# HALFEN HIT INSULATED CONNECTION

## TECHNICAL PRODUCT INFORMATION

**HALFEN HIT INSULATED CONNECTION**

**CONCRETE**

HIT_USA 18

- complete product range for all balcony configurations
- with ICC-ES Approval ESR-3799
- symmetrical HIT units with optimized bearings CSB

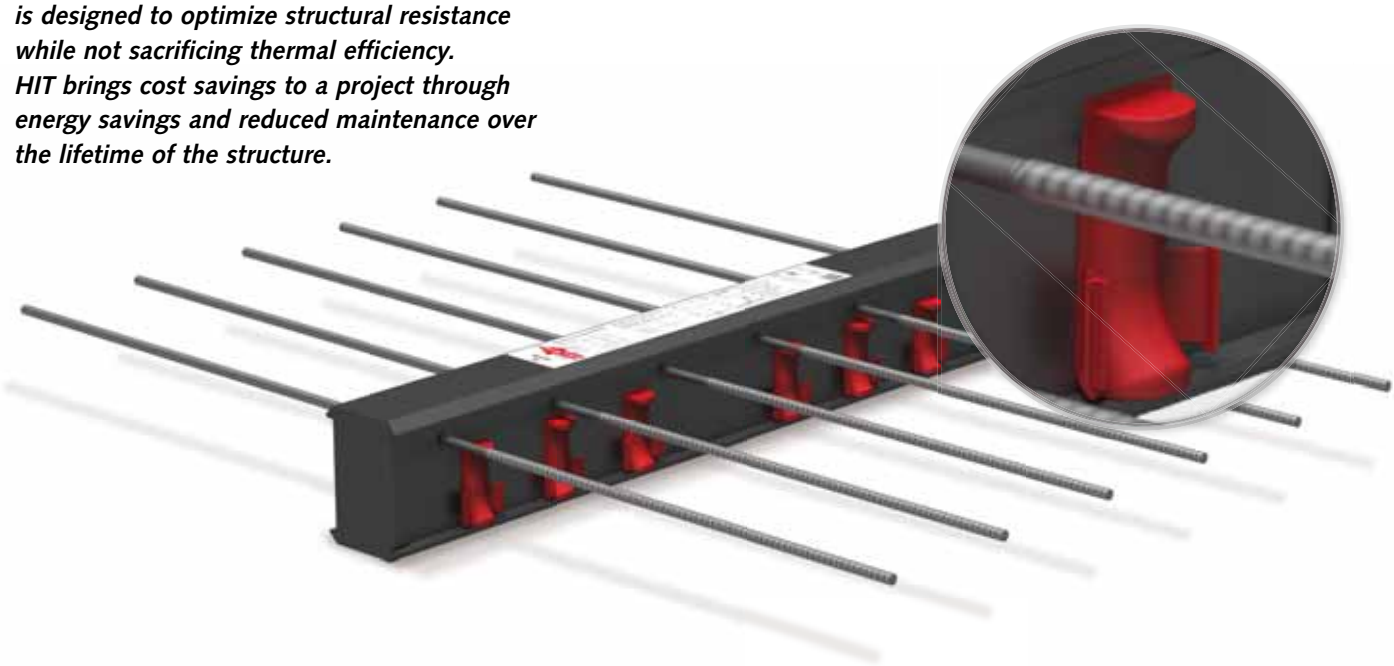
HALFEN

YOUR BEST CONNECTIONS

# Innovation is our standard

## The new HIT-MVX by HALFEN

*Simple to install, the HIT Insulated connection is designed to optimize structural resistance while not sacrificing thermal efficiency. HIT brings cost savings to a project through energy savings and reduced maintenance over the lifetime of the structure.*



ICC-ES Approval – ESR 3799

HIT units with symmetrical CSBs

Installation independently of the main slab or balcony orientation due to symmetrical shape

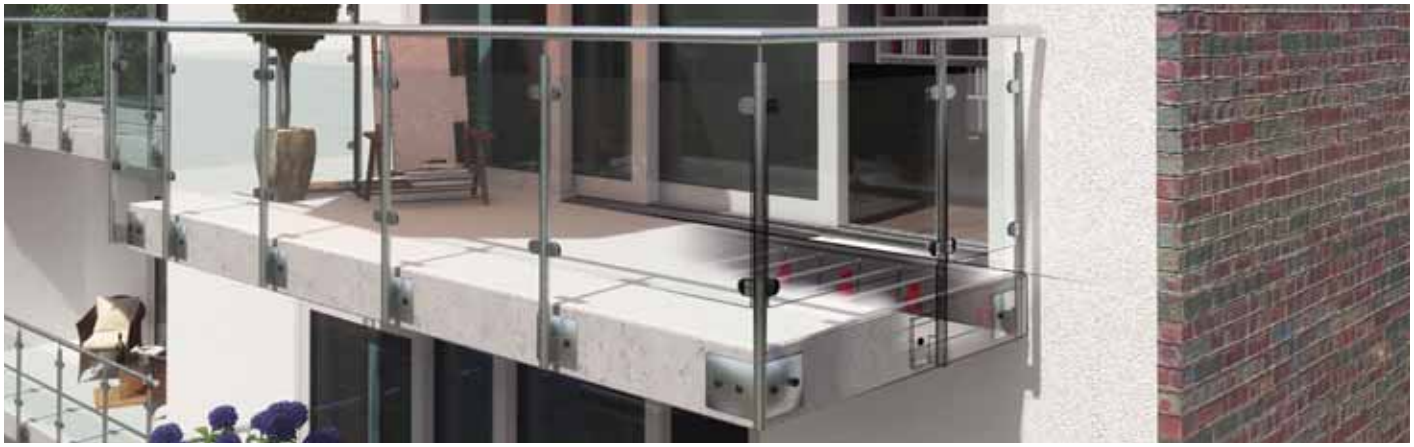
Fire-resistance rating

### Your benefits:

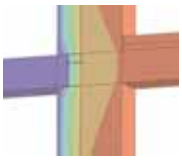
- Mineral wool used for both insulation and fire resistance. All standard units come with a 2HR fire-resistance.
- Only structural thermal break in North America with an ICC Approval.
- Rigid casing provides protection during transport and on-site storage.

# HALFEN HIT INSULATED CONNECTION

## Contents







HIT-HP MVX
HIT-SP MVX

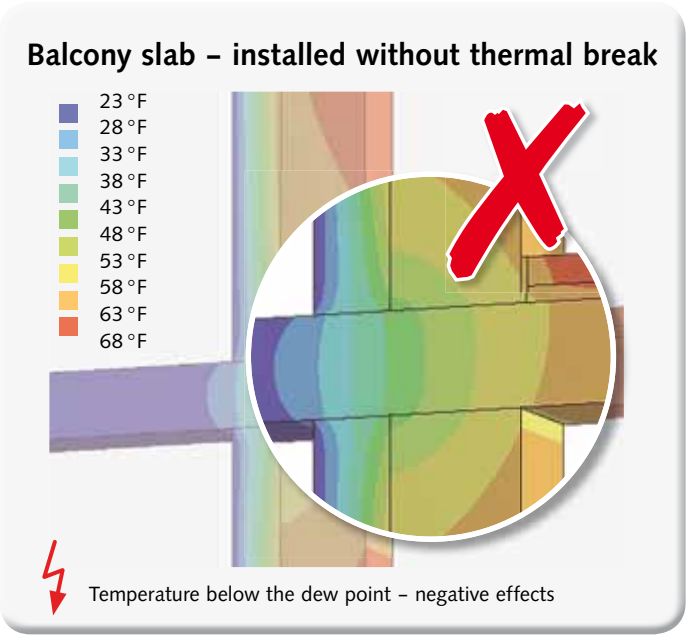
HIT-HP ZVX
HIT-SP ZVX

# Introduction to Thermal Bridging

**HALFEN Thermal Bridging Solutions**
HALFEN's HIT Thermal Connection is an ideal solution to minimize thermal bridging and increase the overall energy efficiency and comfort of a building. The HALFEN HIT system provides a thermal break for continuous balcony slabs and is the first ICC-ES approved thermal break solution for a product of this type.

**Green Building Movement**
The "Green Building" Movement is gaining momentum worldwide resulting in stricter regulations regarding the energy efficiency of structures. This is evident in recent energy code changes (IECC, ASHRAE 90.1 and NECB) requiring continuous building insulation and effective R-values.
Conventional methods and products can not always meet these demands and more innovative and thermally efficient building products are required.

**Effects of Thermal Bridging**
A thermal bridge is an area of the structure which has a significantly higher heat transfer than the surrounding materials, resulting in an overall reduction in the thermal insulation of the building. A thermal bridge can be generated due to construction material or geometry. Quite often this is addressed in aluminum window frames but frequently overlooked in concrete balconies and corbels.



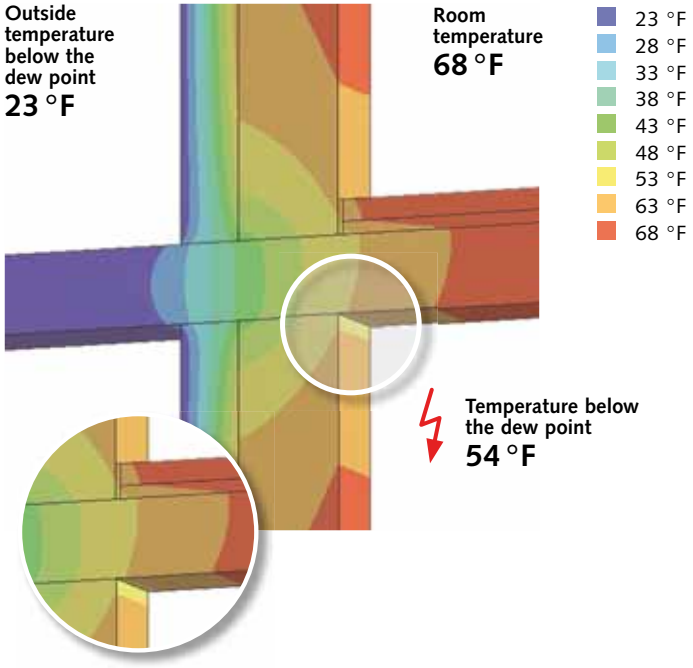

In colder climate zones, thermal bridges can result in greater energy consumption, interior corner condensation causing mold growth and adversely affecting occupants' comfort of living. The HALFEN HIT Insulated connection allows insulation to run continuously through the balcony increasing the effective R-values of the wall system by almost two times compared to a continuous balcony.

HALFEN provides you the tools to make the future greener

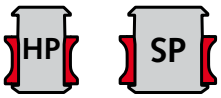
## Thermal gradient non-insulated balcony

In cold weather, thermal bridging leads to a cooling of the inner surface areas along the thermal bridge resulting in:

- Risk of condensation
- Risk of interior mold growth
- Risk of concrete cracking under thermal movement
- High energy costs
- Cooling down of the surface areas around the balcony (cold feet syndrome)
- Increased building maintenance costs

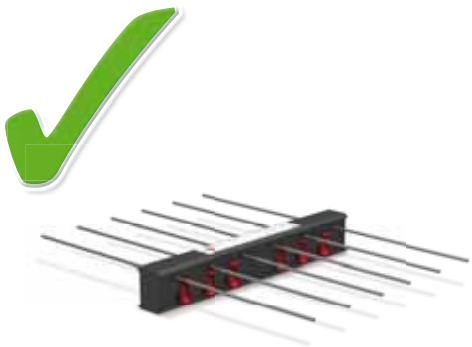


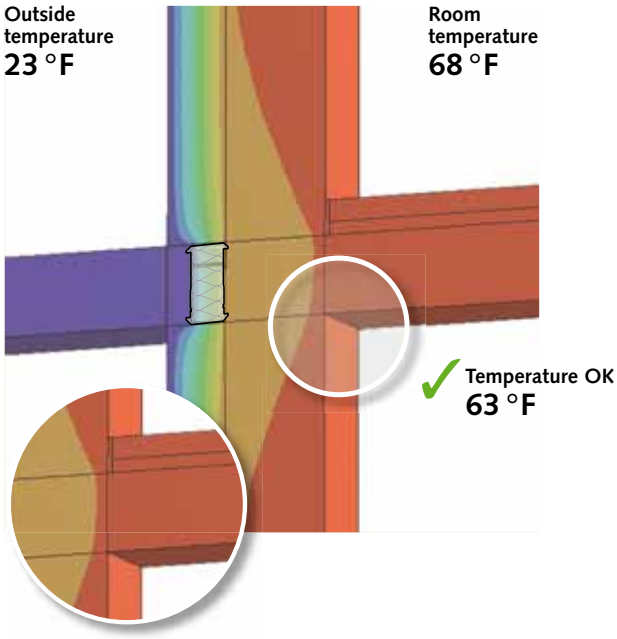

## Thermal gradient insulated balcony




The use of **HIT Insulated Connections** optimizes the connection detail in the following points:

- Definitive thermal separation between floor slab and balcony
- Reduced risk of condensation/mold growth
- Reduced risk of concrete cracking
- Lower energy costs
- Reduced lifetime building maintenance costs





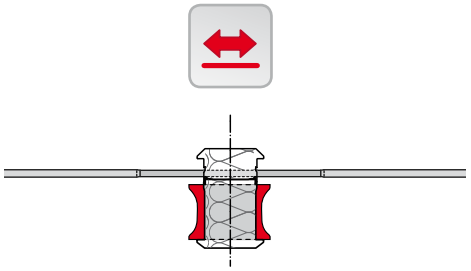
# HALFEN HIT Insulated connection – the innovative balcony connection

**Our main focus is the development and improvement of our products. Thanks to the innovative, double-symmetrical compression shear bearings (CSB), HALFEN can now provide even greater reliability in planning and application as well as an improved installation procedure – either on-site or in the precast plant. The complete product range includes the HIT-HP with an insulation thickness of 3⅛" (80 mm) and the HIT-SP option with 4¾" (120 mm) insulation thickness.**

## Reliable installation

The distinct shape of the CSB-bearing means the HIT Insulated connections for cantilevered balconies (HIT-HP/SP MVX) are symmetrical. Installation is therefore independent of the main slab or balcony direction.

