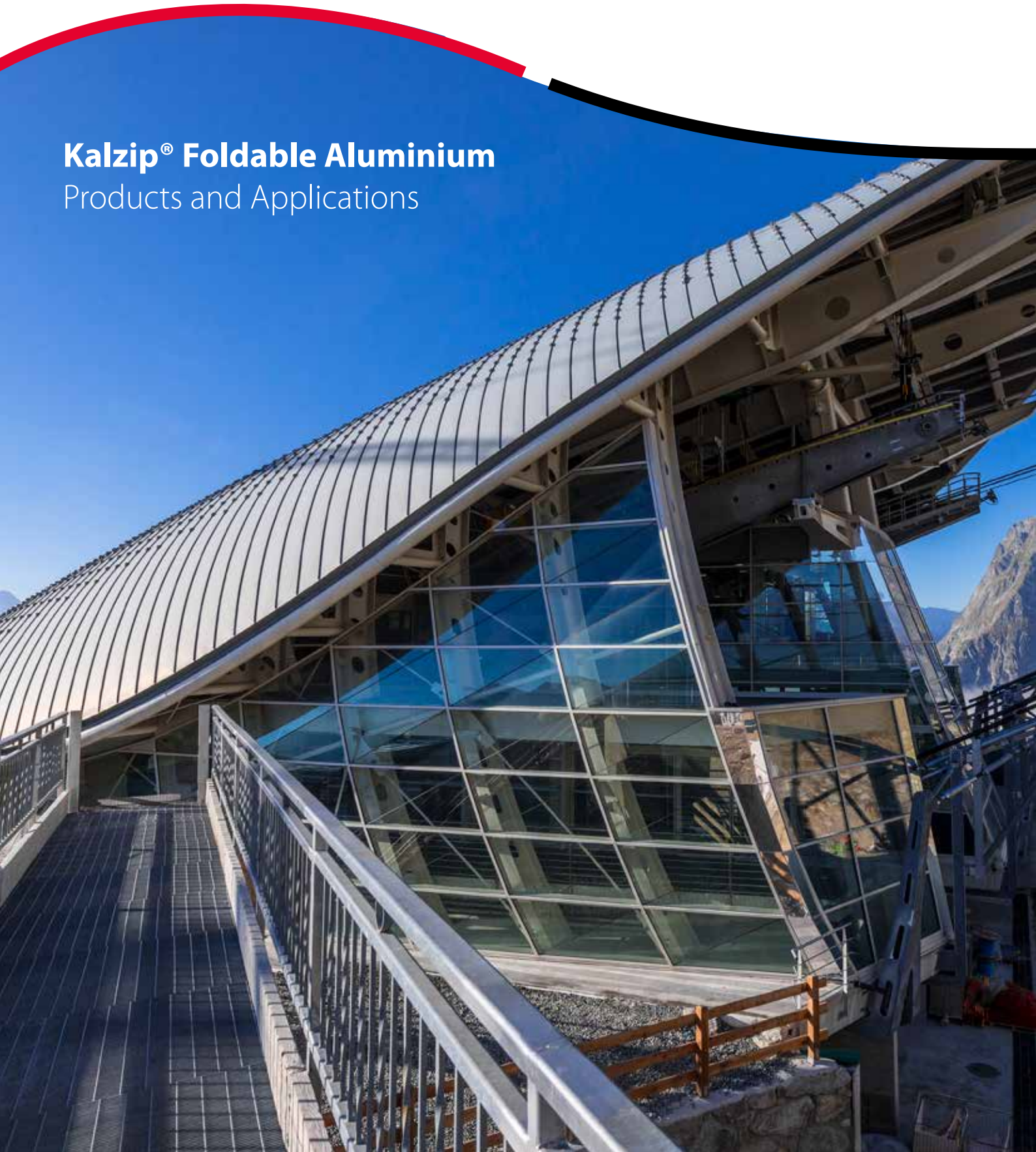
Kalzip® Foldable Aluminium

Products and Applications



Blechbüxx, Hilgert (D),
Material: FalZinc

TRADITIONAL AND FOR THE FUTURE

Building and material - impressive

Metalworking materials for roof coverings and façades and their processing using manual plumbing techniques are a tradition in Europe's building culture that stretches back over 200 years. Many buildings testify to that and exhibit the design variety and the stable value of the material. Today, the metallic surface sets architectural trends in commercial, industrial, administrative and residential construction.

