HALFEN

HALFEN HIT INSULATED CONNECTIONS

Thermal insulation connections for balconies and structural components

YOUR BEST CONNECTIONS

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QUALITY. INNOVATION. DIVERSITY.

HALFEN Insulated connection – for cantilevered structural components and balconies

Designers, architects and building contractors are fully aware when designing cantilevered balconies and other cantilevered components that these need to be considered in the **concept for the thermal insulation** of a building.
This is the only way to meet Energy Saving Ordinance demands and to reduce heat loss.

HALFEN HIT Insulated connections provides a versatile and innovative range of products to meet these demands.

The new **HALFEN HIT Steel to concrete connector** is now available to connect filigree steel structures to concrete.
This reduces thermal bridges with simultaneous high load transfer.

The proven **HALFEN HIT Concrete to concrete connections** not only ensure optimum thermal insulation,
they also comply with the highest **fire safety requirements**, **and** can be used in numerous installation situations.

This brochure illustrates a selection of possible applications. The HALFEN engineering team is available to assist if custom solutions are required for individual construction projects.

Go for quality and innovation with HALFEN HIT Insulated connections.

An evocative landmark, re-interpreted

NEUER HENNINGER-TURM, GERMANY

With a height of 140 metres, the new Henninger Tower in Frankfurt am Main is one of the highest residential buildings in Germany. The architectural design is based on the grain silo of the Henninger Brewery which occupied the site before being demolished in 2013. The new building is now regarded as one of Frankfurt's landmarks.

The apartments in the tower were designed with spacious balconies, whereby the HIT Balcony connections play their part to ensure the upmarket standard of the residential units.

Location: Frankfurt, Germany
Architects: MEIXNER SCHLÜTER WENDT Architekten

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THE HALFEN SHOW HOUSE

All applications at a glance

Welcome to HALFEN. Sit back and enjoy the tour of our show house. This unique, virtual building contains numerous examples of our HIT Insulated connections in use. Explore the applications for HIT Insulated connections concrete to concrete in more detail on the following pages, from the insulated corbel brick support at the ground floor to the roof parapet.

HIT Steel to concrete connector elements for steel-based balcony applications are now also available.

We can also provide you with solutions specifically developed for your individual building projects. Contact us and find out more.

YOUR BENEFITS WITH HIT:

Opt for quality!

HIT Steel to concrete connectors provide:

› RELIABLE PLANNING AND DESIGN
All steel to concrete connectors are approved by the DIBt* Berlin. Apart from the design concept and the construction specifications, the determination of the equivalent thermal conductivity (λ_{eq}) is also regulated.

› ROBUST
The elements are designed to be robust and suitable for on-site installation. They are characterized by a weather-resistant box as reliable protection for the mineral wool insulation core.

› INSTALLATION AID
For uncomplicated and quick installation, an installation aid is pre-assembled as standard and is used as an aid for assembly and adjustment on the formwork. This reduces the time required for installation and is therefore more cost-effective.

› ADJUSTING THE STEEL COMPONENTS
Connected components are easily and freely adjustable using the integrated angled slotted bracket: Lightly tap with a hammer to adjust.

› RELIABLE SUPPORT OF THE NOTCH
The angled slotted bracket plate has a bevelled edge to ensure facing plates are properly connected. This prevents unintentional movement or twisting of the connecting components. This results in a reliable, friction-locked transfer of the loads.

*DIBt German Institute of Construction Engineering.

HIT Concrete to concrete connections offer:

› OPTIMUM PLANNING SECURITY!
HIT Insulated connections meet the fire protection requirements of fire resistance class REI 120 and have approved construction Ψ-values for a standard-compliant detailed verification of thermal bridges.

› VERSATILE FLEXIBILITY!
HIT Insulated connections provide the right solution for every application. With a wide range of products to choose from (HIT-HP with 80 mm insulation and HIT-SP with 120 mm insulation) with numerous possible combinations.

› SAFEST POSSIBLE INSTALLATION
Thanks to the special shape of the innovative double-symmetrical CSB bearing, the HIT Insulated connections for cantilevered balconies (HIT-HP/SP MVX) and Loggias (HIT HP/SP DD and DDL) are symmetrical. This means they can be installed regardless of the direction the slab or balcony runs.

› NO ADDITIONAL WORK!
All the necessary verification processes have already been taken into account.

› ECONOMICAL PLANNING!
The optimised cutting process in the HIT planning software ensures planning is particularly efficient and economical. Meaning the HIT Insulated connections can be installed quickly.