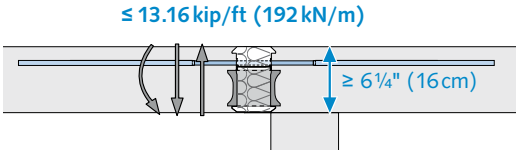
- no confusion of installation direction



## Reliable planning

**HALFEN's integrated safety concept:**
The values provided in the tables are actual design values; therefore, no additional verification for reduction of the shear force is required by the planner.

- possible shear loads up to 13.16 kip/ft (192 kN/m) for for slab thicknesses from 6¼" (16 cm)
- easy load range allocation even with the individual elements in our modular system




## ICC-ES Approval and software

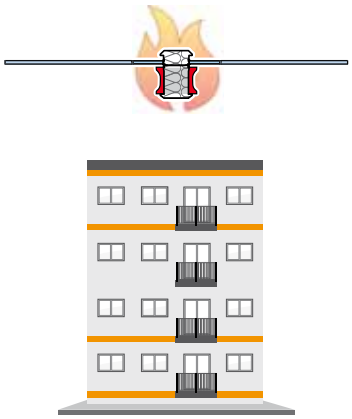
- first structural insulated thermal break that received an ICC-ES Approval
- user-friendly software with integrated offcut-optimization to reduce waste

ICC Approved ESR-3799

## Comprehensive engineering support

HALFEN engineers will be pleased to assist with detailed design and product selection to suit the requirements of each project.

# Further benefits



## Fire protection

**All standard HIT units provide a 2 HR fire-resistance in conformance with ASTM E119**

- use of mineral wool provides both fire resistance and thermal resistance
- suitable for use as a firestop in ETICS façades (Expanded polystyrene)
- no mix-ups of elements with or without demands on fire protection
- additional fire protection is not required due to integrated four-sided fire protection

## Rigid Protective Casing

- rigid casing provides protection during shipping and on site handling
- alternative solutions are delicate and damage easily

## Passive House Institute certified

- certified as energy saving components starting with an insulation thickness of 3⅛" (80 mm) for application in cantilevered and simply supported balcony slabs

## Economical and environmental benefits

Heat emissions from buildings and the release of carbon dioxide from the burning of fossil fuels used to heat and cool them are contributing factors to climate change.
Use of HALFEN's HIT systems result in lower overall energy consumption.

- **Long term energy savings:** Concrete structures with HIT units can be 10 to 15 times more thermally efficient than traditional solutions.
- **Long term maintenance savings:** Less damage from condensation and mold growth produces lower maintenance costs.

# Certificates by the Passive House Institute – Low Energy Component

The Passive House Standard sets very high standards – on the thermal insulation of the building envelope as well as on the individual components.

HALFEN HIT Insulated connections with an insulation thickness from 80 mm are certified by the Passive House Institute as a "Low Energy Component" in the category balcony connection.

Passive House Institute

Low Energy Component

more information can be found at: **passivehouse.com ► certification**

**The following criteria were used in awarding this certificate**

- **Efficiency Criterion**
  In two typical applications (a house and an apartment) the construction fulfills the requirement of:

$$\Delta U_{WB} < 0.025 \text{ W/(m}^2\text{K)}$$

- **Comfort Criterion**
  The inner surface must be warm enough to prevent mold and uncomfortable down-draught and radiation losses:

$$\theta_{i,min} > 62.6\,^{\circ}\text{F } (17\,^{\circ}\text{C})$$

**Low Energy Component HIT-HP MVX**

| Insulation thickness 80 mm for cantilevered balcony slabs | Unit height [in (mm)] | Thermal transmission coefficient ψ [W/(mK)] |
|---|---|---|
| HIT-HP MVX- 0404-18-100-35 | 7 (180) | 0.20 |
| HIT-HP MVX- 0504-18-100-35 | 7 (180) | 0.21 |
| HIT-HP MVX- 0506-18-100-35 | 7 (180) | 0.25 |
| HIT-HP MVX- 0804-18-100-35 | 7 (180) | 0.23 |
| HIT-HP MVX- 0404-24-100-35 | 9½ (240) | 0.22 |
| HIT-HP MVX- 0504-24-100-35 | 9½ (240) | 0.23 |

**Low Energy Component HIT-SP MVX**

| Insulation thickness 120 mm for cantilevered balcony slabs | Unit height [in (mm)] | Thermal transmission coefficient ψ [W/(mK)] |
|---|---|---|
| HIT-SP MVX- 0202-18-100-35 | 7 (180) | 0.109 |
| HIT-SP MVX- 0404-18-100-35 | 7 (180) | 0.167 |
| HIT-SP MVX- 0504-18-100-35 | 7 (180) | 0.16 |
| HIT-SP MVX- 0804-18-100-35 | 7 (180) | 0.17 |
| HIT-SP MVX- 1006-18-100-35 | 7 (180) | 0.21 |
| HIT-SP MVX- 1008-18-100-35 | 7 (180) | 0.24 |
| HIT-SP MVX- 1208-18-100-35 | 7 (180) | 0.25 |
| HIT-SP MVX- 0202-22-100-35 | 8⅔ (220) | 0.113 |
| HIT-SP MVX- 0404-22-100-35 | 8⅔ (220) | 0.173 |
| HIT-SP MVX- 0504-22-100-35 | 8⅔ (220) | 0.17 |
| HIT-SP MVX- 0804-22-100-35 | 8⅔ (220) | 0.18 |
| HIT-SP MVX- 0202-24-100-35 | 9½ (240) | 0.115 |
| HIT-SP MVX- 0404-24-100-35 | 9½ (240) | 0.175 |
| HIT-SP MVX- 0804-24-100-35 | 9½ (240) | 0.18 |
| HIT-SP MVX- 1006-24-100-35 | 9½ (240) | 0.23 |
| HIT-SP MVX- 1008-24-100-35 | 9½ (240) | 0.25 |

**Low Energy Component HIT-SP MVX-OD**

| Insulation thickness 120 mm for cantilevered balcony slabs with downward height offset | Unit height [in (mm)] | Thermal transmission coefficient ψ [W/(mK)] |
|---|---|---|
| HIT-SP MVX-0504-18-100-35-OD | 7 (180) | 0.175 |
| HIT-SP MVX-0504-22-100-35-OD | 8⅔ (220) | 0.179 |
| HIT-SP MVX-0504-24-100-35-OD | 9½ (240) | 0.182 |

**Low Energy Component HIT-SP MVX-OU**

| Insulation thickness 120 mm for cantilevered balcony slabs with upward height offset | Unit height [in (mm)] | Thermal transmission coefficient ψ [W/(mK)] |
|---|---|---|
| HIT-SP MVX-0504-18-100-35-OU | 7 (180) | 0.170 |
| HIT-SP MVX-0504-22-100-35-OU | 8⅔ (220) | 0.178 |
| HIT-SP MVX-0504-24-100-35-OU | 9½ (240) | 0.180 |

# Fire protection according to ASTM E119 and EN 13501

**Advantages**
The advantages of HIT units in comparison to elements that utilize polystyrene and fire boards are obvious:

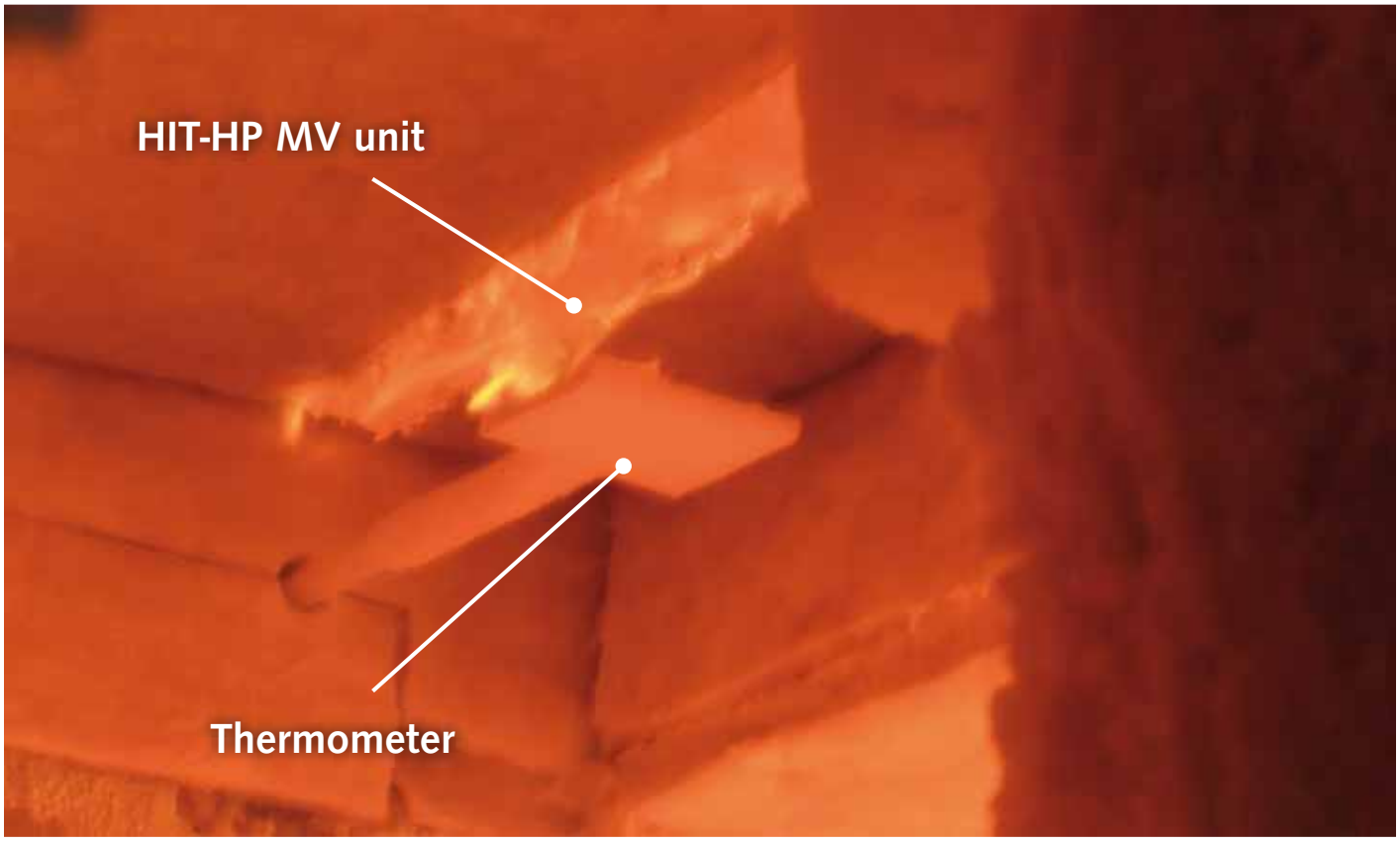
- no confusion of the standard and fire rated units
- fire resistance does not compromise thermal efficiency
- no damage to the load bearing elements caused by flashover on the sides as the fire-resistant insulating wool encloses the load bearing elements from all sides
- protection against weathering

All specific fire requirements for insulated balcony connections are outlined in ICC-ES AC 464 as well as international and local building codes.

The components in close contact to the HALFEN Insulated connections HIT-HP or HIT-SP must also meet the requirements of the respective fire resistance class according to applicable standards in order to fully exploit the fire protection classification of the connection.

**All standard HIT-HP and HIT-SP units come with a 2 HR fire resistance in accordance with ICC-ES AC 464, latest edition of IBC and ASTM E119.**

This is possible due to the special shape of the insulating body in combination with the use of high-quality non-flammable mineral wool.
The compliance with requirements concerning fire protection of any adjoining structural elements must be verified by the engineer.



