A small selection of our products is shown below:

ANCHORING SYSTEMS, MOUNTING SYSTEMS AND ACCESSORIES

- HTA Anchor Channels
- HZA DYNAGRIP® Toothed Anchor Channels
- HGB Handrail Anchor Channels
- HTU Anchor Channels
- HM Mounting Channels and HS T-bolts
- Framing System/Accessories
- Powerclick

REINFORCEMENT SYSTEMS

- HIT Balcony Connections
- HSD Shear Dowel Systems
- HSD-LD Lockable Dowel System
- HTT/HTF Impact Sound Insulation Elements
- HBB bi-Trapez-Box®
- HBT Rebend Connections
- HCC Column Shoe
- HSC Stud Connector

BRICKWORK SUPPORT SYSTEMS, STONE SUPPORT SYSTEMS, TENSION ROD SYSTEMS

- FK4 Brickwork Support System
- HCL Adjustable Concealed Lintel System
- Body Anchors
- UMA Grout-In Anchors
- SUK Sub Structure System
- DETAN Rod Systems
HALFEN BRICKWORK SUPPORT

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Traditional Shelf Angles

Traditional shelf angles are a thermally inefficient means to support exterior brick facades. Their continuous contact with the slab creates a continuous thermal bridge as well as interrupts the exterior insulation layer reducing the effective R-value of the overall wall system. It is also more difficult to accommodate larger wall cavities utilizing a shelf angle. It becomes very heavy, creating installation issues and increases the effects of thermal bridging.

- Very limited adjustment for accurate positioning
- Drilling may damage concrete and its reinforcement
- Welded connections cause safety hazards, and require additional corrosion protection procedures

- Thick structural angles are difficult to position within the mortar joint. Lipped bricks are often required

- Creates a continuous linear thermal bridge
- Insulation is penetrated and interrupted
- Thermal bridges can lead to condensation inside the building

- Thicker insulation and greater air gap require a thicker and larger support angle
HALFEN Brickwork Support

HALFEN FK4 Brickwork Supports are the Eco-efficient alternative to traditional shelf angles. HALFEN’s FK4 system is able to accommodate thicker wall cavities utilizing a thinner and lighter material than that of the traditional shelf angle. The FK4 system is offset from the main structure allowing insulation to span continuously behind. This eliminates the continuous thermal bridge associated with the alternative shelf angle support method. The HALFEN HK4 system utilizes stainless steel reducing the overall thermal conductivity even more.

Thermal Analysis
To compare the effects of the HALFEN FK4 and HK4 system on the effective insulation resistance of a typical wall system a 3D finite element analysis was developed for all three systems. The typical wall system consisted of a 4in brick veneer, rigid insulation, plywood, metal studs with batten insulation and gypsum board. The results of the analysis showed that the HALFEN system results in an effective R-value almost 2 times of that when a traditional shelf angle is utilized.

<table>
<thead>
<tr>
<th>Support System</th>
<th>U-Value (BTU)</th>
<th>Effective R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelf Angle</td>
<td>0.11</td>
<td>9.4</td>
</tr>
<tr>
<td>HALFEN FK4</td>
<td>0.06</td>
<td>16.5</td>
</tr>
<tr>
<td>HALFEN HK4</td>
<td>0.056</td>
<td>18</td>
</tr>
</tbody>
</table>

© 2017 HALFEN · FK4 17-US · www.halfenusa.com
The HALFEN FK4 brickwork support system is available in standard and custom configurations to provide greater design flexibility for brick facades. Innovative engineering principles are used to provide a safe and effective support system, while reducing thermal bridging and providing the contractor with an easy to install, adjustable solution. It is particularly suitable for projects using wide, highly insulated air spaces behind the brick facade. The system is available in both galvanized carbon, and stainless steel.

The FK4 support bracket assembly consists of one or more adjustable hangers welded to a support angle, and is supplied complete with adjustment plates and U-washers.

The fastest and most adjustable method of anchoring the FK4 system to concrete is to use of HALFEN cast-in anchor channels and T-bolts. Post drilled anchors are also possible, but will limit horizontal adjustment and may damage the concrete structure and its reinforcement.

For an adjustable connection to structural steel components, HALFEN channel without anchors can be surface welded to the structure.

* Post installed drilled anchors or welded channels are also possible
HALFEN BRICKWORK SUPPORT

Applications

Appalachian State University (ASU) Boone, NC

ASU – Plemmons Student Units

Belmont University – Nashville, TN

FK4 – Installation

UCLA – Los Angeles, CA

UCLA Teaching and Learning Center – Geffen Hall
The HALFEN FK4 system is an engineered solution and can be designed to meet all project needs. The FK4 brackets can be anchored to cast in place slabs, post tensioned slabs and grouted CMU walls. Although it is more cost effective to locate horizontal joints below the middle of the slab, the FK4 system can be modified to accommodate joints above or significantly below center line of the slab. Wide cavities are also easily accommodated with our innovative design.
The HALFEN FK4 system can utilize steel horseshoe plates to safely support suspended soldier courses over openings in the wall. This eliminates the need to utilize an exposed steel angle which creates a cleaner look and is virtually maintenance free. The horseshoe plates are combined with short lengths of stitching rods which are threaded through the cored bricks to create a more aesthetically pleasing look. The horseshoe plates are made of hot dip galvanized carbon steel.

HALFEN horseshoe plates are available in various shapes and sizes to accommodate a wide range of soffits, including soldier and rowlock courses as well as deeper soffits.
Adjustability

Height adjustability
Three different hangers with 5, 3 and 2 teeth are available to allow a maximum of adjustability and to make the system suit smaller slab thicknesses.