1 **CANTILEVERED STEEL BALCONY**
HIT-SDV | HIT-SMV

2 **CANTILEVERED CORNER BALCONY**
HIT-MVX COR | HIT-MVXL | HIT-DVL
HIT-HT1

3 **CANTILEVERED BALCONY**
HIT-MVX | HIT-MVXL | HIT-DVL
HIT-MVX OU/OD

4 **BALCONY WITH SUPPORT**
HIT-ZVX | HIT-ZDX
HIT-HT2 | HIT-HT3

5 **LOGGIA**
HIT-ZVX without CSB bearing
HIT-DD | HIT-DDL

6 **ROOF PARAPET**
HIT-AT

7 **WALL PARAPET**
HIT-FT

8 **CANTILEVER**
HIT-OTX

STEEL BALCONIES

Extremely adaptable

Steel structures, steel balconies, canopies or shading systems are often connected to reinforced concrete elements. Steel's high thermal conductivity requires an efficient thermal separation in the connection to minimize thermal bridges, to reduce the higher energy consumption, and to prevent condensation damage to the structure.

HALFEN HIT Insulation connections for steel-to-concrete application reduce thermal bridges to a minimum with high load transfer capability.

HIT-SDV

FEATURES

- **DIBT* Berlin: General building approval no. Z-15.7-336 including calculation of equivalent thermal conductivity (λ_{eq})**
- **Insulation thickness: HIT-HP 80 mm, HIT-SP 120 mm**
- **Insulation material: non-flammable mineral wool**
- **HIT-SDV – Individual connections for steel balconies with alternating moment and shear loads up to 75 kN for slab thickness from 18 cm**
- **HIT-SMV – Individual connections for steel balconies with shear load ups to 52 kN for slab thickness from 18 cm**
- **All HIT-SMV types are suitable for application in semi-precast elements; no stirrups need adapting**

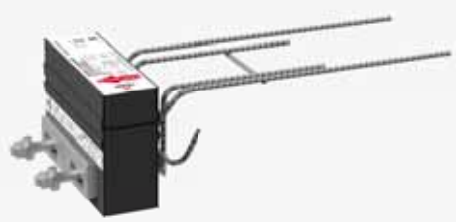
YOUR BENEFITS

- **ROBUST CONSTRUCTION ELEMENT:**
  The mineral wool insulation core is protected by a robust box, suitable for construction site applications.
- **EXTREMELY ADJUSTABLE:**
  The integrated steel, angled slotted bracket is easily and freely adjustable. The bevelled edge of the bracket ensures reliable and even support of the notch even with the typical manufacturing tolerances for weld seams.

HIT-SZV for supported balconies

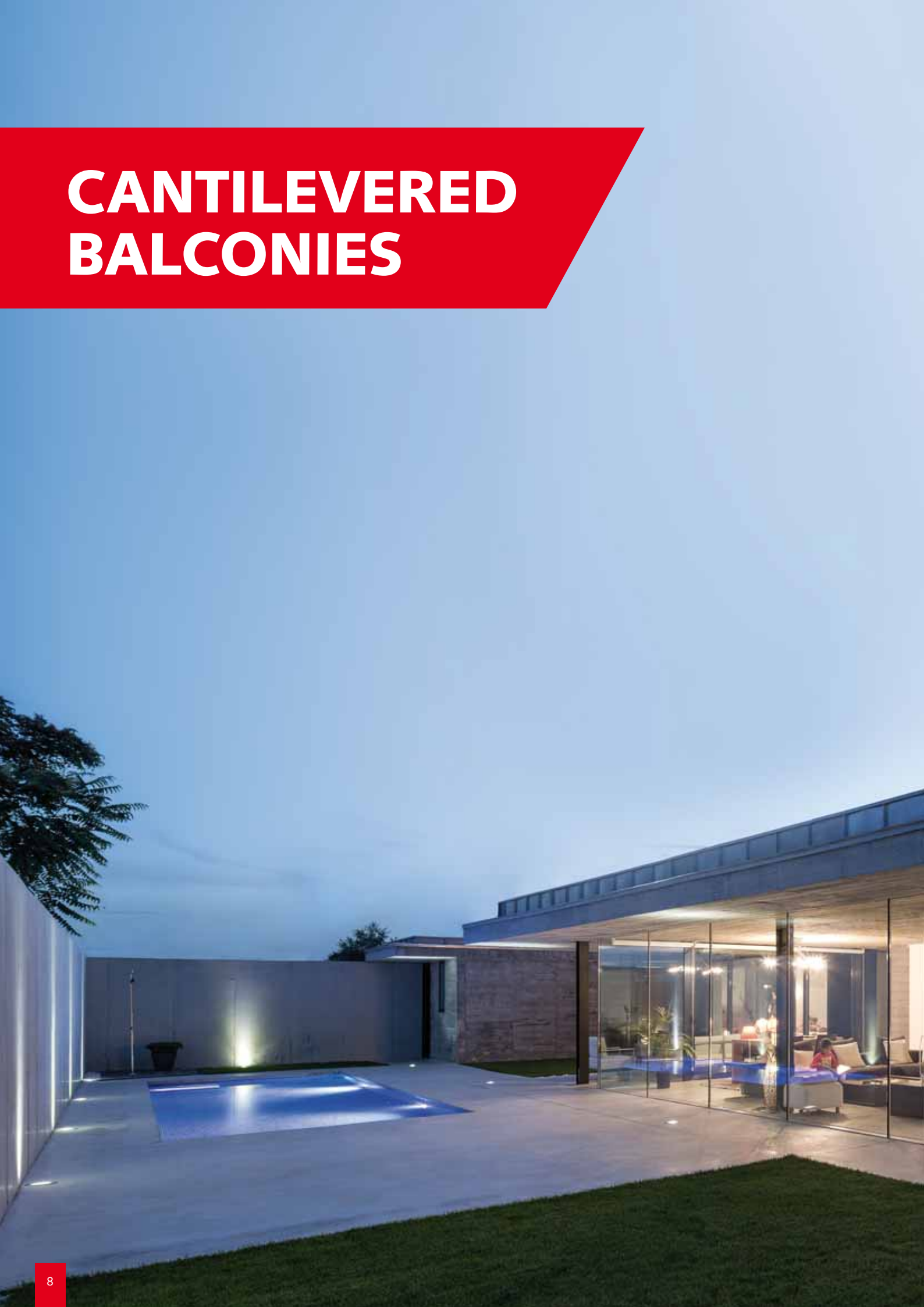
- **has all the main characteristics of steel to concrete connectors**
- **for shear loads up to 75 kN**
- **suitable for application in semi-precast elements**

