensively in construction over the past 40 years and they continue to be the preferred choice for highly demanding environmental conditions, such as industrial, city center, marine and airport locations. One of the unique features of Kalzip is the use of highly durable clad alloys for the additional protection of the core material. This outer cladding or plating gives Kalzip outstanding long term resistance to corrosion.

Testing of the material's capabilities has been ongoing throughout Kalzip's history. Most notably, in 1997, The Federal Institute for Material Research and Testing (BAM) in Germany published a test report, BAM-Ref: 1.4/11416 N1 setting out the results of test carried out in 1993 on a series of Kalzip installations, including on the roof canopy of the Congress Hall in Nuremberg. Here Kalzip 305 profile was installed in 1968 and at the time of testing was approximately 25 years old.

Lightning conduction and protective screening

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

When installing Kalzip roof or wall cladding systems there is generally no need for dedicated or additional lightning protection devices. The calculated probability of structurally damaging lightning strikes is once in every 500 years. Such a strike hitting a Kalzip clad building would cause, at worst, no more than a small hole in one of the sheet seams.

Kalzip as a conductor of lightning

Kalzip aluminum profiled sheets can be regarded as natural components of a lightning conducting system, as per the International Standard ENV 61024-1 "Protection of structures against lightning - Part 1: General Principles", because the crimped seams of the sheets give a permanent electric connection.

Southport Pier Pavilion, England

Jumairah Beach Hotel and Conference Center, Dubai, UAE

Technical requirements for lightning conducting devices

- The Kalzip sheets must be conductively connected to earth
- The seams of the Kalzip sheets must be fully zipped to ensure contact
- There must be conductive connection of the roof sheets to:
  - a conductive wall cladding (metal)
  - a steel or aluminum sub-structure
  - any concrete sub-structure must be reinforced

Kalzip as a protective screening

If the complete building envelope consists of aluminum, i.e. Kalzip systems used for both the roof and wall cladding, the envelope will halt and collect the electrical energy from lightning and safely conduct it to earth thereby preventing dangerous voltages from affecting the power supplies. IT networks and electronic control systems connected to the mains power supplies will be safely protected from damage and in most instances there will be no need for additional protective devices.

Hail damage

As part of the FM Approvals process the Kalzip roof system successfully passed the FM Approvals Simulated Hail Damage Test and meets the requirements for a severe hail damage rating (FM Class 1 - SH).

Compatibility with other materials

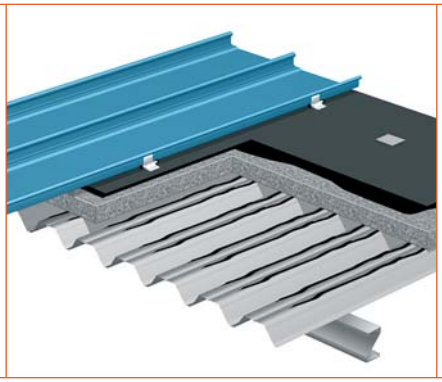
Stucco-finished uncoated aluminum sheets must not come into contact with materials listed below. Where problems of incompatibility are likely to occur, barriers (e.g. paints, bimetallic separation tapes or pads, appropriate to the materials and environment) should be incorporated.

	Environment		
Material	Rural	Industrial	Marine
Zinc	safe	safe	safe
Stainless steel	safe	safe	safe*
Lead	safe	safe	unsafe
Uncoated steel	unsafe	unsafe	unsafe
Copper	unsafe	unsafe	unsafe
Timber treated with fire retardant or preserved with copper or fluoride compounds	unsafe	unsafe	unsafe
Concrete, mortar or alkali-bearing materials	unsafe	unsafe	unsafe

*This applies only for fixing screws and rivets made from stainless steel, other stainless steel elements must be protected.

Museo De La Ciencias, Valencia, Spain

Forum Exhibition, Frankfurt, Germany



Kalzip AF Profile

Kalzip Nature Roof

Kalzip AluPlusSolar

System variations

Kalzip AF profile

Kalzip AF 434 profile in a stucco embossed finish offers a distinctive 'Almost Flat' appearance.

The use of Foamglas® insulant has the benefit of providing a solid supporting substrate to the flat pan of the AF sheet while at the same time offering outstanding thermal performance. In addition, Foamglas® is non-combustible, CFC and HCFC free and the insulant remains totally stable throughout the lifetime of the structure with no degradation or loss of any physical properties.

