



Guide for building owners

*Mach's
einfach!*

RIB-ROOF
metal roofing systems

DIFFERENT ROOF COVERINGS BY COMPARISON

CONCENTRATE ON THE ESSENTIAL



Would a RIB-ROOF metal roof be the right choice for your building?

The market for roofing material is huge, therefore, not only building owners but also architects find it very difficult to make your decision. That's why we would like to give you an overview on the advantages of RIB-ROOF metal roofing systems compared to other usual roof coverings. It's worth, just a look.

We will check RIB-ROOF metal roofing systems against traditional tiled roofs, foil roofs as well as other metal roof coverings, e.g. liners which are very popular with industrial buildings.

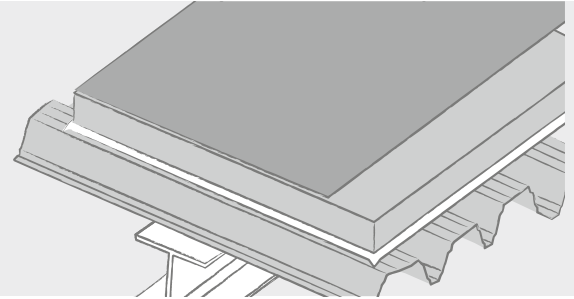
The disciplines are as follows: efficiency, safety and durability, possibilities in design as well as energy and sustainability.

DIFFERENT ROOF COVERINGS BY COMPARISON

CONCENTRATE ON THE ESSENTIAL

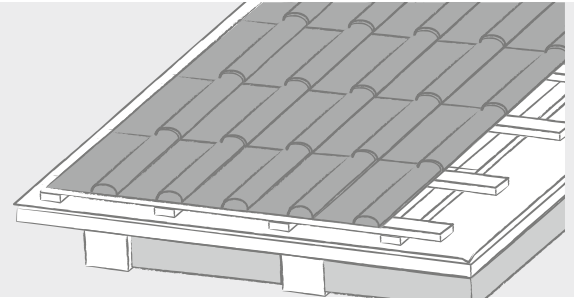
Foil roof

Flat roof sealing of foil roofs is installed by bituminous or plastic sheeting, whereby, different qualities are offered on the market. The DIN 18531 "roof sealing – sealings for not used roofs" – rules for the design of flat roofs as there are special measures necessary for roofs without or low roof pitches. Foil roofs are often gravelled, covered with panels or green.



Tiled roof

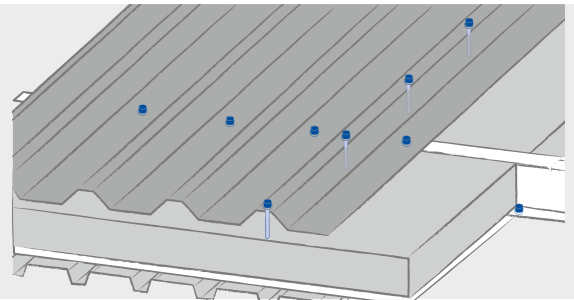
Tiles out of clay or concrete often are used for construction of residential buildings with steep roofs in order to ensure a functional roof covering. Clay is used for tiles, normally without any additives (compared to Tiles made out of concrete). Modern manufacturing methods ensure a uniform colouring, however this can vary from batch to batch.



Liners

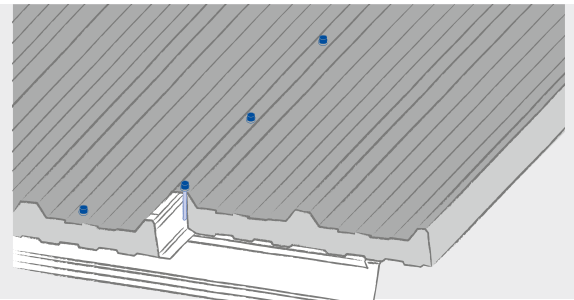
Liners out of steel are used for roof, ceilings and wall constructions with industrial and commercial buildings. In comparison to tiled roofs, the roof pitch can also be lower as precipitation is drained off much quicker.

Additionally, liners do not weigh that much that's why substructures can also be built in lightweight construction. The industrial pre-fabricated liners are screwed together with the substructure, penetrating the profiles, by means of sealing screws. Joints have to be made with long profiles.