View of the fire test chamber during the HIT-HP MV fire-test after 120 minutes of exposure

# Innovations and advantages

**The HIT-Software is a comprehensive design tool that allows users to efficiently design balconies with insulated structural connections.**

The HIT design software allows you to plan verifiable balconies with these ten key advantages:

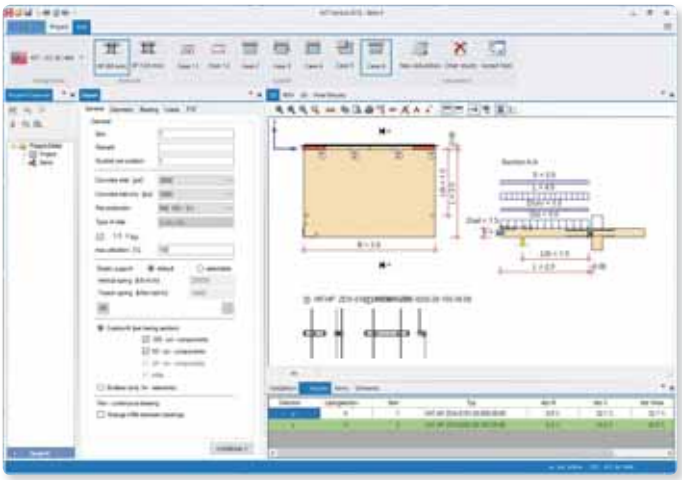
- free download available
- intuitive operation and easy to use
- enhanced load and support options
- comprehensive calculation and output summary
- DXF file output available to include in drawings
- parts list to facilitate ordering
- variable GUI using the current Windows design, fully customizable to your needs
- output of internal force progression for each load case
- option to select a variety of international standards
- numerous language options available


# Only three steps required to complete a parts list for inquiries and orders

Step 1: **Easy and intuitive input of the initial parameters**

HALFEN offers a wide selection of balcony types:

- cantilever balcony (see example on the right)
- simply supported balcony
- recessed, three sides supported
- outside corner balcony
- outside corner balcony with column
- inside corner balcony
- inside corner balcony with column
- height offset balcony

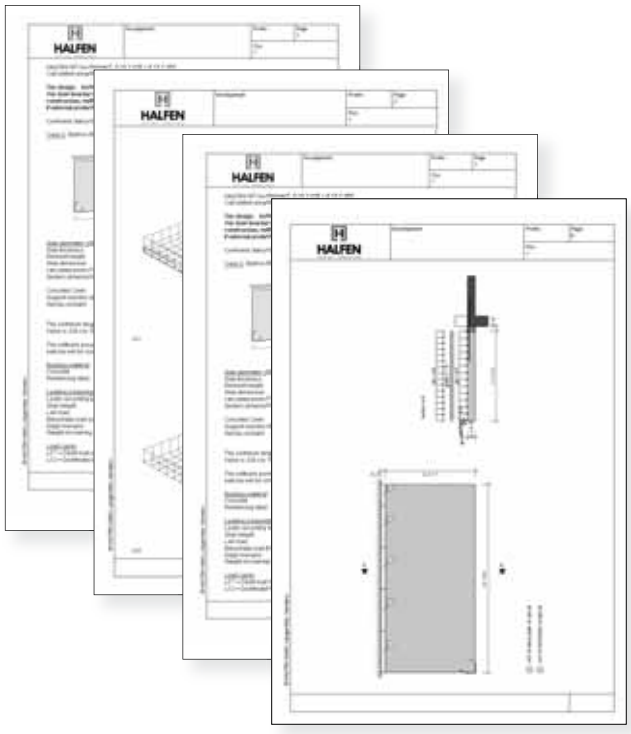


Step 2: **Output of verifiable structural calculations**

The HIT design program uses the geometry of the balcony and the constraints for concrete cover and concrete strength to select the appropriate HIT units.

Results can be printed out as a comprehensive structural calculation. Printouts can be a compact version or in greater detail including all analyzed load cases and combinations, the deflection results, as well as graphic illustrations.

The graphic output capabilities can include not only the basic geometry of the balcony but also a detailed plan view and section cut illustrating the HALFEN HIT Insulated connections.




Step 3: **Parts lists printout**

To simplify the order process the HIT software can generate the following parts lists:

- parts list showing all individual balcony units (example on the right)
- parts listed as HIT types

**HALFEN HIT Insulated connection Parts List**
**HIT Design Software**
Project: Multi-family building, Central Street
Created by: Mr. Builder
Company: ABC

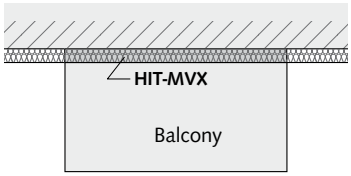
| Position | Article number | Catalog No. | Number of balconies | per item |
|---|---|---|---|---|
| 1 | HIT-SP MVX-0704-22-100-30 | | 4 | 4 |
| 2 | HIT-SP MVX-0402-22-050-30 | | 4 | 1 |
| 3 | HIT-SP MVX-0604-22-100-30 | | 2 | 6 |

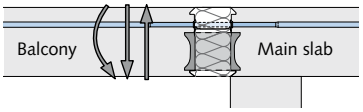
The user-friendly HALFEN Software allows intuitive operation and easy input of parameters for numerous balcony support conditions. HALFEN provides the designer with a comprehensive software with absolute reliability in designing and dimensioning balcony connections.

The software calculates all verifications required in accordance with ICC-ES ESR-3799 – in keeping with HALFEN's integral safety concept that no further approvals need to be acquired by planners when using any HALFEN HIT Insulated connections.

## 1 Cantilevered balcony slabs

### Application for cantilevered balcony slabs




**HIT-HP MVX / HIT-SP MVX**
Transfers bending moments and positive and negative shear forces.
- insulation thickness: 3 ⅛" (80 mm) / 4 ¾" (120 mm)

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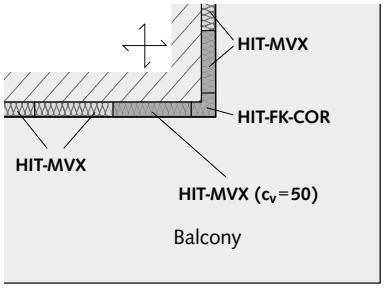
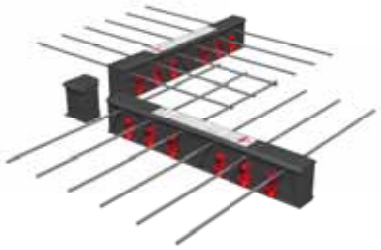
### Application for cantilevered corner balcony slabs



**HIT-HP COR / HIT-SP COR**
For cantilevered outside corner balconies, designed with standard elements with the same load bearing capacity and a corner filler.
- insulation thickness: 3 ⅛" (80 mm) / 4 ¾" (120 mm)

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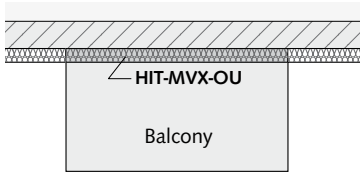
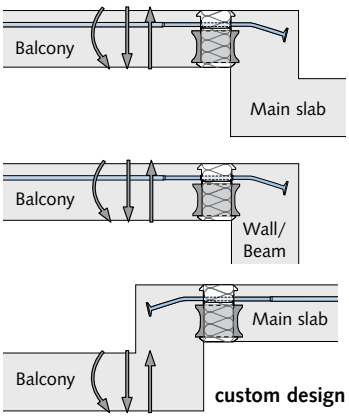
## 2 Cantilevered balcony slabs with height offset or wall/beam connections

### Application for upward height offset




**HIT-HP MVX-OU / HIT-SP MVX-OU**
Height offset, balcony higher than main slab, upward wall/beam connection. Transfers bending moments and positive and negative shear forces
- available as custom design also for balcony side
- insulation thickness: 3 ⅛" (80 mm) / 4 ¾" (120 mm)

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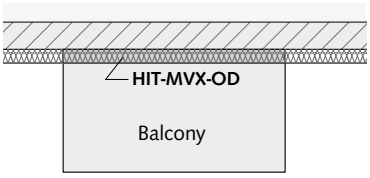
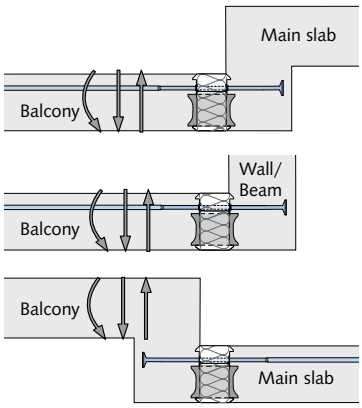
**Application for downward height offset**




custom design

**HIT-HP MVX-OD / HIT-SP MVX-OD**
Height offset, balcony lower than main slab; downward wall/beam connection.
Transfers bending moments and positive and negative shear forces.
- available as custom design also for balcony side
- insulation thickness: 3⅛" (80 mm) / 4¾" (120 mm)

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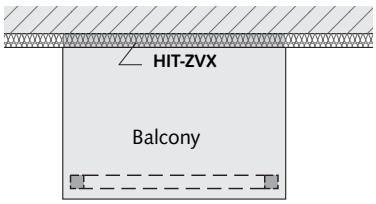
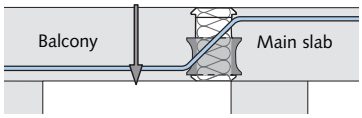
## 3 Simply supported balcony slabs on columns




**HIT-HP ZVX / HIT-SP ZVX**
Transfers shear forces only
- insulation thickness 3⅛" (80 mm) / 4¾" (120 mm)

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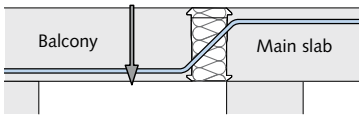


**HIT-HP ZVX / HIT-SP ZVX without CSB** (e.g. for loggias)
Transfers shear forces only for unrestrained simply supported connections, insulation thickness:
- 3⅛" (80 mm) / 4¾" (120 mm)

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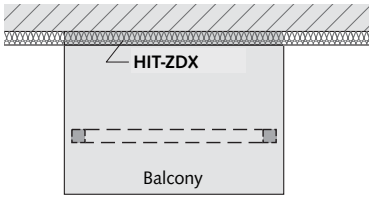


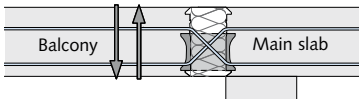


**HIT-HP ZDX / HIT-SP ZDX**
Transfers positive and negative shear forces
- insulation thickness: 3⅛" (80 mm) / 4¾" (120 mm)

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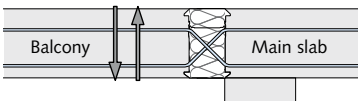


**HIT-HP ZDX / HIT-SP ZDX without CSB**
Transfers shear forces only for unrestrained simply supported connections
- insulation thickness: 3⅛" (80 mm) / 4¾" (120 mm)

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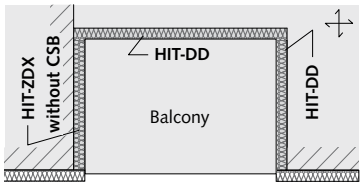
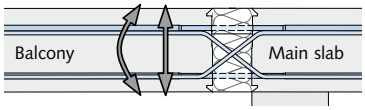
► further types → see following pages

## 4 Continuous slabs



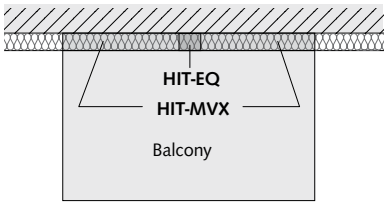



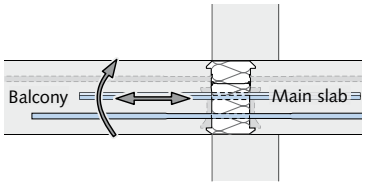

**HIT-HP DD / HIT-SP DD**
Transfers positive and negative bending moments and shear forces
- insulation thickness:
  3 ⅛″ (80 mm) / 4 ¾″ (120 mm)

→ **page 53**

## 5 Resistance of horizontal forces (seismic)

**Application for seismic design**

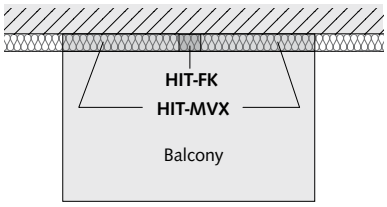



**HIT-HP EQ / HIT-SP EQ**
For transfer of horizontal loads and lifting moments perpendicular to the insulation line
- insulation thickness:
  3 ⅛″ (80 mm) / 4 ¾″ (120 mm)

→ **page 59**

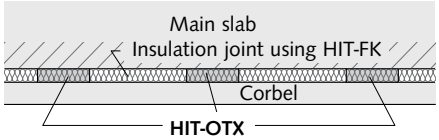
## 6 Fillers

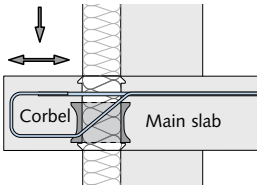



**HIT-HP FK / HIT-SP FK**
Filler without support elements as a complementary element in all applications.
- insulation thickness:
  3 ⅛″ (80 mm) / 4 ¾″ (120 mm)

→ **page 62**

## Parapets and corbels

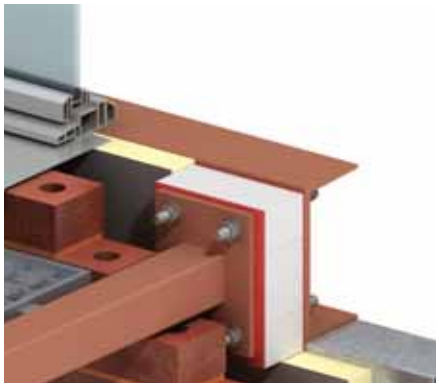



**HIT-HP OTX / HIT-SP OTX**
Forms a thermal barrier between corbel and main slab for selective use. Unit spacing based on structural requirements.
- insulation thickness:
  3 ⅛″ (80 mm) / 4 ¾″ (120 mm)

***send inquiries to info@halfenusa.com***

## Further HALFEN Products for Thermally Insulated Balcony Connection: HALFEN STS and HALFEN STC



**HALFEN STS**
**for steel-to-steel connection**

Transfers bending moments and positive and negative shear forces.

- variable bracket projections and heights
- reduces heat loss by 50 % compared to direct steel connections

***please send inquiries to info@halfenusa.com***

**HALFEN STC**
**for steel-to-concrete connection**

Transfers bending moments and positive and negative shear forces.

- two part assembly allows phased installation
- variable bracket projections and heights

***please send inquiries to info@halfenusa.com***

**More Information**
You want more information on HALFEN STS and HALFEN STC or any other HALFEN products? Please send inquiries to ***info@halfenusa.com*** or just scan the QR code to visit our website.