The cellular glass insulant has the strength to support the fixing plates for the Kalzip E10 clips. The plates are applied to the Foamglas® board, the E10 clips are then screwed to the fixing plates and the outer sheet installed. Generally there is no direct connection to the inner decking and consequently the entire span of the roof is free from cold bridging.

Kalzip Nature Roof

The Kalzip Nature Roof is an advanced green roofing system that has been developed to provide measurable performance and environmental benefits.

The Nature Roof is underpinned by a fully engineered Kalzip system with an unbeatable pedigree. Every single component has been carefully selected for compatibility; the system as a whole has been subjected to the most rigorous testing in the UK.

Nature Roof improves the thermal performance of a building by providing protection against heat loss in the winter and heat gain in the summer. The internal environment is enhanced by more constant temperatures. The release of oxygen by the plants, brings measurable improvements to the surrounding micro-climate while at the same time the plant leaves take in and 'lock-up' air borne pollutants such as particulates from traffic fumes and dust.

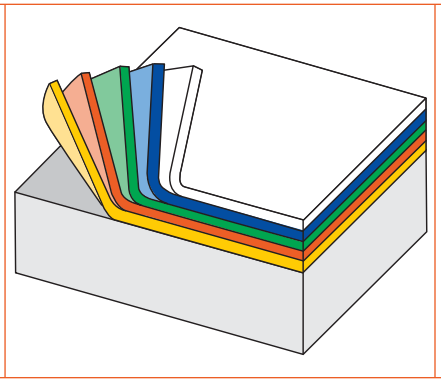
Nature Roof can lead to dramatic improvements in air quality around the building and where large-scale roof greening occurs, to the air quality of entire conurbations.

Kalzip AluPlusSolar

Kalzip AluPlusSolar is a truly integrated photovoltaic building envelope solution equally appropriate for commercial and residential applications. With the correct selection of coated coil, the photovoltaic laminates supplied by Unisolar, can be blended into the roof profile becoming barely noticeable. Alternatively the photovoltaic laminates can be made into a design feature with contrasting colors.

The laminates are factory-bonded directly to the outer surface of the exterior Kalzip sheets and consist of triple-junction thin-film silicon cells deposited onto a stainless steel foil and encapsulated in an ethane vinyl acetate (EVA) co-polymer protective envelope. Each of the three cells converts a different part of the visible spectrum, resulting in superior conversion efficiencies in overcast conditions.

The photovoltaic laminates can be bonded to polyvinylidene difluoride (PVdF) or polyester paint-coated all flat AF65/537 aluminum profiles. The sheets are first cleaned



Layered construction of the PVL
- Flexible stainless steel substrate
- Green cell
- Back reflector film layer
- Red cell
- Blue cell
- Transparent conduct oxide film

Kalzip SolarClad

Retro-fit

with isopropanol. A polyethene/polypropene co-polymer self-adhesive back is revealed on the reverse of the photovoltaic laminates and applied to the flat portion of the profile. No penetrative fixings are required.

Kalzip SolarClad

Kalzip SolarClad is a photovoltaic cladding which has been optimized for use in building envelopes. Its flexibility and versatility enables the solar modules to be fixed onto standing seam systems made from a variety of materials. Kalzip SolarClad is sold as a complete system, the Unisolar PVL film is laminated on to Kalzip carrier plates in the factory to ensure a high quality and fast installation. For further details please contact the Kalzip Technical Department.

Retro-fit

Kalzip aluminum standing seam has always been widely specified for retro-fit projects – it's a lightweight and intrinsically strong roofing system with proven long-term, leak-free performance and minimal maintenance requirements. Now, with the introduction of a tailored lightweight sheet, Kalzip is extending its capabilities in this rapidly growing sector of the market.

Kalzip retro-fit comprises specially fabricated steel sub-structures constructed over an existing flat or shallow pitch roof, forming the frame for a pitched, barrel-vault or wave-form roof of Kalzip aluminum standing seam system.

For clients concerned about preserving and extending the life of an ageing building where resources are strictly limited (typically in the education and health sectors), the great advantage of a Kalzip retro-fit is that the conversion and re-roofing is supplied as a comprehensive package. At the outset the Kalzip team will assess the property's suitability for conversion and then, with a positive outcome, a full evaluation with structural calculations can be carried out for just a small percentage of the contract value.