HIT-SMV



HIT-SZV

CANTILEVERED BALCONIES



Modern charm in a Mediterranean setting:

CASA PORCHE, SPAIN

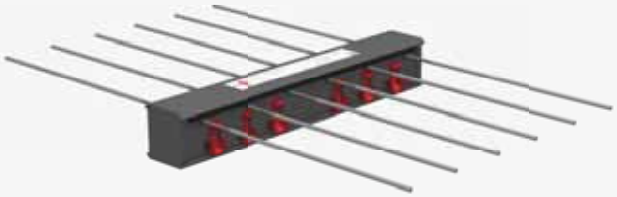
A dream in glass and concrete. This minimalist house in Morales del Vino, Spain, with a floor to ceiling glass façade visually connects the interior of the building with the outdoor spaces.

The reinforced concrete flat roof has a cantilevered overhang. The thermal-bridge from the inside to the outside is technically particularly challenging, however, the HIT Insulated connections used in this project provide optimum thermal insulation.

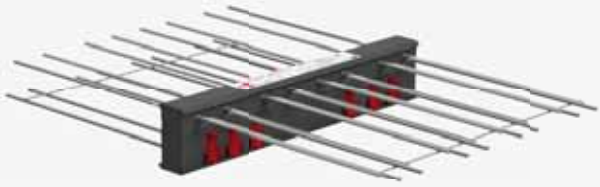
Location: Morales del Vino, Spain
Architects: Julio Pérez Domínguez, Daniel Fernández-Carracedo

System solutions for every building situation

Whether the height is offset or not, the construction is straight or runs around a corner, the HIT Insulated connections offer the optimum solution for every cantilevered balcony. Thanks to the versatile system, you can also combine various connection elements, which take into account the anticipated horizontal forces including all transverse forces or moments, and transfer them safely to the main slab.



HIT-MVX



HIT-MVXL

FEATURES

- **Fire protection class REI 120 (F120)**
- **European Technical Assessment ETA-18/0189**
- **Insulation thickness: HIT-HP 80 mm, HIT-SP 120 mm**
- **Insulation material: non-flammable mineral wool**
- **HIT-MVXL – balcony connection for shear loads up to 426 kN/m for slab thickness from 18 cm**
- **HIT-DVL – balcony connection with 80 mm mineral wool for moment loads up to 426 kN/m for slab thickness from 18 cm**
- **HIT-MVX – symmetrical balcony connection for shear loads up to ±192 kN/m for slab thickness from 16 cm**
- **HIT-MVX OU – balcony connection with an angled anchor head for shear force transfer of up to ±192 kN/m for a slab thickness from 16 cm**
- **HIT-MVX OD – balcony connection with straight anchor head and for shear loads up to ±155 kN/m for slab thickness from 16 cm**
- **Supplied in two parts, therefore all HIT-MVX types are perfect for use in semi-precast slabs**

YOUR BENEFITS

- **HIT-MVXL FOR CHALLENGING CANTILEVER PROJECTS:**
  Realise even the most challenging balcony projects with the new HIT-MVXL! Transfer even higher shear loads and eliminate the need for additional recesses in the main slab when using semi-precast slabs in corner applications.
- **IMPROVED BUILDING PHYSICAL CHARACTERISTICS:**
  By further optimising the shape of the CSB bearing, the number of support elements can be significantly reduced.
  This improves the physical structural characteristics by 30 %.