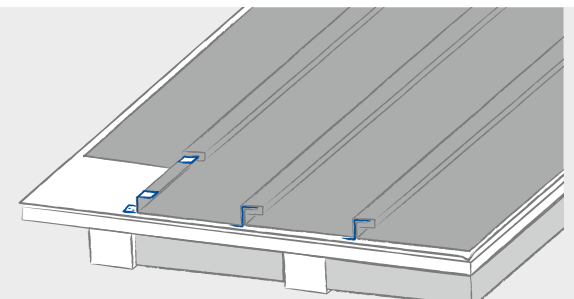
Sandwich panels

The name derives from the construction of the elements in several layers. Normally, the elements consist of two top layers out of galvanised steel or aluminium (often plastic-coated) and an intermediate core out of thermal-insulating material, e.g. polyurethane foam or mineral wool. Therefore, sandwich panels are often sold as thermo or iso roofs. The sandwich elements are also screwed together with the substructure, penetrating the elements, by means of sealing screws. Joints have to be made with long panels.



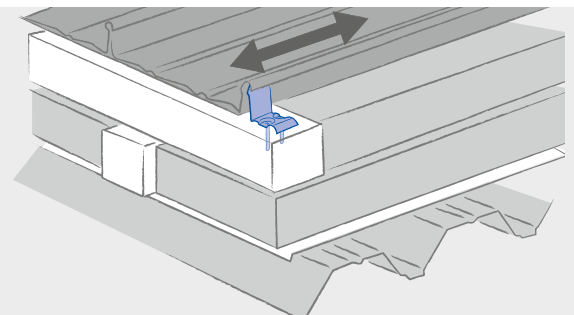
Angle standing seam roofs

Metal roofs produced by craftsmen are often executed with angle standing seams in order to implement steep roof areas. The metal sheets, are normally a fully supported system. Labour for this is intensive and requires a skilled workforce. Angle standing seam roofs are manufactured out of aluminium, stainless steel, copper and titanium zinc.



RIB-ROOF metal roofing systems

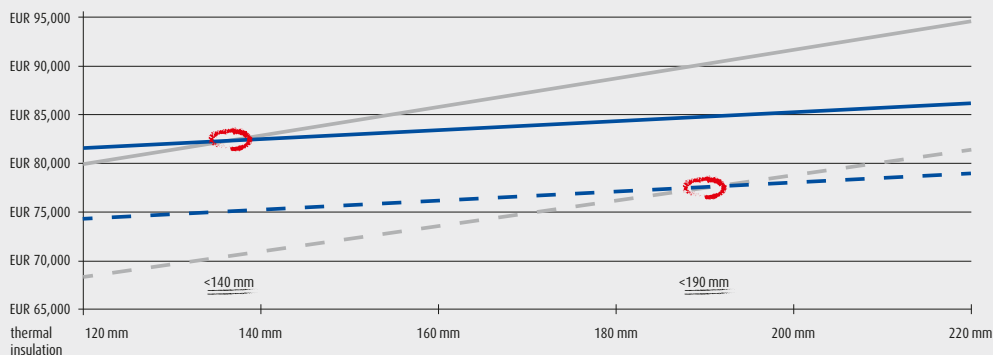
RIB-ROOF profiled sheets (sliding standing seam roofs fabricated-to-measure) pass from ridge to eaves. The hidden fixing elements of RIB-ROOF metal roofing systems are fastened perforation-free on the substructure. The profiled sheets (excellent sliding ability) are simply interlocked into place by means of a unique male and female joint. Roofs from roof pitches of 1.5° can also be executed according to our General System Authorisation approved by building authorities as no joints are needed due to screws which do not penetrate the roof membrane.



EFFICIENCY

MAKE THE DIFFERENCE

Comparison of costs: RIB-ROOF metal roof vs. foil roof



The adjoining graph compares the total costs of a building covered with RIB-ROOF with one covered with foil. The building has a length of 50 m and width of 20 m. The supporting structure is supposed to be a girder construction at a distance of 5 m. Investment costs for roof build-ups from the top edge are compared depending on the chosen thickness of insulation.

RIB-ROOF construction, internal gutter

Supporting structure as liner made out of steel, vapour barrier membrane fixed on supporting structure, clips fastened on wooden lathing with internal soft mineral thermal insulation WLG 040, 6 skylights / RWA regularly ordered on roof area, internal double-layer gutter, sliding seam profile

RIB-ROOF structure, mounted gutter

Supporting structure as liner made out of steel, vapour barrier membrane fixed on supporting structure, clips fastened on wooden lathing with internal soft mineral thermal insulation WLG 040, 6 skylights / RWA regularly ordered on roof area, mounted gutter, sliding seam profile

Foil roof, category K1

Supporting structure as liner made out of steel, vapour barrier membrane fixed on supporting structure, 6 skylights/RWA regularly ordered on roof area, gully drainage, rigid soft mineral thermal insulation WLG 040, flat roof covering category K1 according to DIN 18531 "roof sealing – sealings for not used roofs".