Installation of the entire system is then carried out only by Kalzip's fully trained and approved Teamkal contractor network to ensure the highest quality standards. All necessary, fascias, gutters, soakers and other accessories are manufactured by Kalzip to provide consistency of material, color, performance and long term durability.

Furthermore, specifying Kalzip as a retro-fit solution also provides additional design options to further enhance the aesthetic appeal of the recovered building. Kalzip offers an extensive palette of color coatings and finishes including stainless steel and zinc clad aluminum. The latter is a special combination of zinc on an aluminum base, providing both outstanding durability and a warm traditional feel to the building.

For further information contact the Kalzip Technical Department.

Technical services and support

Technical support

Using the latest CAD equipment, the Kalzip Technical Department is fully equipped to meet the specification requirements of the most complex roof designs down to the finest detail.

Trained staff work closely with clients, tailoring specifications to meet individual requirements of the project - including all necessary calculations, assembly instructions and technical advice - ensuring that both specification and delivery requirements are met. Kalzip provide a comprehensive technical advisory and support service to assist architects, designers, specifiers and approved Kalzip installation contractors with building design, product application and site work issues, from design stage through to project completion and beyond.

The Kalzip technical team has extensive roofing and cladding expertise and can provide suitable designs and details for any application via the latest CAD equipment. Economical construction solutions for the most complex roof designs can also be provided. With the increasing pace of Kalzip's new product introductions additional information to support both the specifier and installer alike are constantly being developed.

More complex shapes and solutions not only mean increased capability within the technical team but also the ability of the department to communicate necessary knowledge to Kalzip's installer network via its training school and courses.

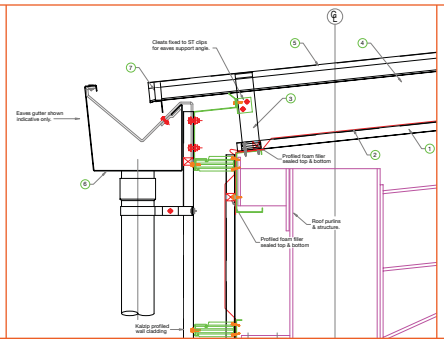
Finally, the Kalzip Technical Department are constantly supporting the projects in progress through its team of dedicated site supervisors who bring back practical solutions of site issues that can then be integrated into courses to develop and tailor the material providing solutions and preventing repeated difficulties.

Training center

The training center is a purpose-built facility at the company's UK headquarters in Haydock, England. Equipped to the highest standards, the center has been providing courses on all aspects of Kalzip products and systems since its inception in 1992.

The center and its key objective – 'To ensure the highest possible standards of design and installation of Kalzip systems in order to provide optimum performance throughout the lifetime of the building' - is seen by many clients, architects, and contractors alike as one of the key differentiators between Kalzip and its many imitators.

The combined technical and training resources at Haydock can test and prove buildability at the earliest stages. Subsequently the company can support the contractor with specialist training, on prototype models of the actual construction where appropriate, or with on-site project specific sessions.



Technical detail

Haydock training center

Dedicated full-time training staff provide courses throughout the year which combine technical theory with 'hands on' practical experience designed to offer the following benefits:

- Trained installers with first class product knowledge
- Improved awareness of good roofing practices
- The 'right first time' approach resulting in reduced call outs to site

The Teamkal Network

To ensure the correct installation of Kalzip products and their system derivatives Kalzip uses experienced and highly trained independent installer networks. Installation of Kalzip roofing and cladding systems is only carried out by trained and approved installers.

Ongoing training to ensure that these installers are fully conversant with new product developments and new regulations is mandatory.

Site practice and workmanship

On-site support

Support on live projects, is provided by the Kalzip site services department for approved contractors, specifiers and clients. Support includes ongoing site inspections, technical advice, site investigations and on-site production surveys.

On-site support is also available for the on-site roll-forming facility.

On-site roll-forming

Where site or local access restrictions apply, Kalzip have the equipment, personnel and expertise to manufacture on-site. Mobile roll former machines with integral generators offer a flexible and effective solution.

On-site roll-forming can be done at either ground, ground to eaves or eaves levels, and in the case of the latter, the fully-integrated production facility (roughly 20 feet long) needs to be mounted on scaffolding or similar type of platform.

It is possible to reposition the mobile roll-former during the manufacturing process, so that the finished sheets are as close as possible to where they will be required. Appropriate lifting beams can also be supplied (223 feet long) to carry the sheets into position.

Kalzip's professional team produces a full operations document, detailing requirements, safe working procedures and risk assessment.