# HALFEN HIT INSULATED CONNECTION

## HIT-HP, HIT-SP

### Material

| | |
|---|---|
| **Tension bars** | A combination of stainless steel grade 690 and carbon steel bars ASTM A615 Grade 75 with yield strength ≥ 500 N/mm² (75 ksi) |
| **Shear bars** | Stainless steel bars in compliance with EN 10088-1 B500NR or equivalent ASTM A955 Grade 75 with yield strength ≥ 500 N/mm² (75 ksi) |
| **Compression shear bearings** | Steel fiber reinforced high-performance mortar with increased compressive and tensile strength as well as optimized thermal conductivity |
| **Casings** | Rigid PVC according to EN ISO 1163 |
| **Insulating material** | Mineral wool (WLG 035) according to EN 13162, classified as Euro Class A1 according to EN 13501-1 |

### Connecting components

| | |
|---|---|
| **Concrete** | Normal weight concrete in compliance with ACI 318 with a compressive strength ≥ 3,000 psi |
| **On-site reinforcement** | Reinforcing steel in compliance with ACI 318 ≥ Gr. 60 |

### Test certificates

#### Technical Approval

| | | |
|---|---|---|
| **HIT-HP/SP MVX**<br>**HIT-HP/SP ZVX and ZDX**<br>**HIT-HP/SP DD** | ICC-ES Approval ESR -3799, approved for use in seismic zones A–F | ICC ES ESR-3799 |

#### Certification

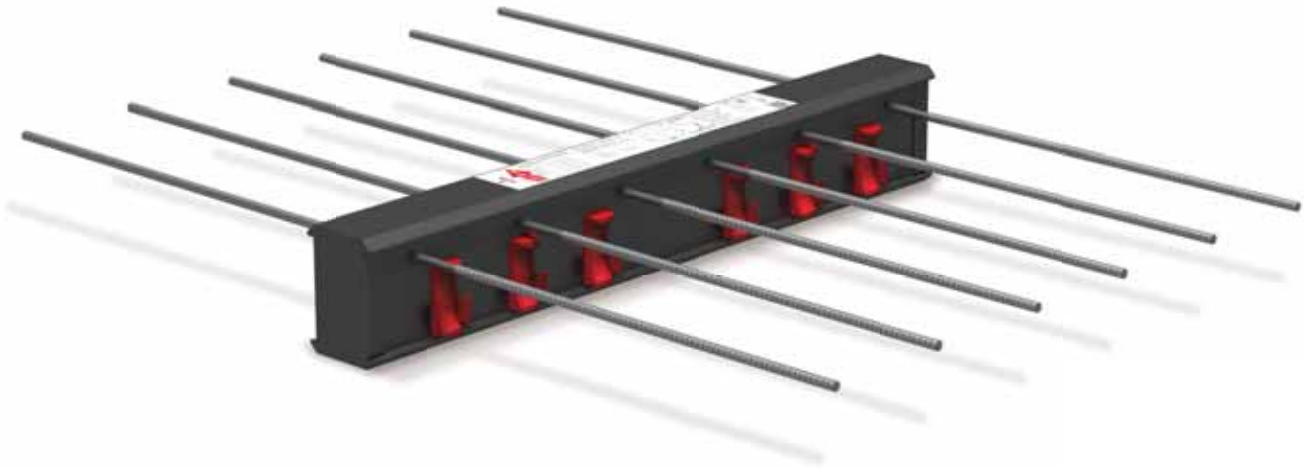
| | | |
|---|---|---|
| **Passive House Institute** | Certification valid for slab thickness from 6 ¼" to 9 ½" (160 mm to 240 mm) | Passivhaus Institut |
| **EPD® Environmental Product Declaration** | EPD-HAL-20160244-IBC1-EN: HIT-HP MVX-0805-20-100 – meets LEED v4 requirements as per ISO 14025 and EN 15804 |  |

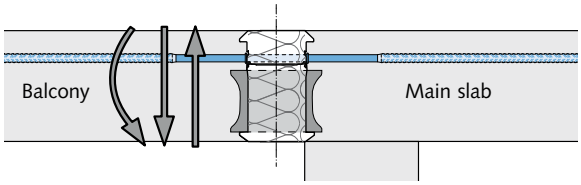
**All documentation on the internet**

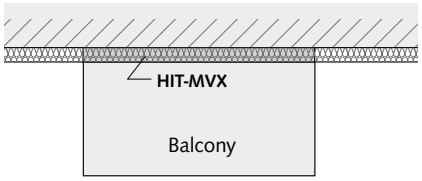
Approval and the complete load range values can be found at **www.halfenusa.com/documentation**. Alternatively, simply scan the QR code and select the required document to download the PDF file.

1

- Symmetrical balcony connection for cantilevered balcony slabs
- Transfers bending moments and positive and negative shear forces






**HIT-HP MVX** – **High Performance** with 3⅛" (80 mm) insulation thickness
**HIT-SP MVX** – **Superior Performance** with 4¾" (120 mm) insulation thickness

**Application**: Cantilevered balcony

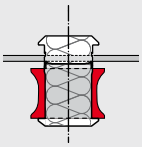
## Load bearing behavior of the HIT-MVX

**Our latest development: Symmetrical HIT units**
The static system of the HIT-MVX units is made of standard tension rods of carbon steel and stainless steel and the innovative CSB with fibre-reinforced high performance mortar.

CSB is an abbreviation for Compression Shear Bearing and describes its unique function; the simultaneous transmission of shear and compression loads.

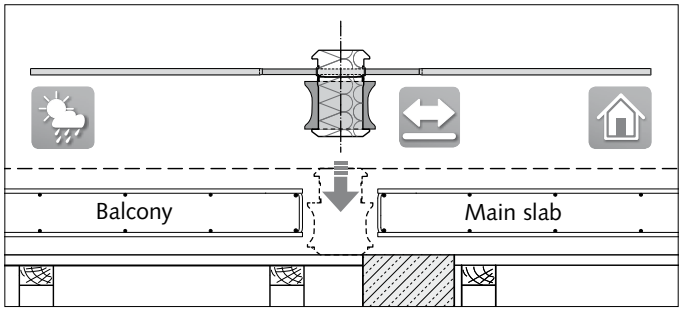
Our latest innovation is the double-symmetrical CSB for transmitting shear loads in both directions. In combination with the tension bars these make up the symmetrical HIT-HP MVX which has 3 ⅛" (80 mm) insulation thickness and the HIT-SP MVX with 4 ¾" (120 mm) insulation thickness. These elements are suitable for moments as well as positive and negative shear loads.

With the double-symmetrical CSB the HIT-MVX Insulated connections are symmetrical and can be installed independently of the main slab or the balcony direction.



**Reliable installation with symmetrical HIT-MVX units**
The HIT balcony connection is designed for practical building requirements. All support elements are sufficiently secured in the rigid plastic casing to ensure safe delivery, transport and easy on-site handling. In addition, the thermal insulation is optimally protected against mechanical damage and water.

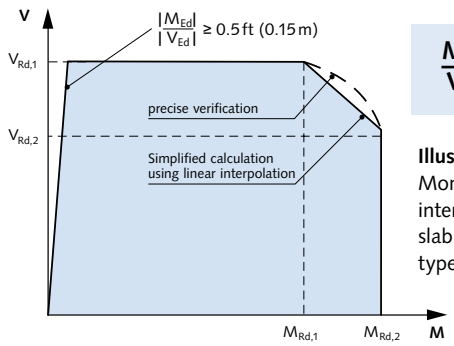
The symmetrical HIT-MVX element can be easily installed from above in the prepared formwork.




**Same loads and moments in both directions**
The arrow marking defining the installation direction will continue to be displayed on all HIT units; including the double-symmetrical HIT-MVX-Type. This is to ensure an efficient installation. If on inspection, it is found that the installation direction shown on the element has been overlooked, the new symmetrical design of the HIT units has a distinct advantage: The HIT unit is designed for the same loads in both directions – therefore the HIT units can stay in-situ with no further modification.


**Load characteristics of the HIT units**
If it is not planned to fully exploit the maximum shear capacity $V_{Rd,1}$, the CSB-technology allows the option of increasing the moment capacity using $M_{Rd,1}$. $M_{Rd,2}$ is the maximum moment capacity with the respective shear resistance $V_{Rd,2}$. This structural behavior is taken into account in our HALFEN HIT-calculation software. The software selects the optimum load range for the HIT units for each current load-combination. The software is available in the download section on the HALFEN website.

The CSB technology allows safe and approval confirmed transfer of shear loads up to 13.16 kip/ft (192 kN/m) in main slab thicknesses from 6 ¼" (160 mm) and larger. To ensure this high shear capacity in the planned application as a cantilevered slab connection, the following ratio must be observed:




$$\frac{M_{Ed}}{V_{Ed}} \geq 0.5\,ft\ (0.15\,m)$$

**Illustration**:
Moment-shear load-interaction in cantilevered slab connections, type HIT-MVX

## Product types – Load range

The respective load range results from the corresponding combination of TB (tension bar) and CSB (compression shear bearings) Box. The combinations of TB and CSB-Box illustrated in the following table are available as standard.

**Possible combinations**

| Unit width B = 9⅞" (25 cm) | No. of tension bars $n_{TB}$ | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Number of compression shear bearings $n_{CSB}$ 1 | ● | ● | | |
| Number of compression shear bearings $n_{CSB}$ 2 | ● | ● | ● | ● |

| Unit width B = 19 11/16" (50 cm) | No. of tension bars $n_{TB}$ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Number of compression shear bearings $n_{CSB}$ 1 | ● | ● | ● | | | | | | |
| Number of compression shear bearings $n_{CSB}$ 2 | ● | ● | ● | ● | ● | | | | |
| Number of compression shear bearings $n_{CSB}$ 3 | | ● | ● | ● | ● | ● | ● | | |
| Number of compression shear bearings $n_{CSB}$ 4 | | ● | ● | ● | ● | ● | ● | ● | ● |
| Number of compression shear bearings $n_{CSB}$ 5 | | | ● | ● | ● | ● | ● | ● | ● |

| Unit width B = 39 3/8" (100 cm) | No. of tension bars $n_{TB}$ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | | 4 | | 6 | | 8 | | 10 | 12 | 14 | 16 | 18 |
| Number of compression shear bearings $n_{CSB}$ 2 | | ● | | ● | | ● | | | | | | | | |
| Number of compression shear bearings $n_{CSB}$ 4 | | ● | | ● | | ● | | ● | | ● | | | | |
| Number of compression shear bearings $n_{CSB}$ 6 | | | | ● | | ● | | ● | | ● | ● | ● | | |
| Number of compression shear bearings $n_{CSB}$ 8 | | | | ● | | ● | | ● | | ● | ● | ● | ● | ● |
| Number of compression shear bearings $n_{CSB}$ 10 | | | | | | ● | | ● | | ● | ● | ● | ● | ● |
| Number of compression shear bearings $n_{CSB}$ 12 | | | | | | | | | | ● | ● | ● | ● | ● |

Values for load bearing capacities for selected units → see pages 20–26. ● = HP and SP

The complete load class range for concrete strength 3,000 psi, 4,000 psi and 5,000 psi for HIT-HP and HIT-SP can be downloaded at **www.halfenusa.com**.

## Ordering example

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **HIT-HP** | **MVX** | **-** | **08 08** | **-** | **20** | **-** | **100** | **-** | **35** |
| **HIT-HP** | **MVX** | **-** | **04 04** | **-** | **18** | **-** | **050** | **-** | **50** |
| **HIT-SP** | **MVX** | **-** | **02 02** | **-** | **18** | **-** | **025** | **-** | **35** |
| | | | ❶ ❷ | | ❸ | | ❹ ❺ | | ❻ | | ❼ | | ❽ |

### HIT Custom solutions

Our technical support team is available to provide support in your project with custom solutions using HALFEN HIT Insulated connections.

**Contact:** → engineering@halfenusa.com

**Type designation**

① Product group
② Joint spacing: HP: 3⅛" (80 mm) or
SP: 4¾" (120 mm)
③ Connection type
④ Number of tension bars
⑤ Number of CSB compression shear bearings
⑥ Unit height [cm]
⑦ Unit width [cm]
⑧ Concrete cover/top [mm]

## Available unit height h

| Concrete cover/top | 1⅜" (35 mm) | 2" (50 mm) |
|---|---|---|
| Available unit heights | 6¼" – 13¾" (16–35 cm) | 7" – 13¾" (18–35 cm) |

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

### Shear capacity $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi

| | | | | | | |
|---|---|---|---|---|---|---|
| Type / Unit width | **B = 39⅜" (100 cm)** | **HP MVX-0202** | **HP MVX-0402** | **HP MVX-0602*** | **HP MVX-0204** | **HP MVX-0404** |
| | B = 19 11⁄16" (50 cm) | HP MVX-0101 | HP MVX-0201 | HP MVX-0301* | HP MVX-0102 | HP MVX-0202 |
| | B = 9⅞" (25 cm) | – | – | – | – | HP MVX-0101 |
| Design values $v_{Rd}$ | **[kip/ft (kN/m)]** | **2.19 (32.0)** | **2.19 (32.0)** | **0.45 (6.6)** | **4.28 (62.4)** | **4.38 (64.0)** |