Foil roof, category K2

Supporting structure as liner made out of steel, vapour barrier membrane fixed on supporting structure, 6 skylights/RWA regularly ordered on roof area, gully drainage, rigid soft mineral thermal insulation WLG 040, flat roof covering category K2 according to DIN 18531 "roof sealing – sealings for not used roofs".

Source: IFBS "Falzprofiltdächer" (seam roofing), page 16, 2012

Cheaply bought – paid dearly?

Real estate are investment and commercial properties in one. Therefore, building owners should cast a critical eye on the costs and risks, irrespective whether the building is intended for rental or own use.

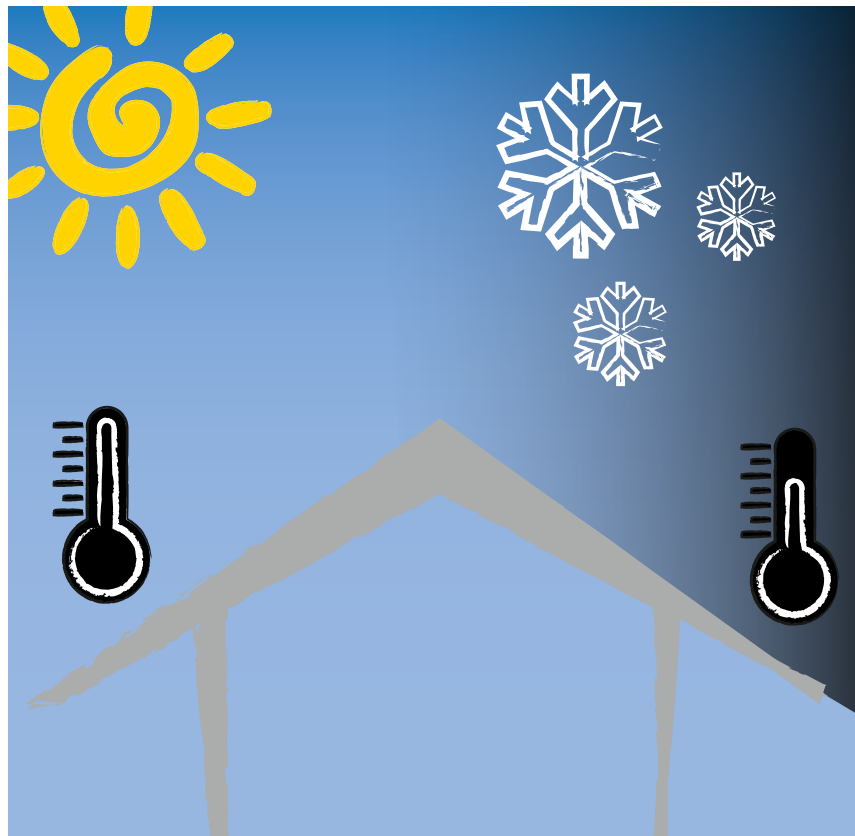
For the purpose of comparing, we first take the acquisition costs. The foil roof scores most of the points in this matter. However, the above graph demonstrates that this is not necessarily the case. A RIB-ROOF metal roof with mounted gutter is even cheaper than a foil roof, category K1. Besides, a selective evaluation can not be justified for

real estate used in the long term. An investment throughout the entire term, including costs for maintenance, repairing and disposal is more meaningful. Premium manufacturers of foils grant a maximum stability guarantee of 20 years.

The "Institute Construction and Environment" (IBU) assumes that an aluminium standing seam roof, such as RIB-ROOF, can be used up to 50 years – more than twice as long. A comparison of terms is already worthwhile from this point of view! However, there are a few more advantages how RIB-ROOF can save costs.

Sun, wind and weather do not cost anything, do they?

The roof protects us against weather, whereas the roof membrane has to stand many influences. The foil roof is especially affected by radiation and considerable changes in temperature. The plastic can possibly become brittle, consequently cracks could arise. Water can penetrate into almost invisible weak points of the sealing into the substructure. "Shattering", an extreme claim, is broadly discussed among experts. Therefore, a regular maintenance of foil roofs, carried out by experts, is indispensable. **RIB-ROOF metal roofing systems** are **maintenance-free**, only the maintenance of internal gutters is recommended. The material can expand, without being damaged, at temperatures between -20° and +80°C due to a high sliding ability of the profiled sheets. **11 million sqm of RIB-ROOF area**, which **have been installed** in icy Russia or the desert country Saudi Arabia so far, prove the qualities of RIB-ROOF with regard to wind and weather.



No other sector of a building is exposed to those high temperatures as the roof membrane. In summer times, temperatures of up to 80°C can be measured, whereas, icy winds can cool the roof to -20°C in winter times.

Extract from the "Environmental Product Declaration for profiled sheets out of aluminium for roof, wall and ceiling covering" according to IFBS (Institute Construction and Environment), issue date 14th January 2013.