Limited space or offset height?

Situations where the walls are narrow or the main slab construction is vertically offset require short balcony connections that are still suitable for the load. The HIT-MVX OU and HIT-MVX OD elements have an anchor head bar, which makes the connection to the main slab already possible from a width of 175 mm.

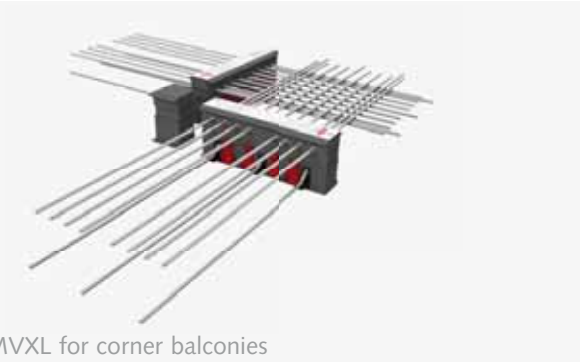
HIT-MVX OU

HIT-MVX OD

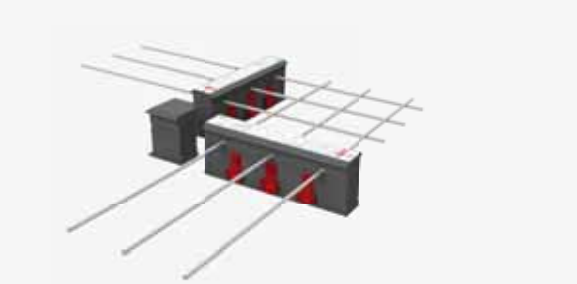
CORNER BALCONY

Designed for corners!

From a structural point of view, the reinforced concrete slab projecting around the corner is a potentially critical point as high shear forces concentrate at the corner. HALFEN also offers an HIT solution for this.



HIT-MVXL for corner balconies



HIT-MVX COR

FEATURES

- **Fire protection class REI 120 (F120)**
- **European Technical Assessment ETA-18/0189**
- **Insulation thickness: HIT-HP 80 mm, HIT-SP 120 mm**
- **Insulation material: non-flammable mineral wool**
- **HIT-MVXL – balcony connection for shear loads up to 426 kN/m for slab thickness from 18 cm**
- **HIT-MVX – symmetrical connection for shear force transfer of up to ±192 kN/m for a slab thickness from 16 cm**
- **HIT-MVXL – tension and shear load bars on one level, no compression bars on the lower level**

YOUR BENEFITS

- **VERSATILE SYSTEM:**
  With the new HIT-MVXL and HIT-DVL elements, unusual balcony designs can now be realized even more efficiently.
- **SIMPLE INSTALLATION:**
  Avoiding conflict with the rebars in the main slab and the clever reinforcement layout facilitate on-site installation.
- **DESIGNED FOR CORNERS:**
  Even precast cantilevered corner balconies can be designed and build with HIT-MVX COR elements.

SUPPORTED BALCONIES

In the Chicago style of the 1900s:

TERRACE EAST, CANADA

With its clearly structured stone façade and the large, three-part windows this six-storey building in Moose Jaw, Saskatchewan, is unmistakably reminiscent of the Chicago-style of the 1900s.
The 36 apartments all have spacious balconies (5.30 m × 5.55 m and 5.30 m × 3.10 m).

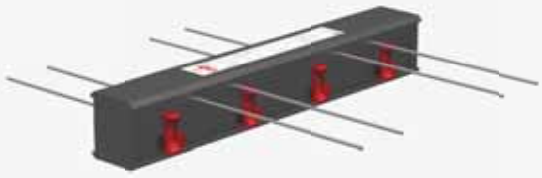
The panels incorporated as interior corners are connected with heat-insulating HIT Insulated connections.

Location: Moose Jaw, Canada
Architects: Anton Tangedal Architect Ltd., Robinson Residential

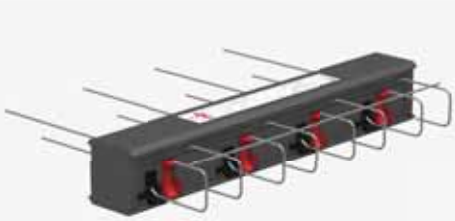
HIT-ZVX and HIT-ZDX: Reliable connections – always

Balconies on supporting columns vary in their needs; for those with supports on the outside, one connection element with shear force transfer in one direction is sufficient in most cases.

Slabs that project further out than the columns may require an element with positive and negative shear capacity. With the HIT-ZVX and HIT-ZDX there are two variants: straight or curved bars.