Surfaces:

The galvanised surfaces FalZinc and Dark FalZinc have been durable surfaces for roof and façade design for many years. According to DIN 81249-1, both surfaces are suitable for use in maritime areas (EN AW-3105). The patina surfaces - TitanSilver, Bronze AL40, UltraDark and Red Copper - captivate due to their metallic surfaces and give the building a unique look. All color patina surfaces are also usable in maritime areas according to DIN 81249-1 (EN AW-3004). We offer further surface variety with our polymer resin-based HPC coatings - FalzColor with the surfaces Stone Grey R and Anthracite Grey R. The surfaces are characterised by their slightly rough texture and their extremely matt degree of gloss of 3%.

Ecology:

Sustainability focuses on the aluminium itself – a material that can be recycled any number of times and for which there are sufficient sources. The material used is manufactured from at least 75 % recycled aluminium. Higher recycling ratios can also be offered for specific projects. All components are 100 % recyclable and can be dismantled without restrictions. Moreover, up to 95 % of the energy required for production is saved when recycling.

Advantages for planners:

- Design freedom due to virtually unlimited formability
- Variety due to the surface variants FalZinc, Dark FalZinc, TitanSilver, Bronze AL 40, UltraDark, Red Copper and FalzColor
- Impressive price-performance ratio
- Certainty regarding planning, construction time and costs due to simple processing of the material, even at low temperatures without pre-heating
- Highly corrosion-resistant and stable in value for long-term building protection
- Connections available in all surface finishes

For the trade:

- Easy to process using traditional plumbing techniques
- Material can be processed directly at low temperatures without pre-heating
- Very light material, therefore easy to handle on the building site
- Cost-effective due to very good price-performance ratio
- A 100 kg roll of FalZinc with a cover width of 600 mm has an unrolled length of about 88 metres in comparison to 33 metres in the case of zinc
- Calculation certainty due to high price stability
- A structured separating layer on solid timber boarding is unnecessary in most structures

Foldable aluminium in use

Idea and execution – perfect

Kalzip foldable aluminium is the ideal material for processing using traditional plumbing techniques. Virtually any shape is feasible for roof and façade. Folding, tilting, flanging and pulling – the surfaces are processed quickly and precisely in a conventional manner with well-known tools.

The design and shaping of the roofs and façades with foldable aluminium determine the method of connection and the fastening of the metal covering using plumbing techniques. Different longitudinal and transverse connections as well as combinations of the same enable grids with different widths and different characteristics. Using manual folding techniques, every detail can be solved securely and with little technical effort.

And Kalzip foldable aluminium was specifically optimised for that – all materials can easily be folded, tilted and flanged using proven and established manual methods without pre-heating, even under the unfavourable conditions that normally prevail in construction. A number of special profiling and folding machines are used to execute the established types of fold.
Important: The machines must be equipped with roller sets suitable for the material and precisely adjusted according to the respective manufacturer's specifications. Kalzip foldable aluminium is suitable not only for the manufacture of classic profile panels, but also for the manual or mechanical manufacture of shingles.

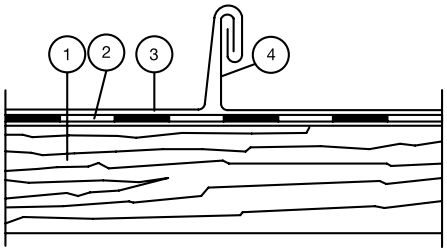


Fig. 1: Double standing seam
1 Timber boarding, 24 mm
2 Sarking membrane
3 Kalzip Foldable Aluminium
4 Double standing seam, 25 mm

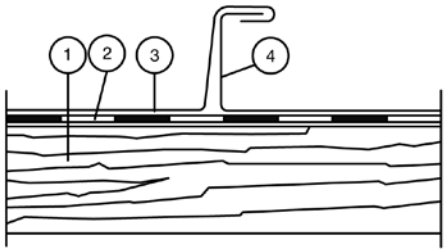


Fig. 2: Angular standing seam
1 Timber boarding, thickness 24 mm
2 Sarking membrane
3 Kalzip Foldable Aluminium
4 Angular standing seam, height 25 mm

