Concealed Anchoring System
For Facade Panels
The KEIL Anchor Facts

The KEIL anchor was developed for mechanical, non adhesive concealed anchoring for different façade cladding materials. The anchor is used worldwide in the façade industry for rain screen, wall cladding, exterior and interior façades.

The aesthetics of the façade face is not compromised by any visible fastening components.

Positioning of concealed anchors on the back of the panel can be selected without restrictions. A wide range of alternatives is made available as to the quality and design of the material. The façade performance will be more effective and in tune with the requirements of specific materials.

Appearance

The façade of a building provides a unique appearance. Designers can imagine many possibilities with different façade materials but they feel that their ideas are impractical due to restriction in anchoring.

The installers of delightful and impressive façade materials are enabled by the KEIL concealed anchoring method to achieve the designer’s vision.

There are no limits to creativity. Whether elegant, traditional, modern, delicate or unconventional – even the boldest façade designs can be implemented.

The KEIL anchor is the perfect choice for architects and designers when specifying thin materials and non visible attachments.

Maintenance and Replacement

No “soiling” or dirt and rust streaks on the face of the façades as the attachment components are situated at the rear.

Damaged or unwanted cladding material is easily replaced without removing or damaging surrounding panels.

KEIL anchors can be reused to replace façade panels.
**APPLICATION & CONSTRUCTION**

### Various Cladding Materials

More than 50 different types of materials may be used with the KEIL concealed façade attachment.

**Regardless of material or thickness - all with the highest degree of safety.**

Dimensional stone with a thickness from 5 or 6 cm or 2 – 2 ¼” inches are standard for façade cladding and for the use with KEIL anchors.

- **Natural Stone** i.e.: Granite, Marble, Lime Stone, Sandstone, Jura Stone and Slate with a minimum thickness of 20mm / ¾”.

- **Ceramic and Porcelain** tile starting with a thickness of: 7mm, ¼”.


The load on the foundation and the building is substantially reduced by using thinner, light-weight panels for the substructure.

### Construction Time, Labor and Shipping

The KEIL system drastically reduces the work involved as fewer holes are required and creates economic advantages by generally allowing thinner panel’s to be used, particularly if rare and expensive cladding material is requested.

Thinner panels, cost less for shipping, handling and installing.

**Quick, simple and safe**

The KEIL undercut holes shall be drilled at the plant or workshop to guarantee precise spacing of the drill holes. The KEIL anchors and hanger attachments will be installed at the job site, this avoids damages during handling and transportation in addition to saving time and labor.

### KEIL Anchor Drill Machine

The drilling of the undercut hole is archived using the KEIL Drilling machine or a CNC machine with KEIL drill bits. Different drill bits for different materials (wet and dry drilling) are available.
The KEIL Undercut Hole

For the application of the KEIL anchor, a “mushroom” like hole is drilled into the material using the KEIL patented undercut method.

The diameter of the undercut hole is larger as the cylindrical channel hole.

The patented KEIL drilling technique carries out the cylindrical and undercut drilling in one step with only one tool.

**Speedy performance** - Drilling time for a 15 mm deep anchor hole, is less than 10 seconds.

The KEIL Concealed Anchor

A KEIL anchor consists of two parts: Anchor and matching bolt.

- **KEIL anchors are made from high quality A4 stainless steel.**

- The KEIL anchor geometry matches the KEIL undercut hole and ensures a stress free attachment to the material.

- Extreme climate changes such as heat or freeze contribute to different expansion or shrinking of the cladding materials. While these factors can cause damage with traditional cladding systems, the “stress free fit” of the KEIL anchor eliminates damage of the façade panel.

**Selection of the correct size anchor and bolt:**

![Diagram showing various anchor sizes and bolt lengths]

As thicker the cladding material, as longer the anchor may be. Always the longest anchor available is selected; this will increase the load factor (Pull out force).

The length of the anchor bolt depends on the anchor length, and thickness of the attachment to the anchor.

For additional technical information please visit www.tile-eze.com.
SAFETY & PERFORMANCE

Variance in Cladding Material Thickness

Tolerances in panel thickness are simply compensated for in a one step drilling task. The KEIL anchoring method allows for adjustment of up to 5 mm in thickness difference of the cladding material – typical for natural stone or manmade cement panels.

Safety – Monitoring

Drilled holes are checked continuously with a monitoring tool to insure that the drilled anchor hole has the correct depth so that the bottom of the anchor can fully expand into the form fit drill hole. This insures that the anchor cannot pull out when load force is applied.

Testing and Performance

Wind Load & Hurricane:

- Wind load factor depends on the density or hardness of the cladding material and substructure.
- The KEIL anchor does not fail.
- Live Hurricane Test was performed when Hurricane IKE in 2005 did not harm a new façade construction with ceramic porcelain tile in Houston Texas.
- The KEIL system passed several inspections in Dade County (Miami).

Seismic Testing & Earthquake

- KEIL anchoring was tested in Europe with US Equipment.
- Prestigious buildings which have used the KEIL Technology have already survived earthquakes
- The Buddha Church Teahouse building in Christchurch, NZ was shocked by earthquakes in 2010 and February 2011 where over 60 % of the old city buildings were heavily damaged or destroyed.
- The city of Santiago de Chile was impacted by an earthquake in 2009. Three Buildings in the City center and a Hospital with KEIL anchored facades have not been affected.
- Earthquake in Railway Station, Taiwan: The façade was complete intact after major earthquake.

Impact on KEIL Anchored Cladding Panels

Heavy impact into the center of the panel may fracture it. After impact at least three or four panel parts will stay anchored with the KEIL System. Only a fraction of the material will separate and come down, versus a clip, dowel or edge mounted panel, which could come down completely.
**KEIL Anchor With Support Structure**

The support structure is the static link between the structural external or internal wall and the façade cladding.

Aluminum and wood or a combination of them are available as materials for the support structure. Aluminum has prevailed in the majority of cases. Aluminum support structures can be adjusted in three dimensions and lie against the building structure free from stress. Any unevenness and wall projections can be compensated to achieve a perfect horizontal and vertical alignment. Aluminum support structures can also be highly effectively integrated into the lightning protection system, even if the cladding is non-conductive.

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**KEIL Anchor Without Support Structure (Direct Anchoring)**

The KEIL anchor facilitates the tight axial connection of the undercut anchor and threaded bolt.

It is used where facade panels need not be removed again after fixing, e.g. to replace damaged panels in precast concrete elements for internal fittings, and for partial replacement or repair is needed with limited space behind cladding and wall.