HIT-ZVX with straight bars



HIT-ZDX with bent bars

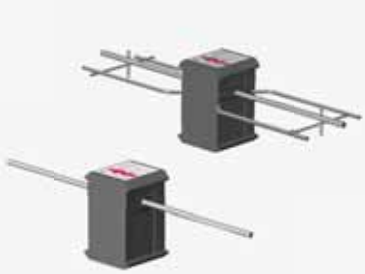
FEATURES

- **Fire protection class REI 120 (F120)**
- **European Technical Assessment ETA-18/0189**
- **Insulation thickness: HIT-HP 80 mm, HIT-SP 120 mm**
- **Insulation material: non-flammable mineral wool**
- **HIT-ZVX – shear force transfer of up to 356 kN/m for a slab thickness from 25 cm taking into account verification of the concrete compression brace**
- **HIT-ZVX – element load-bearing capacity of up to 409 kN/m**
- **HIT-ZDX – element load-bearing capacity of up to ±409 kN/m**
- **Cantilevered shear force bars in the main slab with minimal anchoring depth (from 175 mm)**

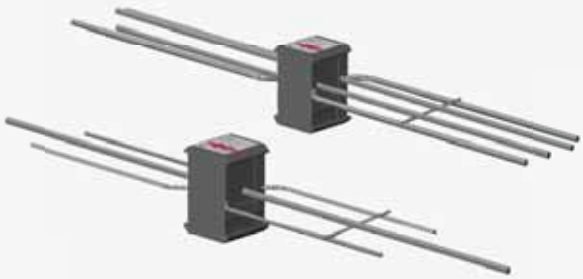
YOUR BENEFITS

- **GUARANTEED TO TAKE THE LOAD:**
  Playing it safe with the extremely high load-bearing capacities of HIT-ZVX and HIT-ZDX.
- **SAVES TIME:**
  All the necessary verification processes have already been provided.
- **SIMPLE COMBINATIONS:**
  With planned horizontal loads, HIT-HT elements can be selectively added.

HIT-HT Types, suitable for horizontal loads



HIT-HT2 and HIT-HT3



HIT-HT4 and HIT-HT5

LOGGIA

The solution for continuous slabs

Unlike cantilevered balconies, a loggia is setback into the building. This means that the balcony is part of the continuous slab and is not penetrated by a wall. To prevent heat loss through the slab that runs out to the exterior of the building, the HIT Insulated connections HIT-DD, HIT-DDL and HIT-ZVX are installed without CSB bearings.

HIT-DDL

HIT-DD

FEATURES

- **Fire protection class REI 120 (F120)**
- **European Technical Assessment ETA-18/0189**
- **Insulation material: non-flammable mineral wool**
- **Insulation material thickness: HIT-DDL – HIT-HP 80 mm; HIT-DD – HIT-HP 80 mm, HIT-SP 120 mm**
- **HIT-DDL symmetrical balcony connection for alternating moment loads up to ±268 kNm/m for slab thickness from 16 cm**
- **HIT-DD symmetrical balcony connection for alternating shear loads up to ±243 kN/m for slab thickness from 16 cm**

YOUR BENEFITS

- **RELIABLE INSTALLATION:**
  The HIT-DDL and HIT-DD Elements are symmetrical and can be installed irrespective of the main slab or balcony direction. This helps prevent installation errors.
- **CLEVER CONNECTIONS:**
  The exceptional performance of the HIT-DDL elements allows a greater freedom in architectural design.

ACCESS BALCONIES

The Alternative to standard staircases

An access balcony connects several residential units via an external, open corridor and therefore offers an alternative method to accessing flats and apartments than directly from a staircase. The main advantage, however, is fire protection: the open corridor functions as the primary escape route. The standard HIT Insulated connections concrete to concrete elements already meet the requirements of fire protection class REI 120.

The type of HIT Insulated connections used for connecting access balconies differ depending on the construction method. Supported slab elements are connected to the building using HIT-ZVX or HIT-ZDX elements.

DESIGN ELEMENTS

Simple elegance in Bremerhaven:

OCEON 1, GERMANY

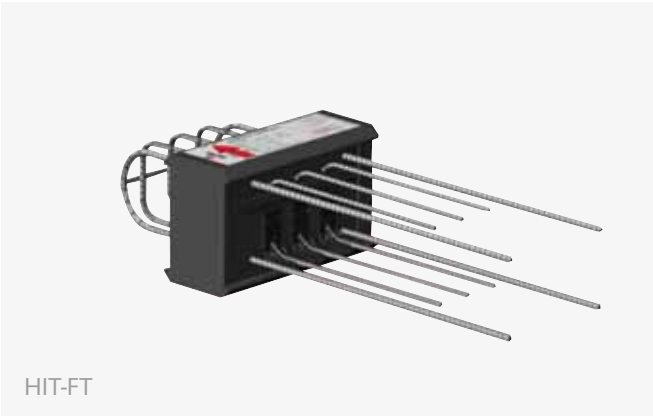
The office building "Oceon 1“ is in Bremerhaven, in a new district with office and residential buildings. The buildings are grouped around an historic loading crane and link the history of the New Harbour with modern architecture.