Einfamilienhaus in Brunsbüttel (GER)
Architect: Architekturbüro Kurt Wittrock
Material: Dark FalZinc

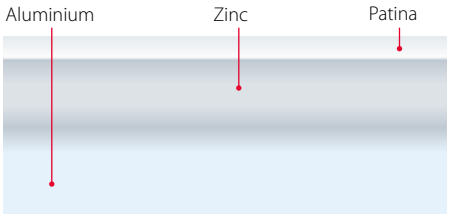
Surfaces, appearance and evenness

FalZinc, Dark FalZinc, Colour Patina and FalzColor

The surfaces of Kalzip foldable aluminium are slightly dulled so that there is less reflection. The degree of reflection is reduced further still by natural weathering. Depending on the viewing angle and the sunlight, wall claddings and visible roof areas may display a slight processing-related waviness. The waves are mostly very flat, but may be more or less visible due to different light reflections. After a period of natural weathering, the surfaces become increasingly matt and reflection is reduced.
In order to achieve a high visual quality, in particular with façade claddings, the professional processing of Kalzip foldable aluminium is of decisive importance.

Kalzip foldable aluminium with a zinc surface uses the symbiosis of two tried-and-tested materials: aluminium and zinc. With FalZinc and Dark FalZinc, a pre-weathered zinc surface is applied to an aluminium core using the PEGAL procedure patented by Kalzip GmbH. The result is products that unite the restrained, classy look of pre-weathered zinc in an ideal way with the advantages of aluminium. The characteristics of the surfaces are permanently retained even under unfavourable weather conditions.

Fig. 1: Schematic illustration



Material properties:

The core of FalZinc and Dark FalZinc as well as the Colour Patina surfaces consists of the seawater-resistant aluminium alloy AlMn 0.5 Mg 0.5 (EN AW-3105) and EN AW-3004 according to DIN 81249-1. The alloy is initially end-rolled in a rolling process that is tailored exactly to the strength characteristics. A subsequent special heat treatment ensures that the materials of the Kalzip product series acquire their outstanding formability and thus meet the requirements of DIN EN 507 „Roofing products from metal sheet“ with definitions for roofing elements made of sheet aluminium with full-surface support. The subsequent application of the metal coating to the surfaces takes place in the process-monitored low temperature range so that the set mechanical/technological values can no longer be influenced. The metal coating of the surfaces has an identical structure on both sides and is only a few microns (1/1000 mm) thick, but is nevertheless firmly bonded to the carrier material due to the galvanic application.

Characteristic data - Kalzip foldable aluminium

Property	Unit	Value
0,2 %-yield strength $R_p0,2$	N/mm^2	min. 95
Tensile strength R_m	N/mm^2	min. 150
Elongation at rupture A 50	%	min. 10
Bending test (folding test) with radius 0 and subsequent straightening	–	no cracks on the bending edge
Thickness tolerance	mm	± 0,04
Specific weight (density)	kg/dm^3	2,72
Modulus of elasticity	N/mm^2	70.000
Thermal length expansion coefficient	$m/(m \cdot K)$	24×10^{-6}
Melting point	°C	approx. 650
Thermal conductivity	$W/(m \cdot K)$	180

Properties of foldable aluminium

Weathering:

As opposed to coated aluminium, FalZinc and Dark FalZinc exhibit the weathering behaviour of genuine metallic surfaces. Even if this effect is desired, we would nevertheless like to make reference to the behaviour of metallic surfaces towards weathering: Deposits from the air and from precipitation can lead to soiling of the surface if they are not subsequently washed off by „clean rain".

In case of dirt that can exhibit a slightly acidic reaction and act for a lengthy period on the surface, depending on the local emissions, changes in the appearance of the surface may appear under certain circumstances. This is not generally a damaging corrosive attack.
A change in the colour of the surface merely occurs, and this usually extends over such a large area that it is only recognisable as a darker shadow.