"Lifetime depends on the location of the building, weather conditions and quality of possible existing coating. Profiled sheets out of aluminium prove a life cycle of >50 years, also depending on the purpose."



What has to be observed with large roof areas?

Especially projects with roof areas of **more than 1 000 sqm** require high demands on the roof membrane. Liners and sandwich panels are only available in certain lengths and have to be put together by means of joints. The larger the roof area, the higher the temperature-related extension movement of the metal. These forces impact on the joints permanently. Therefore, building owners have to assume that damages may arise on these joints which, in turn, can result in high costs for repairing.

RIB-ROOF profiled sheets are produced in **project-related lengths** and are installed **without any joints**. We can deliver profiled sheets up to 33 m – longer sheets are directly produced at site by means of our rollforming machine. The costs for transporting are thereby reduced with large projects. Furthermore, we are proud to say that RIB-ROOF involves a simple installation technology – install sheet by sheet which, in turn, saves time, trouble and costs!

SAFETY AND DURABILITY

WELL THOUGHT THROUGH FROM START TO FINISH

**Planned yesterday, build today,
going to be regretted tomorrow?**

You first have to figure out which encumbrances your roof has to withstand before deciding for or against a roofing material. Please observe that a roof has to guarantee a reliable protection to buildings for decades!

The following impacts can affect the roof from the inside and outside:

- solar radiation
- precipitation in the form of rain, hail and snow
- wind suction, wind pressure
- variations in temperature
- formation of dew, water vapour and icing
- noise from outside and sounds from the inside
- walkability of roof area



The RIB-ROOF metal roofs for the “Fischer warehouses in Dingolfing, Germany” had been built after one another from 1989 onwards. Photovoltaics were subsequently installed perforation-free in 2005.

Bring on the water?

There are many possibilities how water can penetrate into a building. One of the most common point is the roof. Standing seam roofs are **absolutely reliable** with regard to **waterproofing**.

The following three factors are the reason for that:

1. The **roof** and all **accessories** are fastened **perforation-free** without having to be drilled through the roof covering. This is not the same with liners and sandwich panels, e.g. if there needs to be installed a snow guard system, drill holes have to be sealed subsequently. A regular check is inevitable.
2. Weather conditions and variations in temperature do not have an impact on RIB-ROOF metal roofs due to its **excellent sliding ability**. A tiled roof is as **robust** as a **RIB-ROOF metal roof** with regard to

changes in temperature, however, more sensitive against weather conditions. The durability and functionality are affected by storm and hail, for example.

A tiled roof is, therefore, more sensitive to climatic influences which, in turn, affect the durability and functionality. Heavy storm and hail damage are one of the most frequent causes for tiled roofs to be repaired. **Metal roofs** are much more **insensitive**.

3. A RIB-ROOF metal roof is **extremely corrosion-resistant**. Aluminium is suitable for seawater as this material can even brave salty air due to its natural oxide layer. RIB-ROOF steel roofs preserve for a reliable corrosion protection due to a ageing resistant polyester coating or an alu-zinc alloy (corrosion protection class III).



Fire & flame: what to do if it burns?



Every two minutes is a fire reported in Germany. It is also very important to keep the fire protection in mind when putting up buildings, especially the roof area. The fire load should be reduced to a minimum. Sealings, bituminous sheets and polystrol insulation are classified hardly inflammable, however, this does not mean that these materials can not burn.

A **metal roof** out of aluminium or steel is **non-flammable** and, therefore, fulfils all qualifications for fire protection classification A. Such roofs do not provide an opportunity to catch fire, however, the underlaying thermal insulating material must not be flammable. **Therefore, fire insurer favour "hard roofing" when determining premiums.**

RIB-ROOF metal roofs are more resistant to flying sparks and radiating heat which could be very helpful for the installation of photovoltaics. Photovoltaics present a high fire risk for the building due to permanent power supply and cables. The metal roof can be the terminus for the fire in the case of emergency. RIB-ROOF metal roofs do not only offer a reliable tightness but also a reliable protection against flying sparks and radiating heat according to DIN 41082 - part 4. Besides, sufficient **protection** is guaranteed towards the **expansion of fire within the roof structure** according to industrial construction regulation DIN 18234.

Does a roof made out of RIB-ROOF also protect against lightning?

Lightning can also cause considerable damage to property or cause fire. Within analysing this risk for a building, it also has to be checked if there needs to be installed a constant effective lightning protection system.

A metal roof is a "natural air terminal" for lightning protection according to current version of DIN EN 62305-3. No additional air terminals need to be installed compared to tiled and foil roofs. However, if it is absolutely necessary to install additional terminals, you can use our RIB-ROOF brackets for lightning protection.