The façade of the first office building "Oceon 1“ is divided into evenly spaced floor to ceiling windows and sculpturally modelled façade elements made from light white concrete with different surface structures.
These elements synchronise particularly well with the brass-coloured anodised aluminium profiles of the windows.

The horizontal locking elements are connected to the ceilings with insulating HIT corbels.

Location: Bremerhaven, Germany
Architects: WESTPHAL ARCHITEKTEN BDA, Bremen

HIT-AT



HIT-FT

Parapets and cantilevers

Architectural details such as wall parapets, cantilevers or roof parapets must be integrated in the concept for the thermal insulation. The insulating building envelope should be completely sealed. The HIT Insulated connections offer solutions with exact connections even for small-sized components.

FEATURES

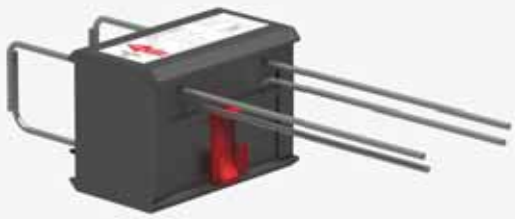
- **Fire protection class REI 120 (F120)**
- **European Technical Assessment ETA-18/0189**
- **Insulation thickness: HIT-HP 80 mm, HIT-SP 120 mm**
- **Insulation material: non-flammable mineral wool**
- **HIT-AT – available in two variants: with short (19 cm) or longer (27 cm) rods**
- **HIT-FT – available in two versions with shear force transfer in one or both directions**
- **HIT-OTX – available for two cantilever depths: from 155 mm and from 195 mm**

YOUR BENEFITS

- **FOR CREATIVE ACCENTS:**
  With the HIT Insulated connections your project can benefit from greater creative freedom, even down to the smaller sized highlights.
- **HALFEN QUALITY STANDARD:**
  High load-bearing capacities and the reliable quality of HALFEN are typical of all HIT Insulated connections for installation situations from the top (parapet) to the bottom of a building (base).

CANTILEVERS

High-lights of the building envelope



HIT-OTX

FIRE PROTECTION WITH HIT INSULATED-CONNECTIONS CONCRETE TO CONCRETE CONNECTION

On the safe side!

Since 2016, fire barriers have been an integral part of fire protection measures in External Thermal Insulation Composite Systems (ETICS) made of expanded polystyrene foam (EPS). The fire barrier must therefore be incorporated in the planning of buildings containing thermal insulation made of EPS. The new regulation also states that "accessible external areas cantilevered on the façade", e.g. balconies and walkways, can act as a fire barrier.

Installation example: HIT-HP and HIT-SP Elements, concrete to concrete connection

The following applies to fire barriers in the balcony area: Elements for connecting balconies that fulfil fire protection class REI 30, as a minimum, can be used as a fire barrier.

› HIT-HP and HIT-SP Elements, concrete to concrete connection, classified in the highest fire protection class REI 120 are available as standard and can therefore always be used as connections meeting all requirements.

WHAT THE FIRE PROTECTION CLASS REPRESENTS:

R The reliable stability of the connection is ensured for the period specified.

E The room-dividing effect of the connection is ensured for the period specified.

I The thermal insulating function of the connection is maintained for the period specified.

120 The characteristics mentioned above are guaranteed for 120 minutes of exposure to fire according to the standard temperature-time curve.

YOUR BENEFITS

› **FIRE PROTECTION INCLUDED!**
All HIT-HP and HIT-SP Elements, concrete to concrete connection, significantly exceed the minimum requirements for fire protection and can therefore be used as fire barriers on all balconies.

› **MAXIMUM PLANNING RELIABILITY!**
With HIT-HP and HIT-SP Elements, concrete to concrete connection, you benefit from peace of mind while planning, knowing that you are on the safe side: There are no additional costs for products with a higher fire protection class, because the elements come with it as standard.

› **SAFE CONSTRUCTION!**
No risk of confusion or mix-ups. Because the HIT-HP and HIT-SP Elements, concrete to concrete connection, come with fire protection as standard, there is no risk of confusion or mix-ups during installation.