### Moment bearing capacity $m_{Rd}$

| Type / Unit width | B = 39⅜" (100 cm) | | HP MVX-0202 | | HP MVX-0402 | | HP MVX-0602* | | HP MVX-0204 | | HP MVX-0404 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B = 19 11⁄16" (50 cm) | | HP MVX-0101 | | HP MVX-0201 | | HP MVX-0301* | | HP MVX-0102 | | HP MVX-0202 | |
| | B = 9⅞" (25 cm) | | – | | – | | – | | – | | HP MVX-0101 | |
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | | | | | | |
| Design values **$m_{Rd}$ [kip*ft/ft (kNm/m)]** for unit height [in (mm)] | 6¼ (160) | | 2.0 | (8.9) | 3.4 | (15.2) | 4.3 | (19.1) | 2.2 | (9.6) | 4.0 | (17.9) |
| | | 7 (180) | 2.1 | (9.4) | 3.6 | (16.1) | 4.6 | (20.6) | 2.3 | (10.1) | 4.2 | (18.9) |
| | 6¾ (170) | | 2.2 | (9.9) | 3.8 | (17.1) | 5.0 | (22.1) | 2.4 | (10.6) | 4.5 | (19.9) |
| | | 7½ (190) | 2.3 | (10.4) | 4.1 | (18.1) | 5.3 | (23.6) | 2.5 | (11.1) | 4.7 | (20.8) |
| | 7 (180) | | 2.5 | (10.9) | 4.3 | (19.0) | 5.6 | (25.0) | 2.6 | (11.6) | 4.9 | (21.8) |
| | | 7⅞ (200) | 2.6 | (11.4) | 4.5 | (20.0) | 6.0 | (26.5) | 2.7 | (12.0) | 5.1 | (22.8) |
| | 7½ (190) | | 2.7 | (11.9) | 4.7 | (21.0) | 6.3 | (28.0) | 2.8 | (12.5) | 5.3 | (23.8) |
| | | 8¼ (210) | 2.8 | (12.4) | 4.9 | (21.9) | 6.6 | (29.5) | 2.9 | (13.0) | 5.6 | (24.8) |
| | 7⅞ (200) | | 2.9 | (12.9) | 5.1 | (22.9) | 7.0 | (30.9) | 3.0 | (13.5) | 5.8 | (25.8) |
| | | 8⅔ (220) | 3.0 | (13.4) | 5.4 | (23.9) | 7.3 | (32.4) | 3.1 | (14.0) | 6.0 | (26.7) |
| | 8¼ (210) | | 3.1 | (13.9) | 5.6 | (24.8) | 7.6 | (33.9) | 3.3 | (14.5) | 6.2 | (27.7) |
| | | 9 (230) | 3.2 | (14.4) | 5.8 | (25.8) | 7.9 | (35.4) | 3.4 | (15.0) | 6.5 | (28.7) |
| | 8⅔ (220) | | 3.3 | (14.8) | 6.0 | (26.8) | 8.3 | (36.8) | 3.5 | (15.5) | 6.7 | (29.7) |
| | | 9½ (240) | 3.4 | (15.3) | 6.2 | (27.7) | 8.6 | (38.3) | 3.6 | (16.0) | 6.9 | (30.7) |
| | 9 (230) | | 3.6 | (15.8) | 6.5 | (28.7) | 8.9 | (39.8) | 3.7 | (16.5) | 7.1 | (31.7) |
| | | 9⅞ (250) | 3.7 | (16.3) | 6.7 | (29.7) | 9.3 | (41.3) | 3.8 | (17.0) | 7.3 | (32.6) |
| | 9½ (240) | | 3.8 | (16.8) | 6.9 | (30.6) | 9.6 | (42.7) | 3.9 | (17.5) | 7.6 | (33.6) |
| | | 10¼ (260) | 3.9 | (17.3) | 7.1 | (31.6) | 9.9 | (44.2) | 4.0 | (17.9) | 7.8 | (34.6) |
| | 9⅞ (250) | | 4.0 | (17.8) | 7.3 | (32.6) | 10.3 | (45.7) | 4.1 | (18.4) | 8.0 | (35.6) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

### On-site reinforcement $A_{s,req}$

| | | |
|---|---|---|
| **Edge frame** | direct support | #3 / 10" |
| **Suspension reinforcement** | indirect support | #3 / 10" |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR. HALFEN HIT software is available at **www.halfenusa.com**.

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

### Shear capacity $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi

| | | | | | | |
|---|---|---|---|---|---|---|
| Type / Unit width | **B = 39⅜" (100 cm)** | **HP MVX-0604** | **HP MVX-0804** | **HP MVX-1004*** | **HP MVX-0406** | **HP MVX-0606** |
| | B = 19 1⁄16" (50 cm) | HP MVX-0302 | HP MVX-0402 | HP MVX-0502* | HP MVX-0203 | HP MVX-0303 |
| | B = 9⅞" (25 cm) | – | HP MVX-0201 | – | – | – |
| Design values $v_{Rd}$ | **[kip/ft (kN/m)]** | **4.38 (64.0)** | **4.38 (64.0)** | **2.59 (37.8)** | **6.58 (96.0)** | **6.58 (96.0)** |

### Moment bearing capacity $m_{Rd}$

| Type / Unit width | | B = 39⅜" (100 cm) | HP MVX-0604 | HP MVX-0804 | HP MVX-1004* | HP MVX-0406 | HP MVX-0606 |
|---|---|---|---|---|---|---|---|
| | | B = 19 1⁄16" (50 cm) | HP MVX-0302 | HP MVX-0402 | HP MVX-0502* | HP MVX-0203 | HP MVX-0303 |
| | | B = 9⅞" (25 cm) | – | HP MVX-0201 | – | – | – |
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | |
| Design values **$m_{Rd}$ [kip*ft/ft (kNm/m)]** for unit height [in (mm)] | 6¼ (160) | | 5.6 (24.9) | 6.8 (30.3) | 7.9 (35.1) | 4.2 (18.7) | 6.0 (26.8) |
| | | 7 (180) | 5.9 (26.4) | 7.2 (32.2) | 8.4 (37.6) | 4.4 (19.7) | 6.4 (28.3) |
| | 6¾ (170) | | 6.3 (27.9) | 7.7 (34.2) | 9.0 (40.0) | 4.7 (20.7) | 6.7 (29.8) |
| | | 7½ (190) | 6.6 (29.3) | 8.1 (36.1) | 9.5 (42.5) | 4.9 (21.7) | 7.0 (31.3) |
| | 7 (180) | | 6.9 (30.8) | 8.6 (38.1) | 10.1 (44.9) | 5.1 (22.7) | 7.4 (32.7) |
| | | 7⅞ (200) | 7.3 (32.3) | 9.0 (40.0) | 10.7 (47.4) | 5.3 (23.7) | 7.7 (34.2) |
| | 7½ (190) | | 7.6 (33.8) | 9.4 (41.9) | 11.2 (49.8) | 5.5 (24.6) | 8.0 (35.7) |
| | | 8¼ (210) | 7.9 (35.2) | 9.9 (43.9) | 11.8 (52.3) | 5.8 (25.6) | 8.4 (37.2) |
| | 7⅞ (200) | | 8.3 (36.7) | 10.3 (45.8) | 12.3 (54.8) | 6.0 (26.6) | 8.7 (38.6) |
| | | 8⅔ (220) | 8.6 (38.2) | 10.7 (47.7) | 12.9 (57.2) | 6.2 (27.6) | 9.0 (40.1) |
| | 8¼ (210) | | 8.9 (39.7) | 11.2 (49.7) | 13.4 (59.7) | 6.4 (28.6) | 9.3 (41.6) |
| | | 9 (230) | 9.2 (41.1) | 11.6 (51.6) | 14.0 (62.1) | 6.6 (29.6) | 9.7 (43.1) |
| | 8⅔ (220) | | 9.6 (42.6) | 12.0 (53.5) | 14.5 (64.6) | 6.9 (30.5) | 10.0 (44.5) |
| | | 9½ (240) | 9.9 (44.1) | 12.5 (55.5) | 15.1 (67.1) | 7.1 (31.5) | 10.3 (46.0) |
| | 9 (230) | | 10.2 (45.6) | 12.9 (57.4) | 15.6 (69.5) | 7.3 (32.5) | 10.7 (47.5) |
| | | 9⅞ (250) | 10.6 (47.0) | 13.3 (59.3) | 16.2 (72.0) | 7.5 (33.5) | 11.0 (49.0) |
| | 9½ (240) | | 10.9 (48.5) | 13.8 (61.3) | 16.7 (74.4) | 7.8 (34.5) | 11.3 (50.4) |
| | | 10¼ (260) | 11.2 (50.0) | 14.2 (63.2) | 17.3 (76.9) | 8.0 (35.5) | 11.7 (51.9) |
| | 9⅞ (250) | | 11.6 (51.5) | 14.6 (65.1) | 17.8 (79.4) | 8.2 (36.4) | 12.0 (53.4) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

### On-site reinforcement $A_{s,req}$

| | | | | |
|---|---|---|---|---|
| **Edge frame** | direct support | #3 / 10" | | |
| **Suspension reinforcement** | indirect support | #3 / 10" | #3 / 9.0" | #3 / 8.5" |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR.
HALFEN HIT software is available at **www.halfenusa.com**.

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

### Shear capacity $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi

| Type / Unit width | | HP MVX-0806 | HP MVX-1006 | HP MVX-1206 | HP MVX-1406* | HP MVX-0408 |
|---|---|---|---|---|---|---|
| | B = 39⅜" (100 cm) | HP MVX-0403 | HP MVX-0503 | HP MVX-0603 | HP MVX-0703* | HP MVX-0204 |
| | B = 19 11/16" (50 cm) | – | – | – | – | HP MVX-0102 |
| | B = 9⅞" (25 cm) | | | | | |
| Design values $v_{Rd}$ | [kip/ft (kN/m)] | **6.58 (96.0)** | **6.58 (96.0)** | **6.58 (96.0)** | **4.73 (69.0)** | **8.56 (124.9)** |

### Moment bearing capacity $m_{Rd}$

| Type / Unit width | | | HP MVX-0806 | | HP MVX-1006 | | HP MVX-1206 | | HP MVX-1406* | | HP MVX-0408 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B = 39⅜" (100 cm) | | HP MVX-0403 | | HP MVX-0503 | | HP MVX-0603 | | HP MVX-0703* | | HP MVX-0204 | |
| | B = 19 11/16" (50 cm) | | – | | – | | – | | – | | HP MVX-0102 | |
| | B = 9⅞" (25 cm) | | | | | | | | | | | |
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¼ (160) | | 7.7 | (34.1) | 9.1 | (40.4) | 10.2 | (45.5) | 11.4 | (50.6) | 4.3 | (19.2) |
| | | 7 (180) | 8.1 | (36.0) | 9.6 | (42.9) | 10.9 | (48.4) | 12.2 | (54.1) | 4.5 | (20.2) |
| | 6¾ (170) | | 8.5 | (38.0) | 10.2 | (45.4) | 11.5 | (51.3) | 12.9 | (57.5) | 4.8 | (21.1) |
| | | 7½ (190) | 9.0 | (40.0) | 10.8 | (47.8) | 12.2 | (54.2) | 13.7 | (61.0) | 5.0 | (22.1) |
| | 7 (180) | | 9.4 | (41.9) | 11.3 | (50.3) | 12.8 | (57.1) | 14.5 | (64.4) | 5.2 | (23.1) |
| | | 7⅞ (200) | 9.9 | (43.9) | 11.9 | (52.7) | 13.5 | (60.0) | 15.3 | (67.8) | 5.4 | (24.1) |
| | 7½ (190) | | 10.3 | (45.9) | 12.4 | (55.2) | 14.1 | (62.9) | 16.0 | (71.3) | 5.6 | (25.1) |
| | | 8¼ (210) | 10.8 | (47.8) | 13.0 | (57.7) | 14.8 | (65.8) | 16.8 | (74.7) | 5.9 | (26.1) |
| | 7⅞ (200) | | 11.2 | (49.8) | 13.5 | (60.1) | 15.4 | (68.7) | 17.6 | (78.2) | 6.1 | (27.0) |
| | | 8 ⅔ (220) | 11.6 | (51.8) | 14.1 | (62.6) | 16.1 | (71.6) | 18.3 | (81.6) | 6.3 | (28.0) |
| | 8¼ (210) | | 12.1 | (53.7) | 14.6 | (65.0) | 16.7 | (74.5) | 19.1 | (85.1) | 6.5 | (29.0) |
| | | 9 (230) | 12.5 | (55.7) | 15.2 | (67.5) | 17.4 | (77.4) | 19.9 | (88.5) | 6.7 | (30.0) |
| | 8⅔ (220) | | 13.0 | (57.7) | 15.7 | (69.9) | 18.1 | (80.3) | 20.7 | (91.9) | 7.0 | (31.0) |
| | | 9½ (240) | 13.4 | (59.6) | 16.3 | (72.4) | 18.7 | (83.2) | 21.4 | (95.4) | 7.2 | (32.0) |
| | 9 (230) | | 13.8 | (61.6) | 16.8 | (74.9) | 19.4 | (86.1) | 22.2 | (98.8) | 7.4 | (32.9) |
| | | 9⅞ (250) | 14.3 | (63.6) | 17.4 | (77.3) | 20.0 | (89.0) | 23.0 | (102.3) | 7.6 | (33.9) |
| | 9½ (240) | | 14.7 | (65.5) | 17.9 | (79.8) | 20.7 | (91.9) | 23.8 | (105.7) | 7.8 | (34.9) |
| | | 10¼ (260) | 15.2 | (67.5) | 18.5 | (82.2) | 21.3 | (94.8) | 24.5 | (109.1) | 8.1 | (35.9) |
| | 9⅞ (250) | | 15.6 | (69.5) | 19.0 | (84.7) | 22.0 | (97.7) | 25.3 | (112.6) | 8.3 | (36.9) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

### On-site reinforcement $A_{s,req}$

| | | | | | | |
|---|---|---|---|---|---|---|
| **Edge frame** | direct support | #3 / 10" | | | | |
| **Suspension reinforcement** | indirect support | #3 / 8.0" | #3 / 8.0" | #3 / 8.5" | #3 / 8.5" | #3 / 7.0" |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR. HALFEN HIT software is available at **www.halfenusa.com**.