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Nevertheless, the roof inclination should be as steep as possible where dirt deposits are to be expected or are unavoidable, so that all accumulated deposits are washed away with the greatest possible flow rate when it rains heavily.
Experience from building practice shows that the self-cleaning effect of roof surfaces only sets in from a roof inclination of around at least 10°. In normal atmospheres as well as in contaminated industrial atmospheres, the zinc and colour patina surfaces are extremely corrosion-resistant due to their core of seawater-resistant aluminium alloy.

Middle station, Courmayeur Mont Blanc (IT)
Architect: Dimensione Ingenierie s.r.l
Material: FalZinc

Interboden, Düsseldorf (GER)
Architect: Ingenieurbüro Meyer, Bonn
Material: TitanSilver

Sustainable protection for roof and façade

Fire behaviour

Metal roofs with Kalzip foldable aluminium, including the metal coatings on both sides, are non-combustible. In accordance with DIN 4102-4, they are regarded as hard roof coverings and correspond to building material fire protection class A1. However, the fire resistance of a component such as a roof or wall structure depends on the interaction of all components, including the functional layer of the substructure. The attainable fire resistance class is thus essentially determined by the fire properties of the substructure. High fire resistance durations can be proven with appropriately arranged, commonly used materials for the substructure as well as with special insulating materials/elements. Roof and façade structures with Kalzip foldable aluminium can thus be ideally integrated even in complex fire protection concepts.

Lightning protection

If permanent lightning protection is required for building projects according to the state building regulations, then roof coverings and façade claddings made of Kalzip foldable aluminium can be integrated in the lightning protection system as a natural component according to the applicable lightning protection standard DIN EN 62305-3, supplementary sheet 4 (VDE 0185-305-1 to 4). The following requirements must be met for this:

- The metal roof elements are screwed or riveted to each other at short distances or connected to one another by means of folding, soldering or welding
- The metal roof must be implemented professionally, i.e. according to the rules to be applied (e.g. standards and guidelines of the building supervisory authorities, plumbing regulations of the ZVSHK [German Central Sanitary, Heating and Air Conditioning Association]) and stably connected to its substructure
- Like any other roof, the metal roof must be checked and if necessary repaired after each lightning strike

Corrosion protection

In some building situations it is necessary to combine materials. In the case of FalZinc, this is possible with the metals lead (Pb), titanium zinc (Zn), stainless steel (S.S.) and hot-dip galvanised steel (St). An assembly with copper and copper alloys can lead to contact corrosion with aluminium and is therefore not allowed. Furthermore, it should be noted that external influences on the metal surface may expedite corrosion. These are, for example, washouts from lime and cement mortar, concrete or fibre reinforced cement. Residues from ageing processes in the case of unprotected bitumen sheeting, shingles, coatings, roof tiles and synthetic bitumen sheeting (e.g. ECB) may have a corrosive (acidic) effect on the material surfaces. Structural measures may be necessary here to discharge these washouts separately, for example via suitable gutters. Emissions and condensate from the combustion of oil, gas and coal, organic deposits on roofs with only a slight inclination or deposits due to industrial emissions with corresponding enrichments can damage the metal or metal surface and must be avoided.

Permissible metal combinations with aluminium in direct contact

Material	Alumimium
Lead: Pb	+
Hot-dip galvanised steel: hdgs - fvzSt	+
Stainless steel: StainlSt - nrSt	+
Zinc, titanium zinc: Zn	+
Structural steel: StrSt - BauSt	-
Copper: Cu	-