POSSIBILITIES IN DESIGN

TAKE ADVANTAGE OF DIVERSITY

Impressive architecture provides for yield!

Architecture enhances the quality of your building and has therefore a positive effect on the value of our property. Architects like to use metal roofs in order to achieve something special. A **precise adjustment** of the roof membrane to the ground plan of a building and the roof geometry is possible **with RIB-ROOF metal roofing systems**. Other roof coverings are subject to restrictions:

Tiles



Tiles can theoretically be installed from roof pitches of 10° onwards. According to the rules of the German Central Association of Roofing Trade, the recommended roof pitch, which has proved its rainproofing in practice, is 22°.

Liners and sandwich panels



The rules recommend a minimum roof pitch of 5° for roofs with joints. The lower the roof pitch, the larger the overlap on the joint so that a permanent tightness is ensured. Curved forms of roofs are not possible with pre-fabricated elements.

Angle standing seam roofs



Angle standing seam profiles, which originate from the traditional plumber technique, are suitable for simple roof areas and connections. The roof pitch should not be under 25° or 35° in snowy regions so that precipitation can drain off quicker, according to the manufacturers.

Foil and bitumen roof



These roof coverings are only possible with flat roofs as the roof area is not visible. Not accessible roofs should be protected by a layer of gravel. Accessible roofs should be protected by panels or greening. However, statics have to be considered with all protective measures as gravel and plant substrates can weigh up to some tons. Foils are not of relevance for inclined roofs.

RIB-ROOF metal roofing systems



Demanding forms of roofs can simply and economically be implemented with RIB-ROOF metal roofing systems. Substructures out of wood and steel are possible and can easily be carried out. The different shapes of our profiled sheets, an installation without any joints and a minimum roof pitch of 1.5° enable a high-quality covering of curved, tapered, steep and flat roofs.

-  steep roof  flat roof
 curved roof

Representative properties can be achieved with metal roofs. The exhibition building of "Alber Treppenbau" in Germany is very popular due to its extraordinary architecture and, therefore, increases the company's level of awareness.



POSSIBILITIES IN DESIGN

TAKE ADVANTAGE OF DIVERSITY

Specialities of RIB-ROOF ...

... are different materials, surfaces and colours. All common metals are available. Surfaces with reduced dazzling effects are functional and beautiful in one. Aluminium and steel can be powder-coated which provides for a colouring with many variants. Please refer to our brochure in the margin in which

you can get an overview on our materials and possibilities in design. Let's get inspired!



Do RIB-ROOF metal roofs provide enough comfort for our conscience?

Of course, if everything was planned and carried out in the right way, the residents neither hear rain and wind nor temperature-related expansions of the material. Compared to liners or angle standing seam roofs, a RIB-ROOF metal roof has a very good sliding ability of the profiled sheets in its holding brackets which reduces friction and constraint and, in turn, prevents from disturbing noises of expansion. If you choose the right roof build-up of RIB-ROOF metal roofing systems, enhanced sound insulation requirements up to 55 dB can easily and economically be fulfilled. Therefore, a RIB-ROOF metal roof also provides enough comfort for your conscience from this point of view.

Flat roof in focus

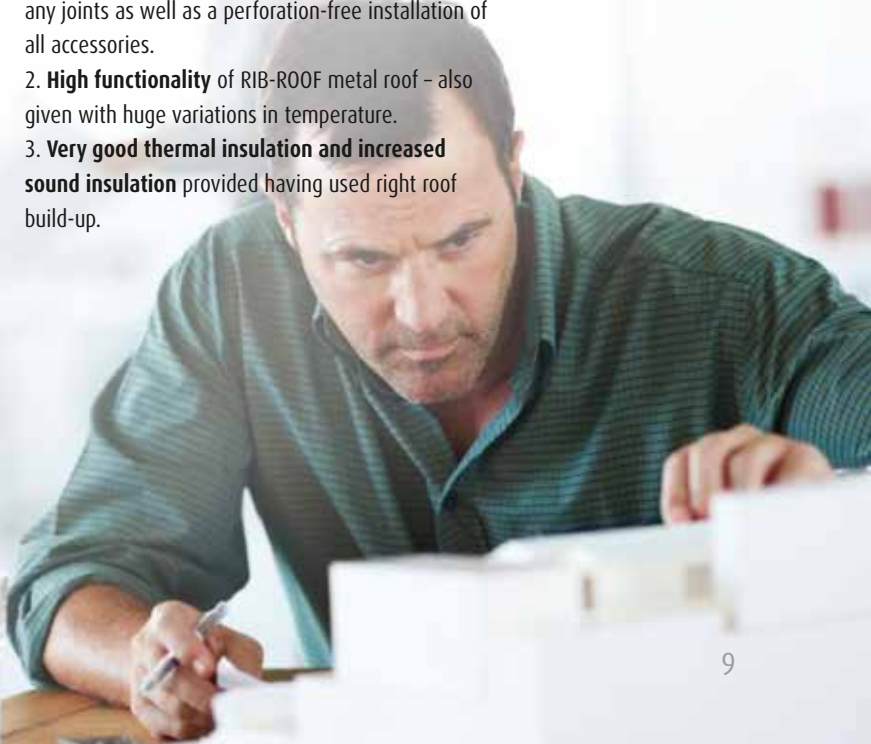
No other roof form symbolizes modern construction so much as a flat roof. However, a flat roof also involves some difficulties:

1. Slower water runoff.
2. High thermal exposure, especially in summer times, due to a steep angle of incidence effected by infrared and UV radiation.

Moreover, a flat roof has to act as an all-in-one solution. A flat roof must independently guarantee thermal and sound insulation as well as protection against weather and temperature in comparison to an inclined roof where functionality is shared between ceiling, attic and roof covering. DIN 18531 "Roof sealings – sealings for not used roofs" and DIN 18195 T5 "Sealing of Buildings" as well as the guidelines for planning and execution of roofs with sealings (so-called "Guidelines for flat roofs") exactly rule the sealing and execution of flat roofs.

A RIB-ROOF metal roof can be installed from roof pitches 1.5° onwards. The following three factors guarantee a secure flat inclined roof in the long term:

1. **Waterproofing** by means of an installation without any joints as well as a perforation-free installation of all accessories.
2. **High functionality** of RIB-ROOF metal roof – also given with huge variations in temperature.
3. **Very good thermal insulation and increased sound insulation** provided having used right roof build-up.



POSSIBILITIES IN DESIGN

TAKE ADVANTAGE OF DIVERSITY



Boulder barn, Putgarten, Germany

The renovation of the historical boulder barn, which is the oldest and biggest one in Mecklenburg-Western Pomerania, Germany, not only required the fulfilment of monument conservation but also the functional adaption of the building to its prospective use for cultural events. The 80-year old hipped roof was replaced by an appropriate colour-coated RIB-ROOF steel roof. The back-mounted installation of roof windows provides for sufficient light in the newly developed attic which is used e.g. for viewing.

Are RIB-ROOF metal roofing systems suitable for renovation of already existing roofs?

The restoration of buildings is a keyword which immediately causes headaches to all building owners. For some building owners it is important to retain the original character of a building whereas others want to separate from the old optics and create something new which suits more to their requirements and wishes. Statics and legal building regulations place high requirements for the restoration of old buildings.

You could be confronted with the following problems when intending to restore a building:

- capacity of roof truss
- disposal of old roof covering material
- fulfilment of energy saving regulations

RIB-ROOF metal roofing systems can easily solve the above-mentioned tasks in the truest sense of the word. It is possible to **save weight** by using aluminium for the profiled sheets; therefore, the old roof truss is often reused. **An adaption to desired overall appearance** is possible due to various surface variants and colour coatings. Therefore, the character of historic monuments is preserved. You can simply install RIB-ROOF profiled sheets on the substructure when renovating flat roofs. The foil or bitumen do not have to be disposed when using thermal insulation between old and new roof, in turn, energy consumption could be reduced at a reasonable price.



What's likely to be experienced in the future!

Sustainability is an important issue for building owners not only due to legal regulations. It is rather a central need in today's lifestyle, avoiding to get rich at the expense of future generations. Ecology, economy as well as personal and entrepreneurial needs have to be brought in accordance which, in turn, is the most frequent difficulty that occurs when constructing and preserving buildings than in any other sectors.

Economic advantages and possibilities of adapting the roof to the requirements of buildings have already been mentioned over the previous pages. However, what about the environmental compatibility and contribution to energy saving with different materials?

ENERGY AND SUSTAINABILITY

THINK AHEAD

Ecology does not start with E, but with M!

M as material. Whether a building was erected sustainable, this largely depends on which material was used. However, the environmental compatibility of a material can only be evaluated if we look from its origin to its eventual disposal. Many product solutions are offered for different roof coverings; therefore, it is difficult to talk about general details in connection with ecological characteristics of roofing material.



The Product Environmental Declaration (so-called EPDs) **are formed by consolidated and neutral data.**

Therefore, these declarations are used for sustainability certification of buildings.

We are proud to say that we

can present the Product Environmental Declaration according to ISO 14025 and EN 15804, drawn up by the Institute for Construction and Environment e.V., for our aluminium and steel profiled sheets.