HALFEN –

Your partner for BIM

HALFEN product and detailing plans created by our engineers for your projects are also provided as BIM (Building Information Modeling) CAD files to generate a 3D model of your building. Using BIM software for the design, construction process and maintenance of a building makes it much easier for architects, builders and suppliers to coordinate all aspects of a project. All information relevant to a building is made available in one place. Problems between various building disciplines can be quickly checked. All involved parties are able to cooperate more effectively resulting in real time and cost saving.

HALFEN provides CAD files for your BIM projects:

with the HALFEN PARTcommunity, **the CAD-Portal**

with the TEKLA® Software building component libraries

VISIT THE HALFEN CAD-PORTAL:

numerous, versatile and complimentary 2D and 3D files available for download!

IMPACT SOUND

1. HBB bi-Trapez-Box
2. HTF Impact Sound Insulation
3. HTPL Perimeter Insulation
4. HTF-B Impact Sound Insulation
5. HTT Impact Sound Insulation

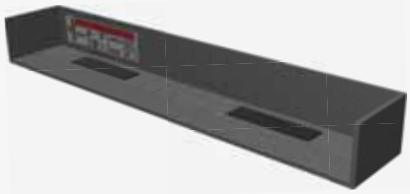
For quiet stairs

Noise can significantly affect the quality of living in apartment buildings or work performance in office buildings.

The sound of footsteps in inadequately insulated stairwells is particularly annoying.
HALFEN can help with its reliable HBB bi-Trapez-Box solutions; HTF and HTT impact sound insulation units.

HBB bi-Trapez-Box

- **High-quality bi-Trapez-Bearing® with general building authority approval**
- **Maximum flexibly with boxes for three landing-slab thicknesses (d = 16/18/20 cm)**
- **Reliability in planning with type-tests approval**
- **Excellent sound insulating properties for a wide range of support loads**
- **Simple and quick installation**

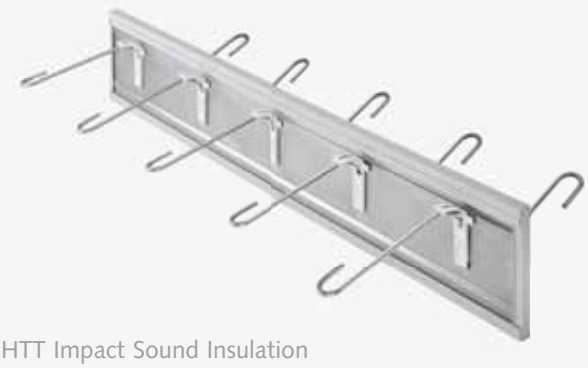


HTF

HTPL

HTF-B

- **Excellent sound insulating properties with a wide range of bearing pressures**
- **General building authority approval for the bi-Trapez-Bearings® used**
- **HTF – adaptable for all stair widths: elements available in widths from 100 and 120 cm, width freely adaptable with insulation and landing strips**
- **HTF-B – use for elastic bearing of precast staircases in the base plate of the lowest floor**
- **HTPL – acoustic decoupling of the staircase and wall**



HTT Impact Sound Insulation

- **Planning reliability through type-tests approval**
- **Fire resistance class up to R120 (F120)**
- **Flexibility for all applications – available in three different load levels**
- **Available for stair widths from 90 to 200 cm**

HALFEN –
For quality that connects

When it comes to connecting your components, you need products you can be sure of, products you can rely on. That is why for decades professionals have been choosing **HALFEN**.
Our products are the culmination of continuous optimisation and development; they are manufactured with high quality materials in our regularly monitored production facilities. We cover a wide range of connecting elements for your construction projects.