**5-Notch Type**
- Vertical Adjustment
  - + 1-3/8" (35 mm)
  - - 1-3/8" (35 mm)

**3-Notch Type**
- Vertical Adjustment
  - + 3/4" (20 mm)
  - - 3/4" (20 mm)

**2-Notch Type**
- Vertical Adjustment
  - + 1/2" (13 mm)
  - - 1/2" (13 mm)

Coarse adjustment with notched hangers

Horizontal adjustability

Left and right adjustment in combination with HALFEN anchor channel

Adjustment maximized by deleting lipped bricks at support levels
HALFEN BRICKWORK SUPPORT

Flashing

Typical flashing over the insulation

Flashing with flexible, reinforced material over FK4 support unit
The HK4 / FK4 - system is a high integrity steel product. The system is available in both, galvanized carbon steel (FK4) and stainless steel (HK4).

Stainless steel offers many advantages to the specifier:

- Excellent corrosion resistance
- Resistance to unsightly staining
- Life-cycle cost benefits
- Lower heat transfer and thus reduced loss of thermal energy through the building shell
- Aesthetic surface finish
- 60 % recycled content
- 100 % recyclable

Life-cycle cost analysis is increasingly recognized as the true way to establish the cost of building components. The use of stainless steel means no costly remedial or refurbishment measures are required during the life of the structure.

As the trend to higher specification and longer service life continues, stainless steel will provide cost-effective long term solutions to specifiers’ problems.

**Excellent corrosion resistance**

HK4 is produced from Grade 316 stainless steel, which is recommended for highly corrosive areas such as marine locations or heavily polluted industrial environments. The lifetime of the stainless steel element is expected to be twice that of the galvanized material.

**Life-cycle cost benefits**

If exposed, for example as a lintel, galvanized steel has to be re-primed and refinished periodically, adding unnecessary maintenance costs for the life of the building.

**Lower heat transfer**

The heat conductivity coefficient of stainless steel is 40 % lower than that of carbon steel. This leads to lower heat transmission and thus to a smaller release of carbon dioxide from burning fossil fuels used to heat and cool the building.

**Recycling**

Stainless steel is 100 % recyclable. When a product finally reaches the end of its long service life, it remains a valuable resource. This helps the environment.
To provide you with all you need for your masonry projects, HALFEN has even more:

**HALFEN Concealed Lintel system**

Engineered brickwork support systems provide hidden support for brick soffits.

Virtually any flat or radius masonry opening can be built without exposed steel using the HALFEN Adjustable Concealed Lintel System (HCL). Commercial, government, institutional, religious and high-end residential projects can now have all brick soffit masonry openings that are aesthetically pleasing and maintenance free.

HALFEN’s technical department uses the architect’s conceptual design to engineer a brick lintel support system for each specific opening. Unlimited combinations using different brick size, span, coursing, soffit depth and arch geometry can be designed and manufactured to meet project specifications.

**Additional advantages:**

- Unlimited span and soffit width can be achieved, with connection(s) to the structure
- Available in hot-dip galvanized or stainless steel

**HALFEN Fleming Anchor system**

The HALFEN HFA Fleming Anchor System is used to restrain exterior masonry facades that are subjected to both wind and seismic loads. The system consists of the Fleming Anchor Channel, which is secured to the substrate; and the Fleming Anchor, one end of which is inserted into the channel. The other end of the Fleming Anchor is bonded into the facade’s horizontal mortar bed which is also reinforced with wire. Once installed the system components efficiently transfer both positive and negative facade loads to the substrate.

**Quality Features:**

- Fleming Anchor Channels are roll formed from 22 gage (0.85 mm) galvanized steel strip. The channel dimensions are 1”x21/32” (25 mm x 17 mm).
- Fleming Anchors are T-shaped and are stamped from 14 gage (1.9 mm) galvanized steel strip, complete with a central stiffening rib and two tabs.
- Field adjustable to allow for job site conditions
- Ships flat for ease of transportation, handling and storage
- Maintenance of exposed steel is eliminated
- Shop drawings and calculations are provided for all conditions
- Engineering State Stamp available upon request
HALFEN BRICKWORK SUPPORT

Design

The loads acting on the HALFEN support brackets and their connection to the concrete are determined by:

- The brick size
- The weight of brickwork to be supported
- The cavity (air gap) ‘a’ (see drawing)
- The bearing depth ‘z min’ (see drawing)
- The spacing of HALFEN support brackets
- Concrete dimensions and compression strength

It is important that this information is provided to HALFEN engineers so the correct HALFEN support bracket can be designed. The tension (T), shear (S), and resultant (R) loads at the connection to the concrete must also be verified by the structural engineer. If HALFEN channels are utilized this service is provided by HALFEN engineers.

Seismic Loads

Seismic loads should be provided to HALFEN engineers so they can be accounted for when calculating loads applied to the HALFEN support brackets and their connection to the structure. HALFEN HFA Fleming Anchors can be used to support horizontal loads.

Wind & Impact Loads

HALFEN support brackets are designed to support the dead load of the facade only. Wind loads or any impact loads on the facade must be supported by independent ties to the structure designed by the structural engineer.

Differential Movement

Movement joints are normally located immediately under support levels. It is important that the architect and structural engineer design the joint for adequate movement to prevent cracking in the facade. It is recommended that the movement joints be strategically placed below the mid point of the slab ideally no less than 5in below the top of slab. HALFEN can accommodate joints above or below this, but results in a higher demand on the system. It is also more economical to the design if the movement joints are at identical locations around the structure if possible. HALFEN engineers can assist in planning and development phases of the project to help coordinate the most economical implementation of the FK$ system into the project.
We Engineer …

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We are here to help!

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We offer AIA accredited courses.
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