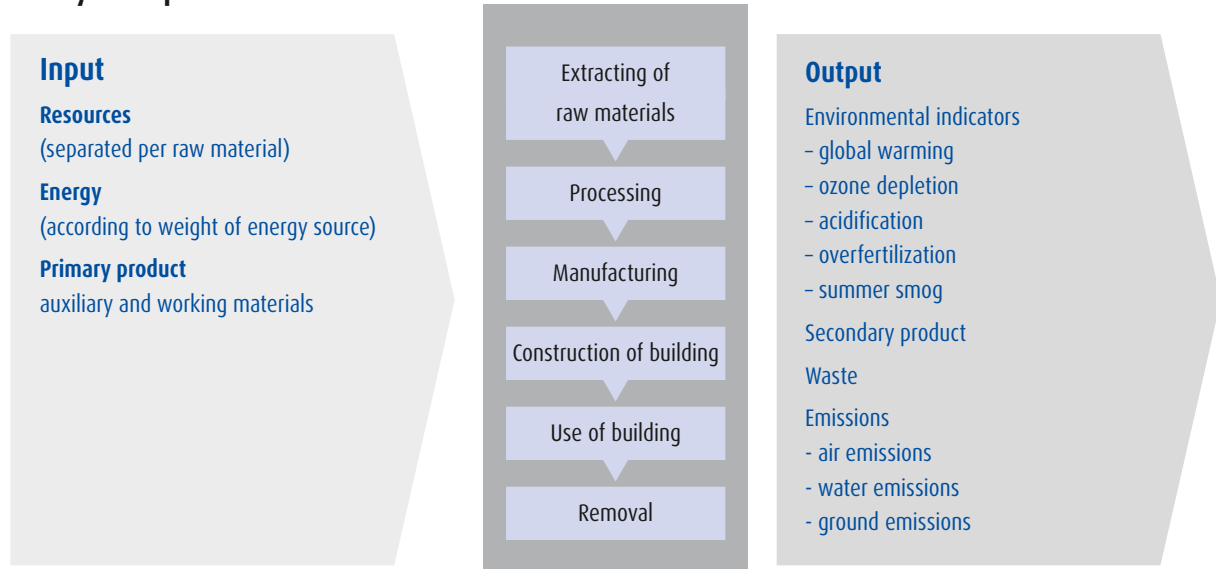
A RIB-ROOF metal roof nowadays consists of **a maximum available quantity of recycled materials.**

On the other hand, thin-walled aluminium and steel profiles are very good recyclable. In Germany

we have a functioning recycling circuit. Therefore, aluminium shows a recycling quote of 92 % at the end – the same also values for steel according to the Federal Ministry of Transport, Building and Urban Affairs ("BVBS"). The following statement is made by the BVBS concerning the evaluation of aluminium as raw material compared to plastic material:

"The differing durability, which may be caused e.g. by a lower UV resistance or involve higher maintenance and lower possibilities in reusing, has to be considered. Metals are considerably corrosion resistant due to passive corrosion protective layers, especially lacquered by metallic and plastic coatings. Moreover, metals are easier to recycle and reuse as plastic or wooden products. Plastic also makes the reuse or recycling very difficult as the amount of materials is permanently increasing. Furthermore it is possible to copolymers different sorts of plastic which nearly makes it impossible to segregate." (www.wecobis.de). The BVBS advises to involve the EPDs in particular cases.

Life cycle of products



Source: IBU

Energy Saving Ordinance (EnEV) forthcoming in 2014!

Everyone who intends to put up a building has to abide by the Energy Saving Ordinance. On the **1st January 2016**, the maximum annual premium will be reduced by 25 % compared to actual EnEV 2009. Moreover, the so-called heat transition coefficient (= U-value) will be reduced by an average of 20 %. A so-called energy certificate is necessary for a person who mortgage or rent a property. The EnEV undertakes you to already state energetic values in property ads. You can **simply and economically fulfil the requirements of EnEV** with a **RIB-ROOF metal roof**.



Cold and hot: How does a RIB-ROOF metal roof react in summer and winter?

A RIB-ROOF metal roof is **nearly free of any heat bridges** as the holding brackets are thermally separated from the substructure. If you use a distance structure as build-up out of wooden lathing, the roof insulation can be optimized and, in turn, heating costs are saved. A RIB-ROOF metal roof also guarantees heat insulation in summer. Standing seam roofs show **lower surface temperatures** compared to other roof sealing materials with darker surfaces which are heated by solar radiation. Therefore, a contribution to air-conditioning of internal rooms is achieved.

Photovoltaics on RIB-ROOF

A RIB-ROOF metal roof is predestined for the installation of photovoltaics. Not only due to the already mentioned aspects of security but there are also different systems on it available which can be

realised simply and economically. It is also possible to install photovoltaics parallel or elevated to the roof by means of our brackets which can be mounted perforation-free.