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

### Shear capacity $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi

| Type / Unit width | B = 39⅜" (100 cm) | HP MVX-0608 | HP MVX-0808 | HP MVX-1008 | HP MVX-1208 | HP MVX-1408 |
|---|---|---|---|---|---|---|
| | B = 19 11⁄16" (50 cm) | HP MVX-0304 | HP MVX-0404 | HP MVX-0504 | HP MVX-0604 | HP MVX-0704 |
| | B = 9⅞" (25 cm) | – | HP MVX-0202 | – | HP MVX-0302 | – |
| Design values $v_{Rd}$ | [kip/ft (kN/m)] | 8.77 (128.0) | 8.77 (128.0) | 8.77 (128.0) | 8.77 (128.0) | 8.77 (128.0) |

### Moment bearing capacity $m_{Rd}$

| Type / Unit width | B = 39⅜" (100 cm) | | HP MVX-0608 | | HP MVX-0808 | | HP MVX-1008 | | HP MVX-1208 | | HP MVX-1408 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B = 19 11⁄16" (50 cm) | | HP MVX-0304 | | HP MVX-0404 | | HP MVX-0504 | | HP MVX-0604 | | HP MVX-0704 | |
| | B = 9⅞" (25 cm) | | – | | HP MVX-0202 | | – | | HP MVX-0302 | | – | |
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¼ (160) | | 6.2 | (27.8) | 8.0 | (35.8) | 9.7 | (43.1) | 11.2 | (49.8) | 12.2 | (54.3) |
| | | 7 (180) | 6.6 | (29.3) | 8.5 | (37.7) | 10.2 | (45.6) | 11.9 | (52.8) | 12.9 | (57.6) |
| | 6¾ (170) | | 6.9 | (30.7) | 8.9 | (39.7) | 10.8 | (48.0) | 12.5 | (55.7) | 13.7 | (60.9) |
| | | 7½ (190) | 7.2 | (32.2) | 9.4 | (41.7) | 11.4 | (50.5) | 13.2 | (58.7) | 14.4 | (64.2) |
| | 7 (180) | | 7.6 | (33.7) | 9.8 | (43.6) | 11.9 | (53.0) | 13.9 | (61.6) | 15.2 | (67.5) |
| | | 7⅞ (200) | 7.9 | (35.2) | 10.3 | (45.6) | 12.5 | (55.4) | 14.5 | (64.6) | 15.9 | (70.8) |
| | 7½ (190) | | 8.2 | (36.6) | 10.7 | (47.6) | 13.0 | (57.9) | 15.2 | (67.5) | 16.7 | (74.1) |
| | | 8¼ (210) | 8.6 | (38.1) | 11.1 | (49.5) | 13.6 | (60.3) | 15.8 | (70.5) | 17.4 | (77.4) |
| | 7⅞ (200) | | 8.9 | (39.6) | 11.6 | (51.5) | 14.1 | (62.8) | 16.5 | (73.4) | 18.1 | (80.7) |
| | | 8 ⅔ (220) | 9.2 | (41.1) | 12.0 | (53.5) | 14.7 | (65.2) | 17.2 | (76.4) | 18.9 | (84.0) |
| | 8¼ (210) | | 9.6 | (42.5) | 12.5 | (55.4) | 15.2 | (67.7) | 17.8 | (79.3) | 19.6 | (87.3) |
| | | 9 (230) | 9.9 | (44.0) | 12.9 | (57.4) | 15.8 | (70.2) | 18.5 | (82.3) | 20.4 | (90.6) |
| | 8⅔ (220) | | 10.2 | (45.5) | 13.3 | (59.4) | 16.3 | (72.6) | 19.2 | (85.2) | 21.1 | (94.0) |
| | | 9½ (240) | 10.6 | (47.0) | 13.8 | (61.3) | 16.9 | (75.1) | 19.8 | (88.2) | 21.9 | (97.3) |
| | 9 (230) | | 10.9 | (48.4) | 14.2 | (63.3) | 17.4 | (77.5) | 20.5 | (91.1) | 22.6 | (100.6) |
| | | 9⅞ (250) | 11.2 | (49.9) | 14.7 | (65.3) | 18.0 | (80.0) | 21.1 | (94.1) | 23.4 | (103.9) |
| | 9½ (240) | | 11.6 | (51.4) | 15.1 | (67.2) | 18.5 | (82.5) | 21.8 | (97.0) | 24.1 | (107.2) |
| | | 10¼ (260) | 11.9 | (52.9) | 15.6 | (69.2) | 19.1 | (84.9) | 22.5 | (100.0) | 24.8 | (110.5) |
| | 9⅞ (250) | | 12.2 | (54.3) | 16.0 | (71.2) | 19.6 | (87.4) | 23.1 | (102.9) | 25.6 | (113.8) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

### On-site reinforcement $A_{s,req}$

| | | | | | | |
|---|---|---|---|---|---|---|
| **Edge frame** | direct support | #3 / 10" | | | | |
| **Suspension reinforcement** | indirect support | #3 / 6.5" | #3 / 6.5" | #3 / 6.0" | #3 / 6.0" | #3 / 6.0" |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR. HALFEN HIT software is available at **www.halfenusa.com**.

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

### Shear capacity $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi

| Type / Unit width | | HP MVX-1608* | HP MVX-1808* | HP MVX-0610 | HP MVX-0810 | HP MVX-1010 |
|---|---|---|---|---|---|---|
| | B = 39⅜" (100 cm) | HP MVX-1608* | HP MVX-1808* | HP MVX-0610 | HP MVX-0810 | HP MVX-1010 |
| | B = 19 11⁄16" (50 cm) | HP MVX-0804* | HP MVX-0904* | HP MVX-0305 | HP MVX-0405 | HP MVX-0505 |
| | B = 9⅞" (25 cm) | HP MVX-0402* | – | – | – | – |
| Design values $v_{Rd}$ | [kip/ft (kN/m)] | **6.62 (96.7)** | **4.94 (72.1)** | **10.96 (160.0)** | **10.96 (160.0)** | **10.96 (160.0)** |

### Moment bearing capacity $m_{Rd}$

| Type / Unit width | | | HP MVX-1608* | | HP MVX-1808* | | HP MVX-0610 | | HP MVX-0810 | | HP MVX-1010 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B = 39⅜" (100 cm) | | HP MVX-1608* | | HP MVX-1808* | | HP MVX-0610 | | HP MVX-0810 | | HP MVX-1010 | |
| | B = 19 11⁄16" (50 cm) | | HP MVX-0804* | | HP MVX-0904* | | HP MVX-0305 | | HP MVX-0405 | | HP MVX-0505 | |
| | B = 9⅞" (25 cm) | | HP MVX-0402* | | – | | – | | – | | – | |
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¼ (160) | | 13.8 | (61.3) | 14.9 | (66.1) | 6.4 | (28.4) | 8.3 | (36.8) | 10.1 | (44.7) |
| | | 7 (180) | 14.7 | (65.2) | 15.8 | (70.5) | 6.7 | (29.8) | 8.7 | (38.8) | 10.6 | (47.2) |
| | 6¾ (170) | | 15.5 | (69.2) | 16.8 | (74.9) | 7.0 | (31.3) | 9.2 | (40.7) | 11.2 | (49.6) |
| | | 7½ (190) | 16.4 | (73.1) | 17.8 | (79.3) | 7.4 | (32.8) | 9.6 | (42.7) | 11.7 | (52.1) |
| | 7 (180) | | 17.3 | (77.0) | 18.8 | (83.8) | 7.7 | (34.3) | 10.0 | (44.7) | 12.3 | (54.6) |
| | | 7⅞ (200) | 18.2 | (81.0) | 19.8 | (88.2) | 8.0 | (35.7) | 10.5 | (46.6) | 12.8 | (57.0) |
| | 7½ (190) | | 19.1 | (84.9) | 20.8 | (92.6) | 8.4 | (37.2) | 10.9 | (48.6) | 13.4 | (59.5) |
| | | 8¼ (210) | 20.0 | (88.8) | 21.8 | (97.0) | 8.7 | (38.7) | 11.4 | (50.6) | 13.9 | (61.9) |
| | 7⅞ (200) | | 20.9 | (92.8) | 22.8 | (101.5) | 9.0 | (40.2) | 11.8 | (52.5) | 14.5 | (64.4) |
| | | 8 ⅔ (220) | 21.7 | (96.7) | 23.8 | (105.9) | 9.4 | (41.7) | 12.3 | (54.5) | 15.0 | (66.9) |
| | 8¼ (210) | | 22.6 | (100.6) | 24.8 | (110.3) | 9.7 | (43.1) | 12.7 | (56.5) | 15.6 | (69.3) |
| | | 9 (230) | 23.5 | (104.6) | 25.8 | (114.7) | 10.0 | (44.6) | 13.1 | (58.4) | 16.1 | (71.8) |
| | 8⅔ (220) | | 24.4 | (108.5) | 26.8 | (119.2) | 10.4 | (46.1) | 13.6 | (60.4) | 16.7 | (74.2) |
| | | 9½ (240) | 25.3 | (112.4) | 27.8 | (123.6) | 10.7 | (47.6) | 14.0 | (62.4) | 17.2 | (76.7) |
| | 9 (230) | | 26.2 | (116.4) | 28.8 | (128.0) | 11.0 | (49.0) | 14.5 | (64.3) | 17.8 | (79.1) |
| | | 9⅞ (250) | 27.0 | (120.3) | 29.8 | (132.4) | 11.4 | (50.5) | 14.9 | (66.3) | 18.3 | (81.6) |
| | 9½ (240) | | 27.9 | (124.2) | 30.8 | (136.9) | 11.7 | (52.0) | 15.3 | (68.3) | 18.9 | (84.1) |
| | | 10¼ (260) | 28.8 | (128.2) | 31.8 | (141.3) | 12.0 | (53.5) | 15.8 | (70.2) | 19.4 | (86.5) |
| | 9⅞ (250) | | 29.7 | (132.1) | 32.8 | (145.7) | 12.3 | (54.9) | 16.2 | (72.2) | 20.0 | (89.0) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

### On-site reinforcement $A_{s,req}$

| | | | |
|---|---|---|---|
| **Edge frame** | direct support | #3 / 10" | |
| **Suspension reinforcement** | indirect support | #3 / 6.0" | #3 / 5.5" |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR. HALFEN HIT software is available at **www.halfenusa.com**.

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

### Shear capacity $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi

| Type / Unit width | B = 39⅜" (100 cm) | HP MVX-1210 | HP MVX-1410* | HP MVX-1610* | HP MVX-1810* | HP MVX-1012 |
|---|---|---|---|---|---|---|
| | B = 19 11⁄16" (50 cm) | HP MVX-0605 | HP MVX-0705* | HP MVX-0805* | HP MVX-0905* | HP MVX-0506 |
| | B = 9⅞" (25 cm) | – | – | – | – | – |
| Design values $v_{Rd}$ | [kip/ft (kN/m)] | 10.96 (160.0) | 8.31 (121.2) | 6.62 (96.7) | 4.94 (72.1) | 13.16 (192.0) |

### Moment bearing capacity $m_{Rd}$

| Type / Unit width | | B = 39⅜" (100 cm) | HP MVX-1210 | | HP MVX-1410* | | HP MVX-1610* | | HP MVX-1810* | | HP MVX-1012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | B = 19 11⁄16" (50 cm) | HP MVX-0605 | | HP MVX-0705* | | HP MVX-0805* | | HP MVX-0905* | | HP MVX-0506 | |
| | | B = 9⅞" (25 cm) | – | | – | | – | | – | | – | |
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¼ (160) | | 10.8 | (47.9) | 13.3 | (59.0) | 14.7 | (65.4) | 16.0 | (71.3) | 8.7 | (38.5) |
| | | 7 (180) | 11.4 | (50.6) | 14.0 | (62.5) | 15.6 | (69.3) | 17.0 | (75.7) | 9.1 | (40.6) |
| | 6¾ (170) | | 12.0 | (53.3) | 14.8 | (65.9) | 16.5 | (73.3) | 18.0 | (80.1) | 9.6 | (42.6) |
| | | 7½ (190) | 12.6 | (55.9) | 15.6 | (69.3) | 17.4 | (77.2) | 19.0 | (84.5) | 10.0 | (44.6) |
| | 7 (180) | | 13.2 | (58.6) | 16.4 | (72.8) | 18.2 | (81.1) | 20.0 | (89.0) | 10.5 | (46.6) |
| | | 7⅞ (200) | 13.8 | (61.3) | 17.1 | (76.2) | 19.1 | (85.1) | 21.0 | (93.4) | 10.9 | (48.7) |
| | 7½ (190) | | 14.4 | (63.9) | 17.9 | (79.7) | 20.0 | (89.0) | 22.0 | (97.8) | 11.4 | (50.7) |
| | | 8¼ (210) | 15.0 | (66.6) | 18.7 | (83.1) | 20.9 | (92.9) | 23.0 | (102.2) | 11.9 | (52.7) |
| | 7⅞ (200) | | 15.6 | (69.3) | 19.5 | (86.6) | 21.8 | (96.9) | 24.0 | (106.7) | 12.3 | (54.7) |
| | | 8 ⅔ (220) | 16.2 | (71.9) | 20.2 | (90.0) | 22.7 | (100.8) | 25.0 | (111.1) | 12.8 | (56.8) |
| | 8¼ (210) | | 16.8 | (74.6) | 21.0 | (93.4) | 23.5 | (104.7) | 26.0 | (115.5) | 13.2 | (58.8) |
| | | 9 (230) | 17.4 | (77.3) | 21.8 | (96.9) | 24.4 | (108.7) | 27.0 | (119.9) | 13.7 | (60.8) |
| | 8⅔ (220) | | 18.0 | (79.9) | 22.6 | (100.3) | 25.3 | (112.6) | 28.0 | (124.4) | 14.1 | (62.8) |
| | | 9½ (240) | 18.6 | (82.6) | 23.3 | (103.8) | 26.2 | (116.5) | 29.0 | (128.8) | 14.6 | (64.9) |
| | 9 (230) | | 19.2 | (85.3) | 24.1 | (107.2) | 27.1 | (120.5) | 29.9 | (133.2) | 15.0 | (66.9) |
| | | 9⅞ (250) | 19.8 | (87.9) | 24.9 | (110.6) | 28.0 | (124.4) | 30.9 | (137.6) | 15.5 | (68.9) |
| | 9½ (240) | | 20.4 | (90.6) | 25.6 | (114.1) | 28.9 | (128.3) | 31.9 | (142.1) | 16.0 | (71.0) |
| | | 10¼ (260) | 21.0 | (93.3) | 26.4 | (117.5) | 29.7 | (132.3) | 32.9 | (146.5) | 16.4 | (73.0) |
| | 9⅞ (250) | | 21.6 | (95.9) | 27.2 | (121.0) | 30.6 | (136.2) | 33.9 | (150.9) | 16.9 | (75.0) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

### On-site reinforcement $A_{s,req}$

| | | | | |
|---|---|---|---|---|
| **Edge frame** | direct support | #3 / 10" | | |
| **Suspension reinforcement** | indirect support | #3 / 5.5" | #3 / 5.0" | #4 / 8.0" |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR. HALFEN HIT software is available at **www.halfenusa.com**.