Structures with Kalzip® foldable aluminium

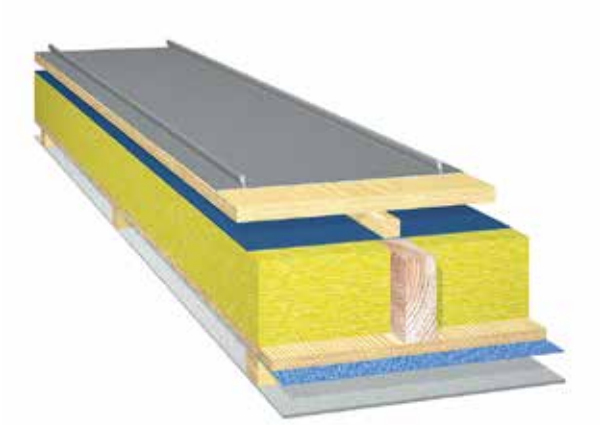
Double standing

In the case of the double standing seam, profile panels with two upstands of different heights are folded together. As a rule, pre-fabrication initially takes places as an angular standing seam with bending machines or roll formers. Using special handheld tools or folding machines, the open angular standing seam is closed and folded over once again in a further work step. The integrated indirect fastening elements (retainers) are part of the system. The double standing seam connection offers maximum security for the tightness of the connection and can be used for all roof areas with an inclination ≥ 3°. Special measures such as fold seals (tapes or gel), fold elevation or a sarking are necessary in the inclination range ≥ 3° to < 7°.

Angular standing seam

The angular standing seam is virtually an unclosed double standing seam. With its visual width of around 10 millimetres, it ensures pronounced structuring and is used on account of its better flatness for façade claddings as well as for designed roof areas from a roof inclination of 25 degrees. Under certain circumstances, a minimum roof inclination of 35 degrees has to be complied with in areas with frequent snowfall. On account of the lack of a second forming process, less stress is introduced into profile panels with angular standing seams than with the execution with the double standing seam system. The slight formation of waves that is typical of the system is therefore reduced to a minimum. In order to achieve clearer structuring, the variable angular seams are often varied in height and width and prefabricated in the low-stress bending process.

Two-shell, rear-ventilated roof structure (cold roof)



In the case of a two-shell, rear-ventilated roof structure, also known as a cold roof, the Kalzip metal covering and its supporting substructure are separated from the actual building structure by an aerated and ventilated intermediate space. However, in order to achieve functionally reliably rear ventilation, certain minimum cross-sections of the supply and exhaust openings as well as the height of the air space have to be complied with. Its effectiveness is influenced by the height difference between the supply and exhaust air openings. The necessity for roof underlays, if necessary with structured fabric, arises from the DIN standards and trade rules.

Two-shell, rear-ventilated façade structure

Kalzip foldable aluminium sets new standards for visually beautiful façades and meets the highest demands in terms of building technology and design, from the planning to the implementation. The unmistakable metallic surfaces minimise reflections and convey restrained, representative building characters, even in the case of large areas.
Kalzip foldable aluminium can be processed using plumbing techniques for metal wall claddings. The most frequently selected execution is the angular standing seam or a diamond or shingle covering on a rear-ventilated boarding.

Shingles made of Kalzip® foldable aluminium

Shingles made of Kalzip foldable aluminium are light, durable and usable for a variety of applications. There are many individual options when choosing the surfaces and the shingle dimensions. Any geometrical shape can be implemented with foldable aluminium, regardless of whether it's a square, rectangle or diamond. Due to their small size, shingles are also ideally suited for covering curved or rounded roof and façade surfaces. A virtually unlimited combination of shapes and sizes offers the planner a high degree of architectural design freedom.

Standard shingle size:

	Blank	Visible size
Coil 600 mm band width	600 mm	510 mm
	300 mm	225 mm

Fig. 1.0 Example of a shingle:

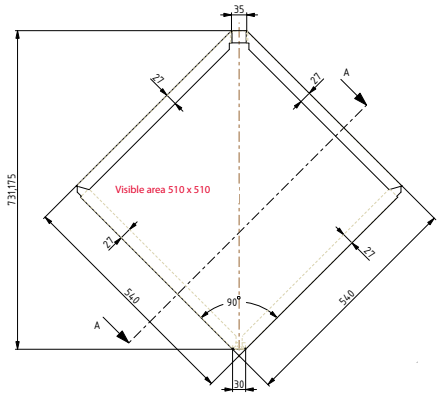


Fig. 1.1 Example of a shingle:

Haus der kleinen Füße Kindergarten, Georgsmarienhütte (GER);
Installer: Bauklempnerei Clemens Neumeister jun. GmbH
Architect: Michels Architekturbüro GmbH
Material: Bronze AL40

Petrus Jakobus Church, Karlsruhe (GER), Architect: Peter Krebs, Büro für Architektur, Material: FalZinc

Roof and façade

Precision down to the smallest detail

Kalzip foldable aluminium is manufactured on state-of-the-art production machines with strict quality checks according to standards, manufacturers' specifications or individual customer requirements. Close manufacturing and thickness tolerances enable highly precise formation of the folds using the familiar devices and machines used in the plumbing trade.