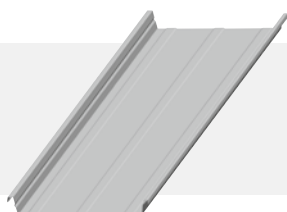
RIB-ROOF METAL ROOFING SYSTEMS

SUMMARISED IN DETAILS

RIB-ROOF metal roofing systems take the easy way:



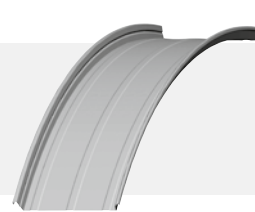
- ✓ long lifetime and therefore cheaper, specific investments compared to other materials (aluminium profiled sheets > 50 years)
- ✓ low maintenance costs (maintenance-free)
- ✓ economic and reliable execution of large roof areas due to an installation without any joints
- ✓ rainproof due to perforation-free installation of roof and accessories
- ✓ immune to weather
- ✓ highly weatherproof and corrosion-resistant
- ✓ non-flammable
- ✓ suitable lightning protection according to DIN EN 62305-3
- ✓ nearly free of thermal bridges as well as wintry heat insulation
- ✓ diverse shapes
- ✓ different materials, surfaces and colours selectable
- ✓ "simple" renovation
- ✓ increased sound insulation grantable
- ✓ Product Environmental Declaration available
- ✓ great recyclability
- ✓ predestined for photovoltaics



straight



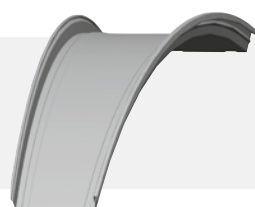
tapered



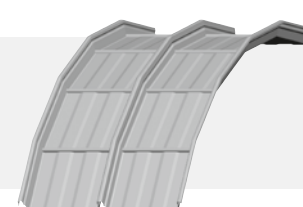
convex curved



concave curved



tapered convex curved



tapered concave curved

Cue the film: Installation of a RIB-ROOF metal roof

At our website you can find many films and installation animations which show you how quick and simple a RIB-ROOF metal roof can be installed. Furthermore, you can get inspired by our references!

www.rib-roof.com

RIB-ROOF METAL ROOFING SYSTEMS

SUMMARISED IN DETAILS

Characteristics and application	RIB-ROOF	Angle standing seam	Liners	Sandwich panel	Foil	Tiles
Sustainability / longevity	👍👍	👍	👎	👎	👎	👍
Efficiency regarding investment	👍	👎	👍	👍	👍👍	👍
Efficiency regarding maintenance	👍👍	👍	👎	👎	👎	👎
Security regarding extreme weather conditions	👍👍	👍	👎	👎	👎	👎
Maintainability, maintenance	👍👍	👍	👎	👎	👎	👍
Recyclability (EPDs)	👍👍	👍👍	👍👍	👍👍	👍👍	👍
Variety of shapes and materials, variants	👍👍	👍👍	👎	👎	👎	👍
Installation of accessories (photovoltaics, solar thermal energy, snow guard system, ...)	👍👍	👍	👎	👎	👍👍	👎
Thermal bridges	👍	👍	👎	👎	👎	👍
Sound insulation	👎	👎	👎	👎	👍	👍
Fire protection	👍👍	👍👍	👍👍	👎	👎	👍👍
Corrosion protection	👍	👍	👎	👎	👍👍	👍👍
UV resistance	👍👍	👍	👍	👍	👎	👍
Lightning protection	👍	👍	👍	👍	👎	👎
Resistance, e.g. snow clearing	👍👍	👍👍	👍	👍	👍👍	👎

Our experts are your insurance for smooth constructing.

To put architectural visions into practice not only requires know-how but also practical experience. Our specialised RIB-ROOF installers exactly know what to do. They will help you to successfully finish your projects. We are prepared to provide you with a list of RIB-ROOF partners in your vicinity. Please contact us in this matter!

Furthermore, we offer you comprehensive advice and services. Our internal engineers and specialised craftsmen exactly know what's important due to international experience with large projects. Our specialised employees like to support building owners and architects in each stage of your project, from tendering to developing proposals of details.





RIB-ROOF
Metal roofing systems



Roof Drainage



Shelving Systems



Industrial
Metal Works

Technical amendments, errors and printing mistakes are reserved.

zambelli



MADE IN GERMANY

Zambelli
RIB-ROOF GmbH & Co. KG
Hans-Sachs-Straße 3 + 5
94569 Stephansposching
Germany

Phone +49 9931 89590-0
Fax +49 9931 89590-49
E-mail rib-roof@zambelli.de
www zambelli.com