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

### Shear capacity $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi

| Type / Unit width | B = 39⅜" (100 cm) | HP MVX-1212* | HP MVX-1412* | HP MVX-1612* | HP MVX-1812* |
|---|---|---|---|---|---|
| | B = 19 11⁄16" (50 cm) | HP MVX-0606* | HP MVX-0706* | HP MVX-0806* | HP MVX-0906* |
| | B = 9⅞" (25 cm) | HP MVX-0303* | – | HP MVX-0403* | – |
| Design values $v_{Rd}$ | [kip/ft (kN/m)] | 9.99 (145.8) | 8.31 (121.2) | 6.62 (96.7) | 4.94 (72.1) |

### Moment bearing capacity $m_{Rd}$

| Type / Unit width | B = 39⅜" (100 cm) | | HP MVX-1212* | | HP MVX-1412* | | HP MVX-1612* | | HP MVX-1812* | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B = 19 11⁄16" (50 cm) | | HP MVX-0606* | | HP MVX-0706* | | HP MVX-0806* | | HP MVX-0906* | |
| | B = 9⅞" (25 cm) | | HP MVX-0303* | | – | | HP MVX-0403* | | – | |
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¼ (160) | | 12.1 | (53.7) | 13.7 | (61.1) | 15.3 | (68.1) | 16.8 | (74.7) |
| | | 7 (180) | 12.7 | (56.6) | 14.5 | (64.6) | 16.2 | (72.1) | 17.8 | (79.2) |
| | 6¾ (170) | | 13.4 | (59.6) | 15.3 | (68.0) | 17.1 | (76.0) | 18.8 | (83.6) |
| | | 7½ (190) | 14.1 | (62.5) | 16.1 | (71.4) | 18.0 | (79.9) | 19.8 | (88.0) |
| | 7 (180) | | 14.7 | (65.5) | 16.8 | (74.9) | 18.9 | (83.9) | 20.8 | (92.4) |
| | | 7⅞ (200) | 15.4 | (68.4) | 17.6 | (78.3) | 19.7 | (87.8) | 21.8 | (96.9) |
| | 7½ (190) | | 16.0 | (71.4) | 18.4 | (81.8) | 20.6 | (91.7) | 22.8 | (101.3) |
| | | 8¼ (210) | 16.7 | (74.3) | 19.2 | (85.2) | 21.5 | (95.7) | 23.8 | (105.7) |
| | 7⅞ (200) | | 17.4 | (77.3) | 19.9 | (88.7) | 22.4 | (99.6) | 24.8 | (110.1) |
| | | 8⅔ (220) | 18.0 | (80.2) | 20.7 | (92.1) | 23.3 | (103.5) | 25.8 | (114.6) |
| | 8¼ (210) | | 18.7 | (83.2) | 21.5 | (95.5) | 24.2 | (107.5) | 26.7 | (119.0) |
| | | 9 (230) | 19.4 | (86.1) | 22.3 | (99.0) | 25.0 | (111.4) | 27.7 | (123.4) |
| | 8⅔ (220) | | 20.0 | (89.1) | 23.0 | (102.4) | 25.9 | (115.3) | 28.7 | (127.8) |
| | | 9½ (240) | 20.7 | (92.0) | 23.8 | (105.9) | 26.8 | (119.3) | 29.7 | (132.3) |
| | 9 (230) | | 21.3 | (95.0) | 24.6 | (109.3) | 27.7 | (123.2) | 30.7 | (136.7) |
| | | 9⅞ (250) | 22.0 | (97.9) | 25.3 | (112.7) | 28.6 | (127.1) | 31.7 | (141.1) |
| | 9½ (240) | | 22.7 | (100.9) | 26.1 | (116.2) | 29.5 | (131.1) | 32.7 | (145.5) |
| | | 10¼ (260) | 23.3 | (103.8) | 26.9 | (119.6) | 30.3 | (135.0) | 33.7 | (150.0) |
| | 9⅞ (250) | | 24.0 | (106.8) | 27.7 | (123.1) | 31.2 | (138.9) | 34.7 | (154.4) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

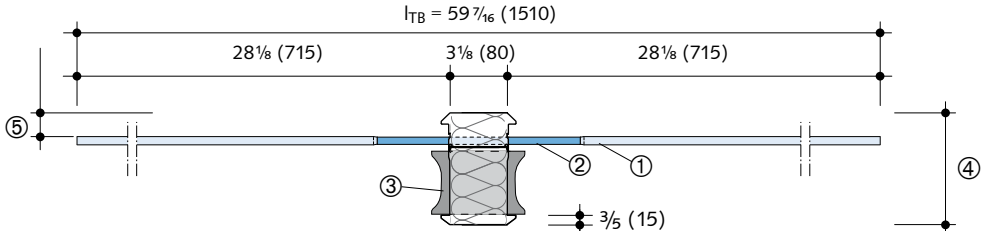
### On-site reinforcement $A_{s,req}$

| | | |
|---|---|---|
| **Edge frame** | direct support | #3 / 10" |
| **Suspension reinforcement** | indirect support | #4 / 8.0" |

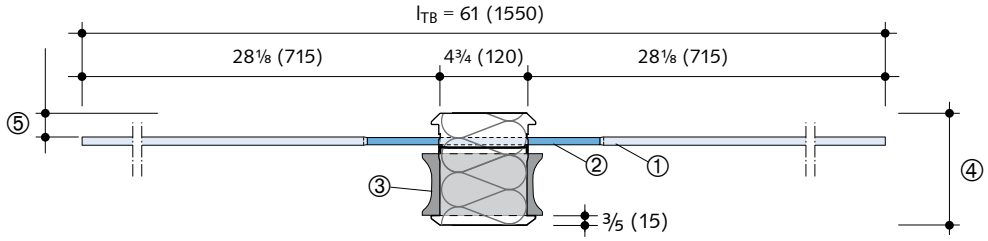
Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR. HALFEN HIT software is available at **www.halfenusa.com**.

## Product description – Cross-sections

### HIT-HP MVX




### HIT-SP MVX



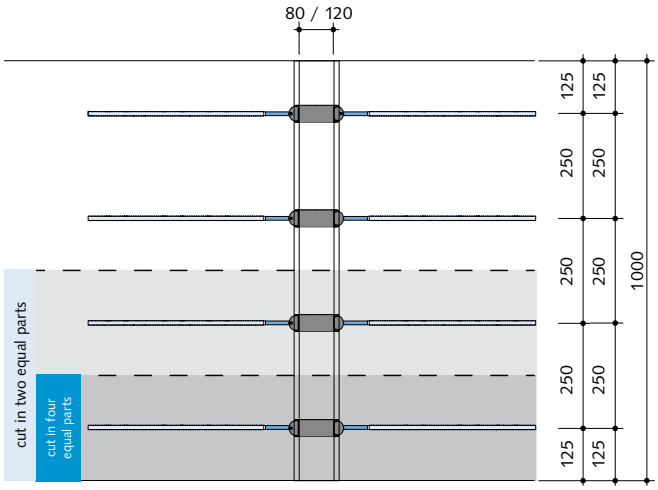

**Dimensions: in (mm)**

① Carbon steel tension bar #4
② Stainless steel tension bar 10.5 mm
③ Double-symmetrical compression shear bearings CSB
④ Unit height h: 6 1/4 (160) ≤ h ≤ 13 3/4 (350)
⑤ Concrete cover top: 1 3/8" (35 mm) / 2" (50 mm)

## Field Cutting HIT units

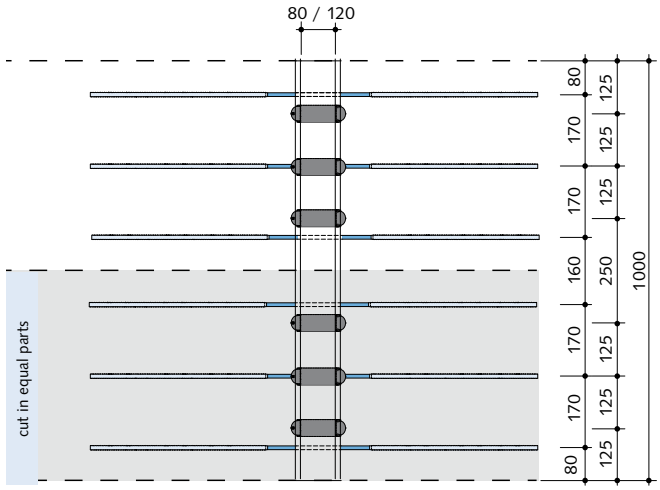
The layout of the tension bars and the CSB has been optimized when cutting the element to size is required.

HIT-HP/SP - MVX 0404 - ... - 100
HIT-HP/SP - MVX 0202 - ... - 050
HIT-HP/SP - MVX 0101 - ... - 025




With an even number of support elements these are grouped in sections; simplifying cutting the elements.

HIT-HP/SP - MVX 0606 - ... - 100
HIT-HP/SP - MVX 0303 - ... - 050

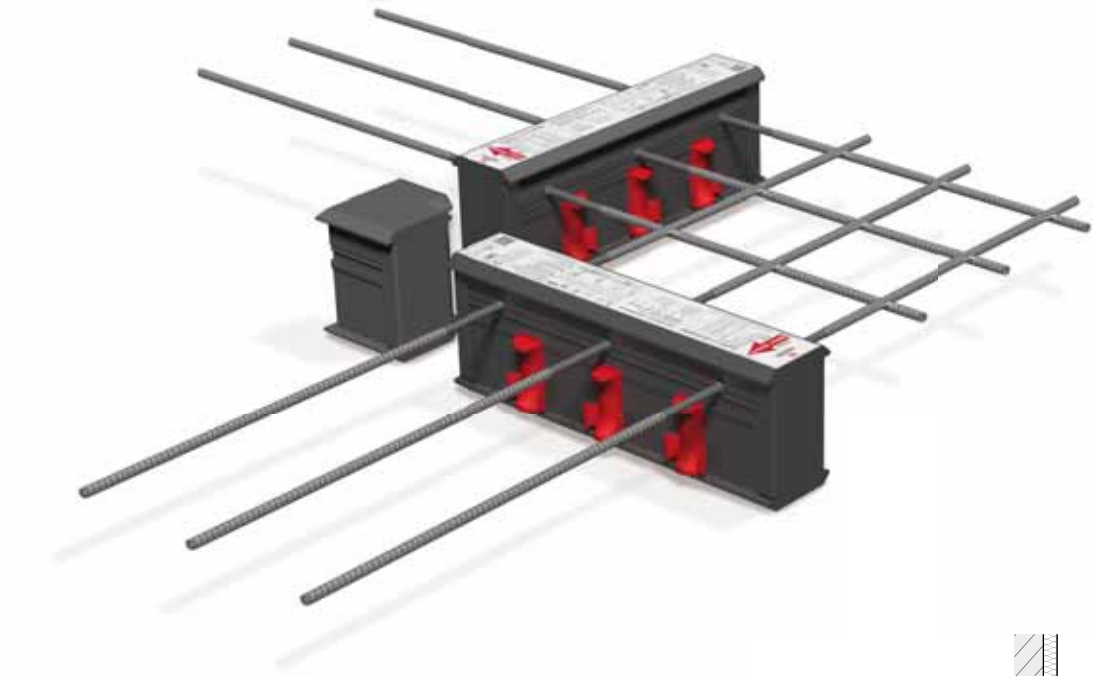


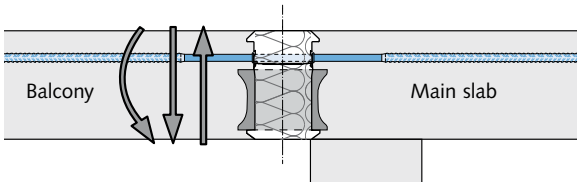

**Dimensions: [mm]**

# HALFEN HIT INSULATED CONNECTION

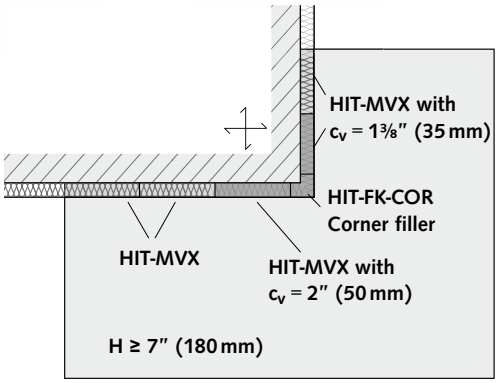
## HIT MVX-COR

- Symmetrical connection for cantilevered corner balcony slabs
- Transfer of bending moments as well as positive and negative shear forces






**HIT-HP MVX** – **High Performance** with insulation thickness 3 ⅛" (80 mm)
**HIT-SP MVX** – **Superior Performance** with insulation thickness 4 ¾" (120 mm)

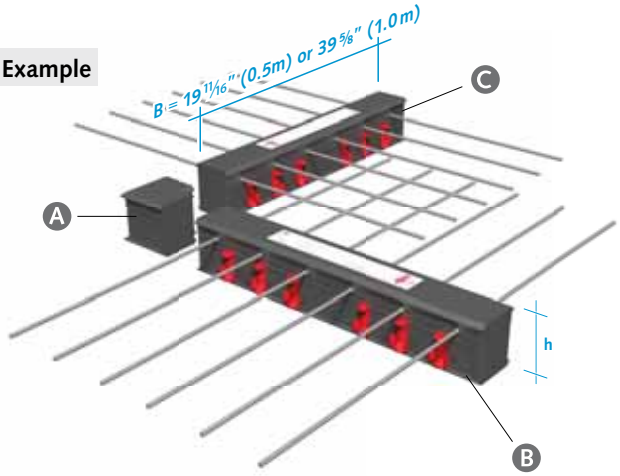



**Application example:** outer corner

## Units for corner balconies

In addition to the standard linear connections a corner situation may be constructed (taking the occurring moments and the positive and negative shear forces into account) using HIT-HP MVX or HIT-SP MVX standard elements in 19 11/16" (0.5 m) or 39 5/8" (1.0 m) lengths.

