

HS ATTACHMENT TECHNOLOGY

The KEIL undercut hole

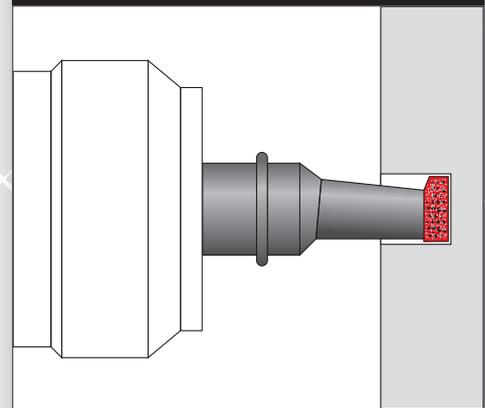
A cylindrical hole is drilled and then conically undercut in one step with only one tool.

Different levels of automation are possible depending on machine type and material.

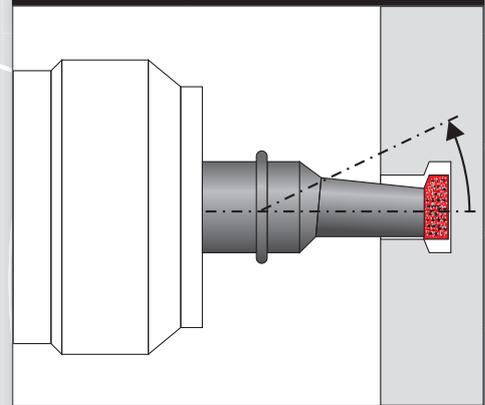
The drilling time in ceramics is less than 10 seconds.

Panels of any size or weight are given an undercut of precise and uniformly symmetrical shape.

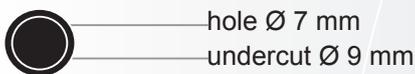
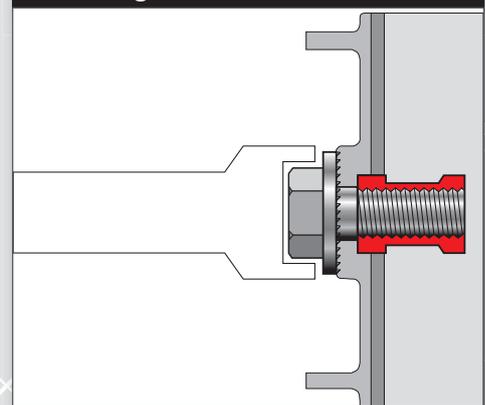
Drilling



Undercutting



Mounting



To prepare for installation, an undercut anchor is inserted into the hole and tightened to a positive fit using a screw.

Quick, simple and safe with normal tools, e.g. a cordless screwdriver.

Safety Information

Safety and product liability require that the KEIL undercut attachment system is always used as a unit. Correct functioning is ensured only if matching KEIL products (anchor with screw or threaded pin, drill head and facade drill bits) are used together. Their use as a system has also been stipulated in the approvals granted and applied for. The components of the KEIL undercut attachment system are protected by patent.

The KEIL undercut anchor

The KEIL undercut anchor, for invisible attachment of thin panels, is manufactured from stainless steel.

Its geometry, matched to the KEIL undercut hole, applies maximum loads to the panels in an optimum manner.

This geometry ensures stress-free attachment in all commonly used panel materials from 6 mm thickness.

Depending on panel thickness or carrying capacity required, different insertion depths (h_s) are available. The KEIL undercut anchor is designed in such a way that it withstands a greater load than just the weight of the panel.

The KEIL undercut anchor offers major benefits due to the high installation integrity. The anchor is placed quickly, easily and safely at a controlled depth for all panel thicknesses in an optimum installation by using matching KEIL system components: anchor, panel bracket and KEIL locking screw with integral locking mechanism.

