Lightning conduction and protective screening of buildings

Kalzip roof and wall systems are flexible and adaptable to the architectural and technical requirements of industrial, private or public buildings and they offer a safe as well as effective protection against lightning strikes on buildings as well as protection against their electromagnetic impact in electrical systems.

Lightning protection based on building covers made of Kalzip profile panels

An economic and efficient measure for the protection against lightning and its impact can be achieved in two ways using Kalzip aluminum profile panels:

- as a containment system for the protection against lightning strikes in buildings
- as building shielding against the electro-magnetic impact of lightning strikes.

Normally there are no separate or additional containment systems required for lighting when using Kalzip roof or wall systems.

In case of a lightning strike, the possibility exists that a small hole may be generated in a flange. This damage is always located above the water carrying level and can be easily closed again. However, statistically speaking, this case occurs rarely. Additional damage to the Kalzip cover may not be expected.

State-of-the-art industrial operations, administrative offices, data centers and banks all house extensive electronic equipment, such as

- Communication systems with a connection to energy providers
- Computers and data networks
- Control systems for production

… and must therefore be protected against the electro-magnetic impact of lightning strikes

Kalzip® as a conductor of lightning

Kalzip profile panels are viewed as a part of a lightning conduction system in accordance with DIN EN 62305-3, because their flanging is effective as a permanent electrical connection.
However, it is required that the profile panels are connected conductive with the ground (see fig. 1)

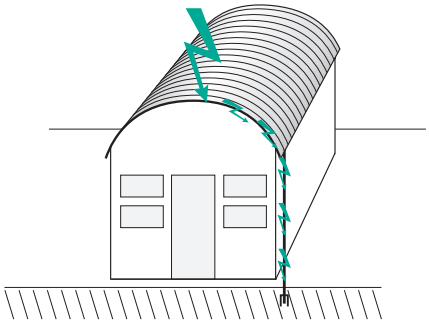

Fig. 1 Kalzip® as a conductor of lightning

If the Kalzip profile panels are coated, then a type test in accordance with DIN V VDE V 0185-600 is required. Kalzip has passed this test (test report No. BET/ Corus 08-06-17-1d, available on request).

This means that all roofs made of Kalzip profile panels are - without additional requirements - suitable to be used as a natural part of a standard conforming lighting protection system in accordance with VDE 0185-305-3 (IEC/ EN 62305-3).

Approved clamps are available for the connection of the Kalzip profile panels. The clamps were developed in close cooperation between Kalzip and the supplier OBO Bettermann and were tested for lightning ampacity as per VDE 0185-561-1 IEC/ EN 62561-1 (test certificate available on request). The test was performed with 50 kA. If two clamps are used, then a lightning ampacity of 100 kA is achieved. One clamp is adequate for buildings of the lightning protection class 3 if the lightning ampacity is distributed. Additional information can be found in the OBO lightning protection guideline (www.obo.de).

Lightning protection clamps for Kalzip standing seam profiles:

- Clamp type BS (V2A): Kalzip clamp FS2 + OBO connection clamp for Rd 8-10mm (see fig. 2). Art. No. and type OBO Bettermann: 5317 50 2 - RSF 249 8-10 VA
- Cable holder type HS (V2A): Kalzip clamp FS2 + OBO cable holder for Rd 8mm (see fig. 3). Art. No. and type OBO Bettermann: 5317 51 2 - RSF 177 20 VA M8

Fig. 2 Clamp type BS

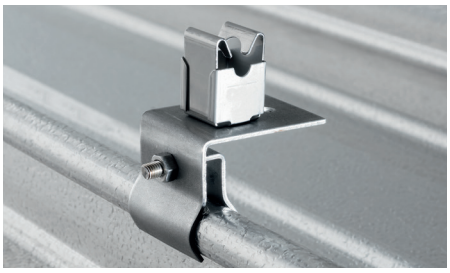

Fig. 3 Clamp type HS

Design prerequisites for conduction system

- Kalzip profile panels must be connected conductive with the ground
- Flanges must be closed
- conducting connection to
  - a conducting wall cover (metal)
  - a substructure made of steel or aluminum
  - the reinforcement of a concrete substructure and its grounding must be implemented

This means that the design details must be coordinated with expert specialist company for lightning protection systems.