Kalzip roofs and façades offer top thermal insulation, save energy and preserve resources. Kalzip foldable aluminium protects the structure and gives it an appealing exterior. Matching system accessories for roof drainage and components for the integration of snow guard systems are available from specialist retailers.

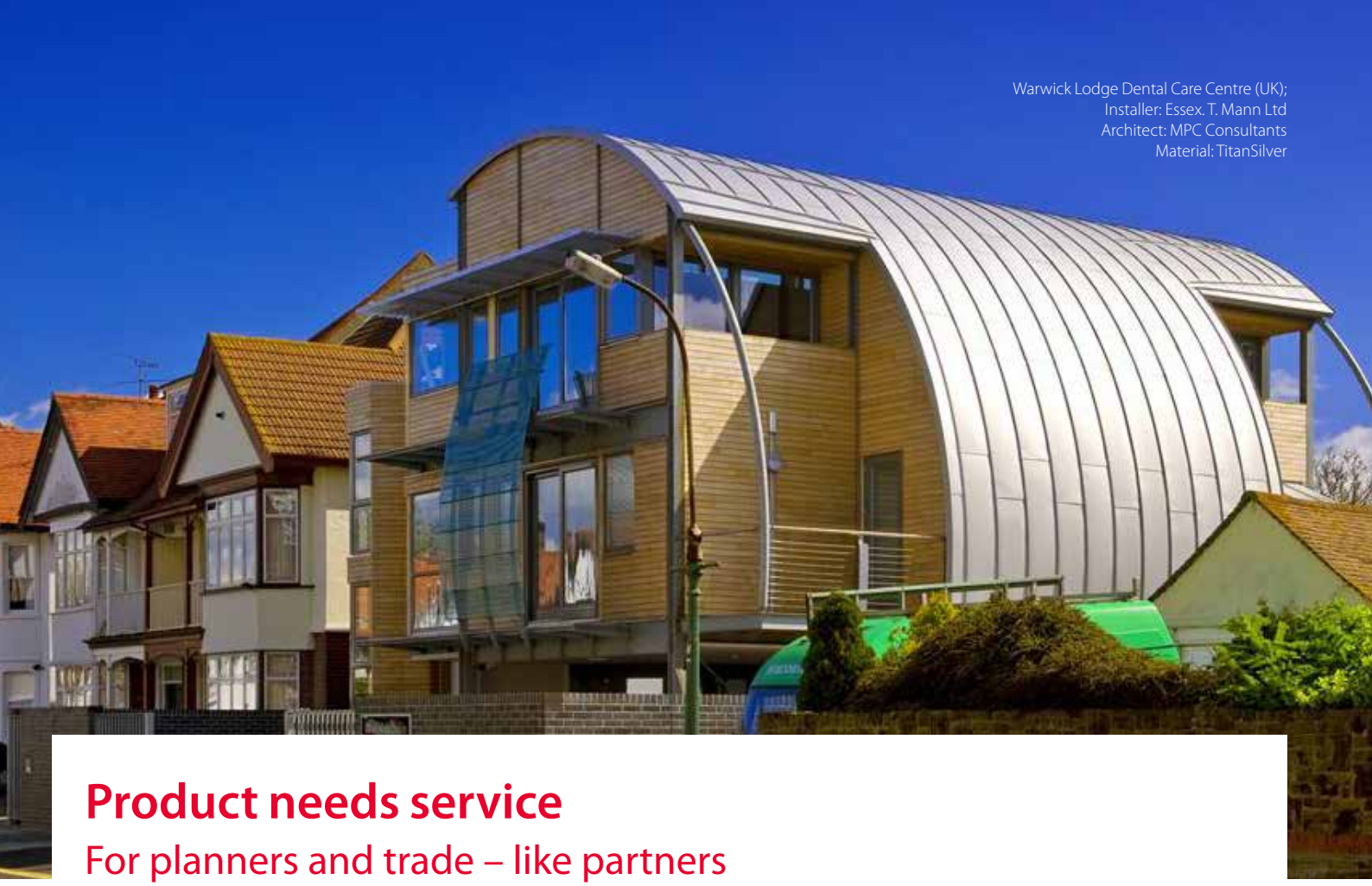
Packaging and dimensions

	FalZinc	Dark FalZinc	TitanSilver	Colour Patina (Bronze AL40, UltraDark & Red Copper)	FalzColor
Coiled goods* Standard dimensions	0,7 x 500/600/670 mm	0.7 x 600 mm	0.7 x 600/1,200 mm	0.7 x 600/1,200 mm	0.7 x 600
	1,0 x 600 mm	1.0 x 600 mm	1.0 x 600/1,200 mm***	1.0 x 600/1,200 mm***	1.0 x 1,200 mm***
Standard coil weights	100 kg (ID** 400)	100 kg (ID** 400)	100 kg (ID** 400)	100 kg (ID** 400)	100 kg (ID** 400)
	500 – 2.400 kg (ID** 508)	500 – 2,400 kg (ID** 508)	500 – 1,000 kg (ID** 508)	500 – 1,000 kg (ID** 508)	500 – 1,000 kg (ID** 508)
RAD (approx.) ring outside diameter, in each case with a band width of 600 mm	100 kg = 490 mm	100 kg = 490 mm	100 kg = 490 mm	100 kg = 490 mm	100 kg = 490 mm
	500 kg = 810 mm	500 kg = 810 mm	500 kg = 810 mm	500 kg = 810 mm	500 kg = 810 mm
	1.200 kg = 1.100 mm	1,200 kg = 1,100 mm	1,200 kg = 1,100 mm	1,200 kg = 1,100 mm	1,200 kg = 1,X100 mm
	1.600 kg = 1.230 mm	1,600 kg = 1,230 mm	–	–	–
	2.400 kg = 1.470 mm	2,400 kg = 1,470 mm	–	–	–
Sheet metal	all standard sizes from 2,000 to 6,000 mm in length deliverable only with film – FalzColor is delivered exclusively without film.				
Weight	1.98 kg/sqm (0.7 mm thickness)	1.98 kg/sqm (0.7 mm thickness)	1.90 kg/sqm (0.7 mm thickness)	1.90 kg/sqm (0.7 mm thickness)	2.03 (0.7 mm thickness)