Only two parts (anchor sleeve and screw) are required for safe attachment. Additional screw-in parts for the KEIL undercut anchor provide individually tailored connection options, such as

- ▶ Connection to a support structure
- ▶ Connection to a cassette structure
- ▶ Attachment of soffit panels with internal angles
- ▶ Direct attachment to a wall using fork anchors or plug-in anchors
- ▶ Attachment of wash hand basins, countertops, furniture, grave surrounds or natural stone radiators

Types



$h_s = 4,0\text{mm}$



$h_s = 5,5\text{mm}$



$h_s = 7,0\text{mm}$



$h_s = 8,5\text{mm}$



$h_s = 10,0\text{mm}$



$h_s = 11,5\text{mm}$

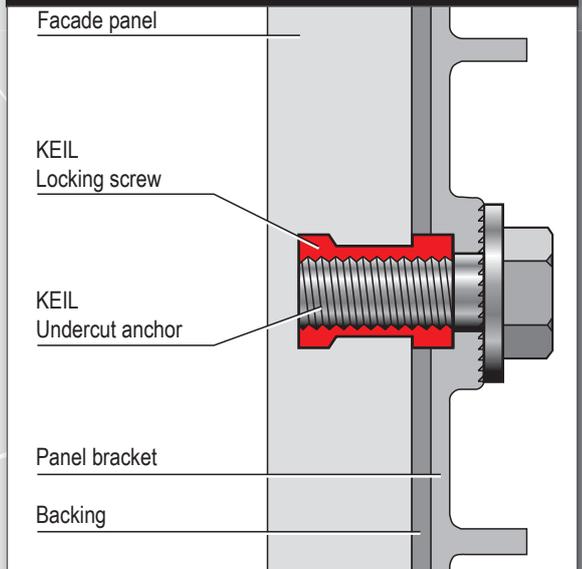


$h_s = 13,0\text{mm}$

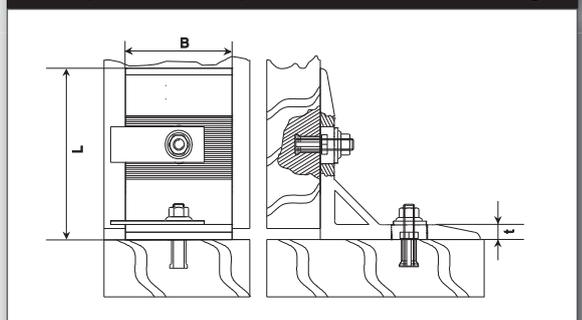


$h_s = 15,0\text{mm}$

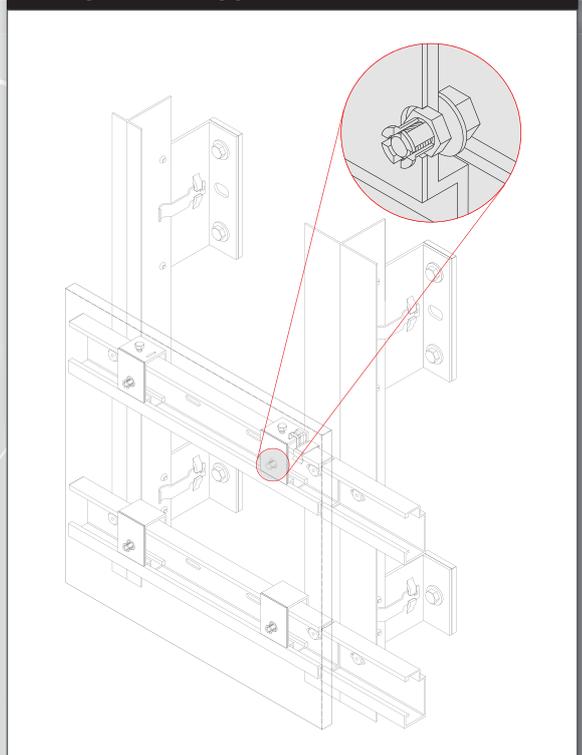
The principle



Example of soffit panels with internal angle



Example of a support structure



The KEIL undercut drilling systems

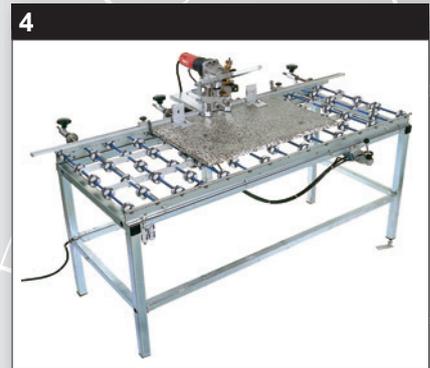
KEIL system toolset consisting of:

- 1 Facade drill bit
- 2 Drill head



Undercutting drilling machines can be supplied as:

- 3 Portable drilling machines
- 4 Drilling tables with roller conveyor
- 5 Automatic drilling machines



The KEIL service

Advice for your particular attachment problems from our service team.