Kreuzeck Cableway, Garmisch-Partenkirchen, Germany

Norwich Bus Station, England

New Exhibition Munich, Germany

Collége Cité Mixte Marseilleveyre, Marseille, France

Cairngorm Funicular Railway, Aviemore, Scotland

Kalzip fabrications and associated products

Fabrications

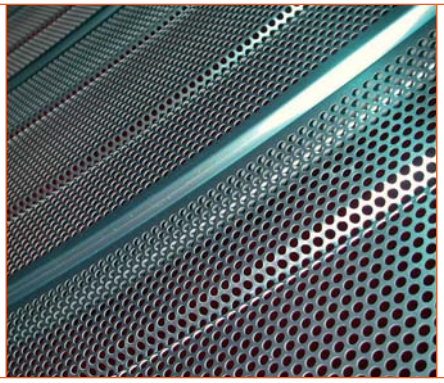
To ensure total compliance for all Kalzip projects, Kalzip fabrications offers a range of flashings and tailor made fabrications to provide that 'attention to detail' look. It is important that the material, color and finish of products matches the Kalzip sheet.

Offering the highest standards in manufacture and service, a full range of complementary products, which include gutters, both in aluminum and membrane lined steel, insulated and single skin can be supplied. Bullnoses and column cases rolled in house, ranging from 4 1/3 in. diameters upwards, tapers and cranks are fabricated and welded in specialist bays.

All accessories are available in stucco-embossed, mill finish and pre or post-coated material.

Utilizing state-of-the-art 3D software, Kalzip fabrications is able to produce accessories with no risk of human error. Investment in an advanced machine has enabled the de-coiling of material to the customers exact required length thereby minimizing product waste. And with the ability to produce secondary steel, standard flashings and gutters up to 28 feet in length, it can help to reduce fixing times and on-site costs.

With ever-tightening regulations, the technical performance of the installation details and interfaces is of paramount importance. Using the highest-grade alloy, with full traceability, Kalzip fabrications offer comprehensive support and, critically, supply minimum risk solutions to all essential roofing and cladding details.



Aberfan public toilets, Port Talbot, Wales

Spencer Street Station, Melbourne, Australia

Devonshire building, Newcastle University, England

Essential accessories

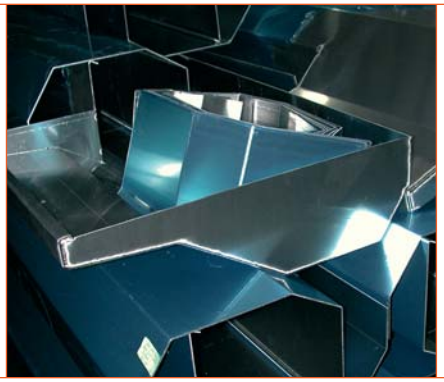
For total compatibility of material, color and finish, Kalzip provides a service to the highest standards of craftsmanship in metal fabrication and welding. All essential accessories including gutters, ridge and gable flashings (both curved and straight), bullnose fascias and special tapers, required to achieve total consistency of material appearance and performance right across the roof and through to the interfaces with other building components are available.

Associated products

A full range of safety products, including fall restraint systems (arrest also), walkways, both with and without hand rail and toe board in grillage aluminum and upvc (white) are available.

All the products provided have been tested to ensure they do not perforate the surface of Kalzip and the installation is undertaken by Teamkal Height Safety Specialists who use non-penetrative clamps fastened to the seams.

For detailed information on any of the above please refer to the Kalzip fabrications brochure.



Design checklist

	Design input		Comments
1	Loadings	☐	
2	Building type (humidity class)	☐	
3	Thermal requirement	☐	
4	Air permeability requirement	☐	
5	Acoustic requirement	☐	
6	Life expectancy/durability	☐	
7	Fire performance	☐	
8	Natural lighting	☐	
9	Construction type	☐	
10	Roof sheet design	☐	
11	Drainage	☐	
12	Details	☐	
13	Accessories	☐	
14	Lightning protection	☐	
15	Aesthetics	☐	
16	Solar solutions	☐	
17	Green roofing	☐	
18	Others (budget/programme)	☐	

For design calculations please contact the Kalzip Technical Department on +44 (0) 1942 295500

Exhibition Hall 3 Frankfurt Trade Fair, Germany

Goldsmiths College, University of London, England

Leon von Gelder College, The Netherlands

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