	2.82 kg/sqm (1.0 mm thickness)	2.82 kg/sqm (1.0 mm thickness)	2.72 kg/sqm (1.0 mm thickness)	2.72 kg/sqm (1.0 mm thickness)	2.84 (1.0 mm thickness)

* Standard delivery with paper intermediate layer, protective film with processing edge optionally available at extra cost, other coil sizes on request.

** Inside diameter

*** All 1.0 mm qualities are available only in edged quality
- Supplementary material in edged quality 1.00 mm x 600 mm
- Supplementary material in edged quality 1.00 mm x 1,200 mm
- Supplementary material in edged quality 1.00 mm x 1,250 mm



Warwick Lodge Dental Care Centre (UK);
Installer: Essex. T. Mann Ltd
Architect: MPC Consultants
Material: TitanSilver

Product needs service

For planners and trade – like partners

As a planner or professional tradesman, you can obtain valuable information for your daily work from our service area.
In addition to contacts for object-related consulting, you will find tendering texts, detailed CAD drawings and the contact addresses of our retail partners.

Our consulting service

Qualified consultants will provide you with detailed preliminary information about the technology and handling of Kalzip foldable aluminium. You can find the name of your contact in the Contact area on our website at www.kalzip.com.

Our technical service

- Tendering texts tailored to your building project
- Technical support for solving questions of detail
- Consulting and assistance with all questions around Kalzip

At a glance – surfaces and colours

FalZinc

Dark FalZinc

TitanSilver

Bronze AL 40

UltraDark

Red Copper

FalzColor - Anthracite Grey R

FalzColor - Stone Grey R

www.kalzip.com

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Kalzip is a Donges Group company

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