Approvals for various materials and sizes with and without support structure are available. The KEIL undercut attachment system is **protected by patents**.

Demonstration and training at the customer or in our works.

We can demonstrate the undercut system including drilling technology to you. Portable drills or machines with roller tables can be demonstrated in your company. We should be pleased to demonstrate the automatic drilling machines during your visit to our company or at selected distributors.

Machine **rental service** without capital investment:

KEIL and various national and international distributors also rent the drilling machines for undercut holes with KEIL facade drill bits. Use the possibilities of extending your existing machine range temporarily or to have the optimum machine available for special jobs without having to tie down capital.

Drilling and undercutting **service**:

The drilling capacities are adapted to requirements and sufficient capacities are also available for large projects. We have extensive experience in this area.

The KEIL safety

Approvals of the KEIL KH undercut anchor (as at 1/2013)

Approval	Insertion depth	Insertion depth									Spacer
		h _s =4	h _s =5,5	h _s =7	h _s =8	h _s =8,5	h _s =10	h _s =11,5	h _s =13	h _s =15	
ETA-03/0055 Porcelain stoneware to EN			●	●		●					
ETA 09-0348 Porcelain stoneware Royal Mosa			●	●		●					
ETA 12-0175 Porcelain stoneware Petraluxe			●	●		●					
ETA-06/0220 Rieder glass fibre concrete						●					
ETA-06/0253 Natural stone				●			●			●	●
ETA-06/0247 Mineralit polymer concrete						●					
ETA-11-0409 Eternit fibre cement					●						
Z-21.9-1534 Eternit fibre cement					●						
Z-21.9-1822 Dansk Eternit fibre cement						●					
Z-21.9-1544 HPL Trespa			●				●				

Approvals can be provided on request.

KEIL undercut anchors are monitored by third parties.
If required, a certificate of conformity may be requested.



The KEIL arguments

Technology

- ▶ Highest safety due to many patents and approvals, for example the European Technical Approval (ETA) for the attachment of facade panels (see above).
- ▶ A complete system – technically mature and proven innumerable times.
- ▶ Facade panels as thin as 6 mm – economic and saving resources.
- ▶ Installation independent of temperature and climate with a high degree of pre-assembly in the factory or on site.
- ▶ Position of undercut anchor on the back of the panel can be selected without constraints.
- ▶ Tolerances in panel thickness are simply compensated for by means of spacers.
- ▶ Earthquake tested up to magnitude 9.4 on the open-ended Richter scale.
- ▶ Very high load capacity due to optimum load application, but without stressing the facade panel by lateral bracing = positive fit.
- ▶ Breakage loads are up to seven times higher than for edge attachment (e.g. bolt anchors).
- ▶ Subsequent replacement of individual or all facade panels.
- ▶ Non-flammable, mechanical and permanently safe attachment



Photo: KEIL

Design & aesthetics

- ▶ There are no limits to creativity. Whether elegant, traditional, modern, delicate or unconventional – even the boldest facade designs can be implemented.
- ▶ A clean facade undisturbed by visible attachment points.
- ▶ More than 50 different panel materials are available: e.g. ceramics/fine stoneware, natural stone, plastics/HPL, fibre cement, glass fibre reinforced concrete, ceramic glass, artificial stone, glass.
- ▶ The combination and interaction of different materials, shapes and colours is possible and helps to achieve the effects planned.
- ▶ Closed or open joints without visible anchors are characteristic for high-quality facades.
- ▶ No dirt or rust streaks as the attachment components are situated at the rear.
- ▶ Long life and low maintenance costs.
- ▶ Larger panels than for attachment at the edge for the same safety level.
- ▶ Increase in the value of the building with regard to acceptance and marketing.

Photo: Shackerley



Photo: Trespa



Photo: KEIL



Photo: fibreC by Rieder