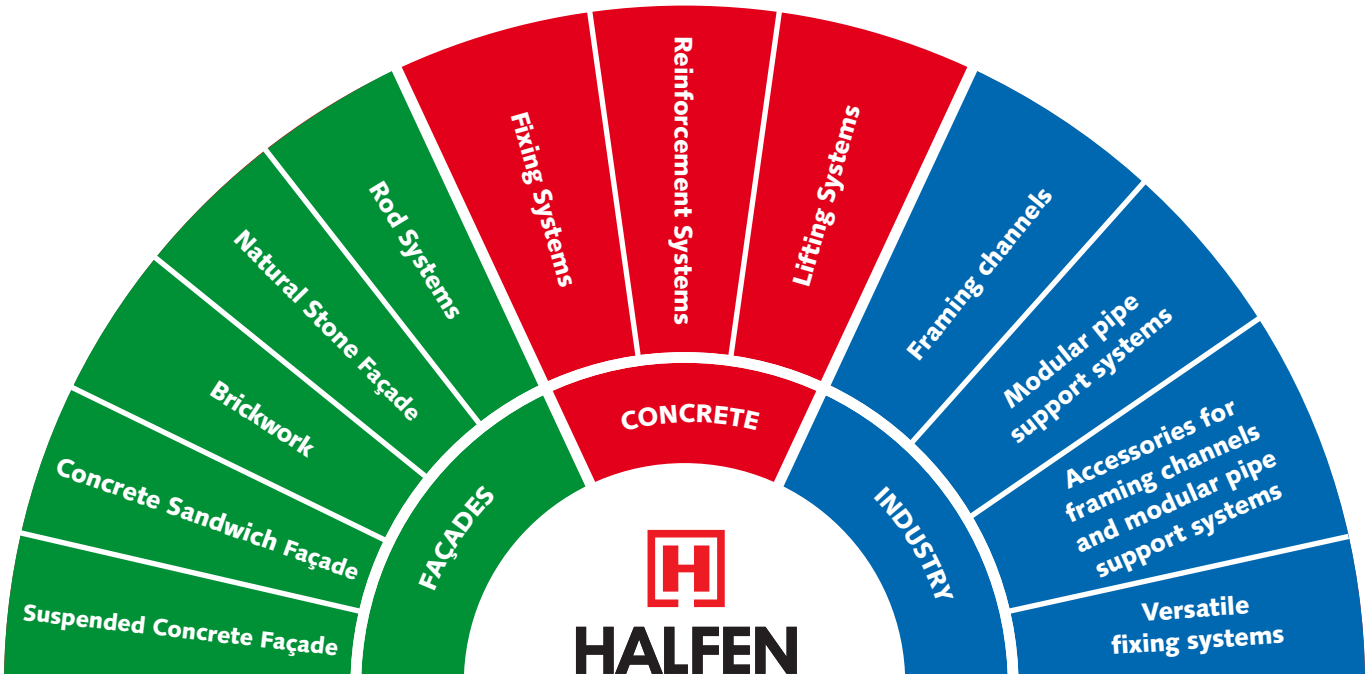
Go for quality – choose **"MADE BY HALFEN"**.

HALFEN Cast-in Channels HTA-CE

Balustrade fixings HGB

DETAN Rod system – design elements

HALFEN HK5 – Brickwork support systems for brickwork façades



FAÇADES

SUSPENDED CONCRETE FAÇADE

- FPA / FPA-SL30 Precast panel anchors
- DS / HFV / SPV / WDI / ULZ Horizontal anchors
- LD Adjustable restraints
- WPA Top fixing dowels
- BRA Parapet corbels

CONCRETE SANDWICH FAÇADE

- SPA Wire anchors
- FA Flat anchors

BRICKWORK

- HK5 / FK5 / KM Brickwork support
- HW / KW / KWL Bracket
- HK5-S / FSW / HSL Ties for precast lintels
- LSA / HEA / HPV Cavity wall ties
- HGA Scaffold anchors
- ML / BL Wall ties

NATURAL STONE FAÇADE

- DT / BA / DH Natural stone support
- UMA / UHA Grout-in anchors
- SUK / UKB Natural stone support systems

ROD SYSTEMS

- DETAN-S Rod systems steel
- DETAN-E Rod systems stainless steel
- DETAN Compression rod systems

CONCRETE

FIXING SYSTEMS

- HTA / HZA HALFEN Cast-in channels
- HGB Balustrade fixings
- HCW Curtain wall system
- HTU Profiled metal sheet fixing channels
- HKW Corner guards
- DEMU Fixing anchors T-FIXX® / Bolt anchors
- HLX Lift-Box
- HB Mechanical anchor bolt systems
- HVL Precast Connections

REINFORCEMENT SYSTEMS

- HIT Balcony connectors
- HBB / HTT / HTF / HTPL Impact sound insulation products
- HBS-05 Coupler systems
- HUC Universal connection
- MBT Reinforcement connections
- HEK Precast connections
- HLB Loop Box
- HBT Rebend connections
- HCC / HAB Column shoes
- HSD Shear dowels
- HBJ Betojuster
- HSC Stud Connector
- HDB Punching shear reinforcement

LIFTING SYSTEMS

- DEHA KKT Spherical head anchors
- FRIMEDA TPA Lifting anchors
- HD Socket lifting anchors
- DEHA HA Socket lifting anchors

INDUSTRY

FRAMING CHANNELS

- HM / HL / HZM Framing channels

MODULAR PIPE SUPPORT SYSTEMS

- HCS POWERCLICK Modular pipe support systems

ACCESSORIES FOR FRAMING CHANNELS AND MODULAR PIPE SUPPORT SYSTEMS

- HVT Frame connector
- KON Cantilevers
- HRS Pipe clamps
- HRG, HCS Pipe supports
- RUK Pipe base
- AHS Lift-off safety devices
- HS / HSR / HZS HALFEN T-bolts
- GWP Locking plate

VERSATILE FIXING SYSTEMS

- HFX HALFIX Versatile positioning system
- HVG VERSOGRID Installation grid

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