Kalzip as shielding

If the entire building covering is made of aluminum (see fig. 4) - roofing and wall coverings made of Kalzip systems - then the currents flowing from the containment system into the ground will be distributed in such a way that they can no longer induce hazardous voltages in wire loops.

IT networks and control systems as well as the connected equipment will not be destroyed or damaged and therefore do, in most cases, not need additional protective measures. An optimal shielding is achieved if the Kalzip profile panels of the building covering are all connected conducting and grounded and if larger openings in the covering are bridged.

Research at Kalzip has shown that - depending on the design - the electromagnetic field inside and therefore the induced voltages and currents are reduced by a factor of more than 100.

Design prerequisites for shielding

- The building cover must be continuously connected and grounded (see fig. 5). Window openings must be bridged.
- Kalzip provides a metal surface (stucco textured, AluPlusZinc or rolled blank)
- For coated Kalzip profile panels:
  - the clips must be placed on a metal substructure.
  - the clips must be connected to underlayed aluminum strips (min. 60 mm wide and 0.7 mm thick) if a substructure or wood is used.
- Connection of roof and wall: each profile panel must be connected to each other with aluminum strips as short as possible at the connection from roof to wall (min. 60 mm wide and 1 mm thick).
- Window openings must not be larger than 1.5 m x 1.5 m, larger openings must be bridged using aluminum strips (50 x 1 mm) or must be conductive connected at the aluminum window frame if no other conducting connection is available at the site.

This means that the design details must be coordinated with a specialist company for lightning protection systems

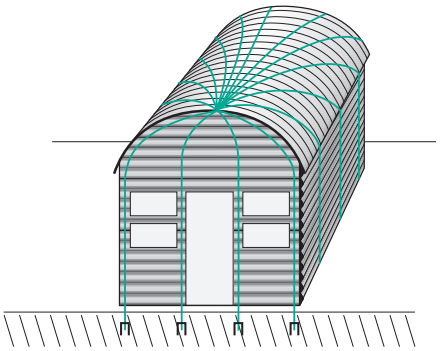

Fig. 4 Kalzip as as shield

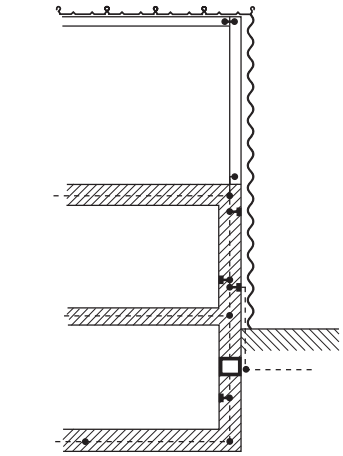

Fig. 5 Example of a continuous connection and grounding

Supply source for the lightning protection clamps for Kalzip standing seam profiles:
Germany: OBO Bettermann Vertrieb Deutschland GmbH & Co. KG, Postfach 5164, 58606 Iserlohn, Email: info@obo.de,
Phone: +49 2371 7899-2000, Fax: +49 2371 7899-2500, Web: www.obo.de
International: OBO Bettermann Holding GmbH & Co. KG, P.O. Box 1120; 58694 Menden, Germany
Email: export@obo.de, Phone: +49 2373 89-1700, Fax: +49 2373 89-1238, Web: www.obo-bettermann.com

www.kalzip.com

Kalzip GmbH
August-Horch-Straße 20–22
D-56070 Koblenz
P.O.BOX 10 03 16
D-56033 Koblenz
P: +49 (0) 2 61 98 34-0
F:+49 (0) 2 61 98 34-100
E: germany@kalzip.com

German 08/19