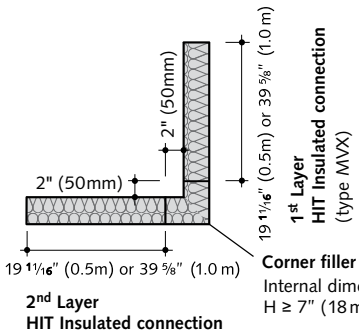
**Example**




Ⓐ Corner filler

Ⓑ HIT-MVX Standard element, 1st layer reinforcement, $c_v$ = 1 3/8" (35 mm)

Ⓒ HIT-MVX Standard element, 2nd layer reinforcement, $c_v$ = 2" (50 mm)




HP SP

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ⓐ | HIT-HP | FK | - | | 18 | - | | | COR |
| Ⓑ | HIT-HP | MVX | - | 0804 | - | 18 | - | 100 - | 35 |
| Ⓒ | HIT-HP | MVX | - | 0804 | - | 18 | - | 100 - | 50 |
| | | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ |

**Type designation**

① Product group
② Joint spacing:
HP: 3 1/8" (80 mm) or
SP: 4 3/4" (120 mm)
③ Connection type
④ Number of tension bars
⑤ Number of double symmetrical CSB
⑥ Unit height h [cm]
⑦ Unit width B [cm]
⑧ Concrete cover (top) [mm]
⑨ For corner application only

## Exemplary load bearing capacity values HIT-HP MVX COR

**Shear capacity ±$v_{Rd}$**

**Concrete strength:** ≥ 4,000 psi

HP

| Type / Unit width | B = 39 3/8" (100 cm) | HP MVX-0604 | HP MVX-0804 | HP MVX-1004* | HP MVX-0406 | HP MVX-0606 |
|---|---|---|---|---|---|---|
| | B = 19 11/16" (50 cm) | HP MVX-0302 | HP MVX-0402 | HP MVX-0502* | HP MVX-0203 | HP MVX-0303 |
| | B = 9 7/8" (25 cm) | – | HP MVX-0201 | – | – | – |
| Design values $v_{Rd}$ | [kip/ft (kN/m)] | 4.38 (64.0) | 4.38 (64.0) | 2.59 (37.8) | 6.58 (96.0) | 6.58 (96.0) |

**Moment bearing capacity $m_{Rd}$**

| Type / Unit width | B = 39 3/8" (100 cm) | | HP MVX-0604 | | HP MVX-0804 | | HP MVX-1004* | | HP MVX-0406 | | HP MVX-0606 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B = 19 11/16" (50 cm) | | HP MVX-0302 | | HP MVX-0402 | | HP MVX-0502* | | HP MVX-0203 | | HP MVX-0303 | |
| | B = 9 7/8" (25 cm) | | – | | HP MVX-0201 | | – | | – | | – | |
| Concrete cover [in (mm)] | 1 3/8 (35) | 2 (50) | | | | | | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6 1/4 (160) | | 5.6 | (24.9) | 6.8 | (30.3) | 7.9 | (35.1) | 4.2 | (18.7) | 6.0 | (26.8) |
| | | 7 (180) | 5.9 | (26.4) | 7.2 | (32.2) | 8.4 | (37.6) | 4.4 | (19.7) | 6.4 | (28.3) |
| | 6 3/4 (170) | | 6.3 | (27.9) | 7.7 | (34.2) | 9.0 | (40.0) | 4.7 | (20.7) | 6.7 | (29.8) |
| | | 7 1/2 (190) | 6.6 | (29.3) | 8.1 | (36.1) | 9.5 | (42.5) | 4.9 | (21.7) | 7.0 | (31.3) |

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

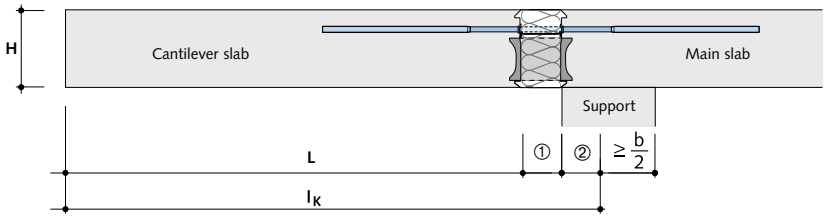
All load bearing capacity values and connecting reinforcement → pages 20–26 [value $c_v$ = 2" (50 mm) is decisive]

## Span-to-depth ratio

The maximum cantilever lengths ($l_k$) are shown in the table below; these are based on the minimum thickness of cantilever support conditions presented in ACI 318-14 Table 7.3.1.1. The cantilever length $l_k$ should be considered as shown in the figure below. Interim values can be interpolated.

| Cantilever lengths | Slab thickness H [in (cm)] of concrete slab | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 6¼ (16) | 7 (18) | 7½ (19) | 8¼ (21) | 8½ (22) | 9 (23) | 9½ (24) | 10 (25) | 10½ (27) |
| Maximum cantilever length $l_k$ [ft (m)] | 5.25 (1.6) | 5.83 (1.8) | 6.3 (1.9) | 6.8 (2.1) | 7.1 (2.2) | 7.5 (2.3) | 7.9 (2.4) | 8.3 (2.5) | 8.75 (2.7) |

Larger span lengths are permitted, but deflections must be checked in accordance with ACI 318-14 Ch24.
Deflections reflect use of Grade 60 rebar.




① 3⅛" (80 mm) or 4¾" (120 mm)
② 3⅛" (80 mm)
$l_k$ = Cantilever length
b = Support width

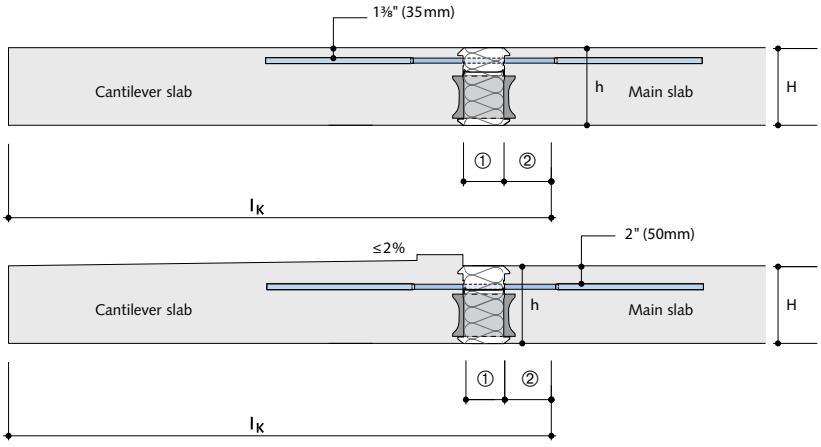
## Connecting reinforcement

| No. of tension bars $n_{TB}$/m | $A_{s,TB}$ [in²/m] | $A_{s,TB}$ [cm²/m] | Minimum reinforcement |
|---|---|---|---|
| 2 | 0.35 | 2.26 | #3/10" |
| 3 | 0.53 | 3.39 | #4/10" |
| 4 | 0.70 | 4.52 | #4/9" |
| 5 | 0.88 | 5.65 | #4/7.25" |
| 6 | 1.06 | 6.79 | #4/6" |
| 7 | 1.23 | 7.92 | #4/5" |
| 8 | 1.41 | 9.05 | #4/4.5" |
| 9 | 1.58 | 10.18 | #4/4" |
| 10 | 1.76 | 11.31 | #4/3.5" |
| 11 | 1.94 | 12.44 | #4/3.25" |
| 12 | 2.11 | 13.57 | #4/3" |
| 13 | 2.29 | 14.70 | #4/2.75" |
| 14 | 2.46 | 15.83 | #4/2.5" |
| 16 | 2.82 | 18.10 | #4/2.25" |
| 18 | 3.17 | 20.36 | #4/2" |
| Main slab thickness (h) 6¼" (160 mm) – 13¾" (350 mm) | | | |

Reference the latest edition of ACI 318 to calculate development length and splice length referencing the material specifications on page 16.

## Concrete cover and type

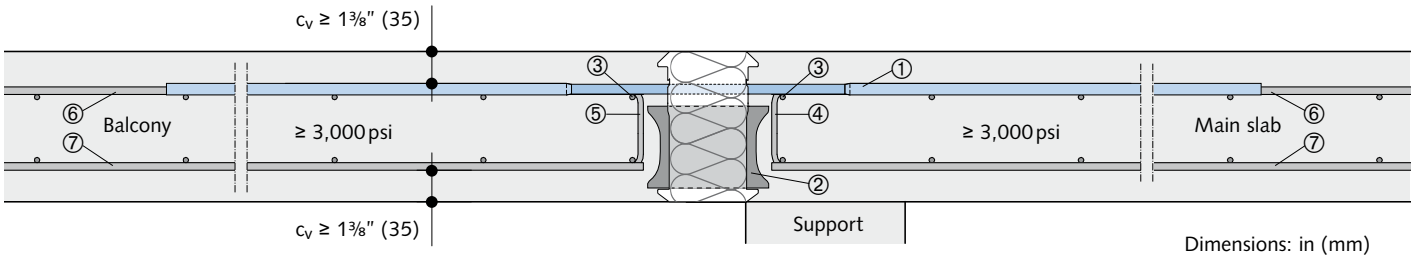
HALFEN HIT unit tension bars have a concrete cover of ($c_v$) 1⅜" (35 mm) or 2" (50 mm).
For balcony slabs with a sloping surface we recommend choosing the HIT units with 2" (50 mm) concrete covering.




① 3⅛" (80 mm) or 4¾" (120 mm)
② 3⅛" (80 mm)
$l_k$ = Cantilever length
b = Support width
h = HIT unit height
H = Height of slab

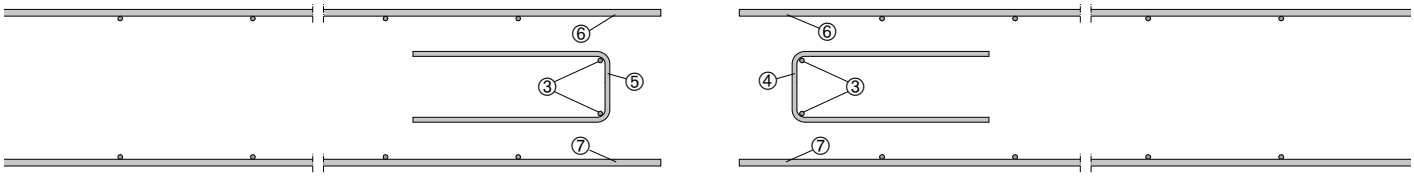
## On-site reinforcement for direct and indirect support

### Longitudinal section




Dimensions: in (mm)

### Reinforcement detail



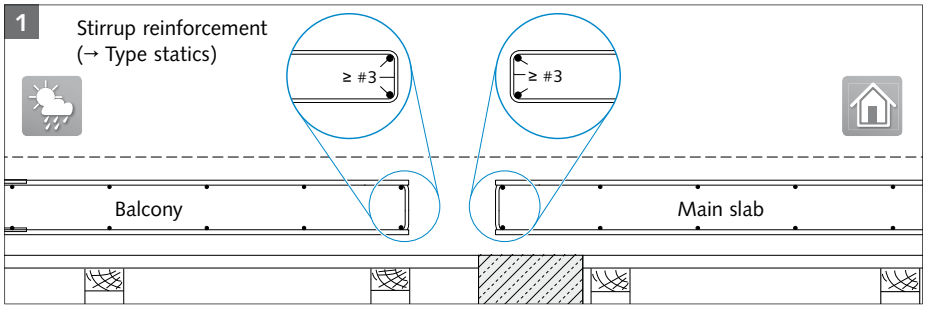

### Legend: Section / Reinforcement detail

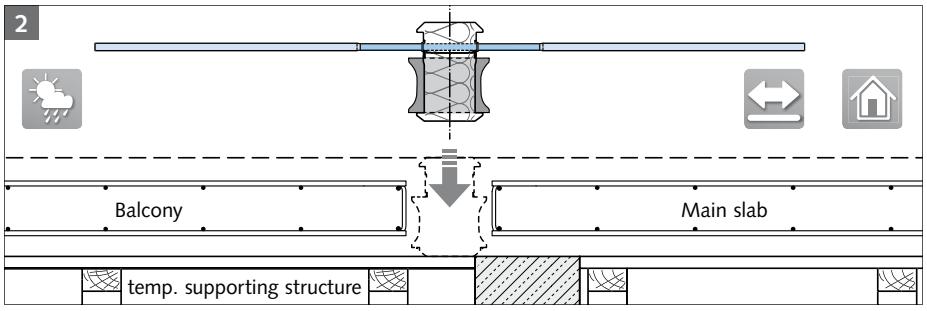
① Tension bar
② Double-symmetrical CSB
③ Horizontal transverse tensile reinforcement $A_{s,h}$ min. 2× rebar size #3
④ Vertical tensile splitting reinforcement $A_{s,v}$ min. #3 / 10", see also → pages 20–26
⑤ Vertical tensile splitting reinforcement $A_{s,v}$ min. #3 / 10", see also → pages 20–26
⑥ Upper connecting reinforcement → page 30
⑦ Lower connecting reinforcement

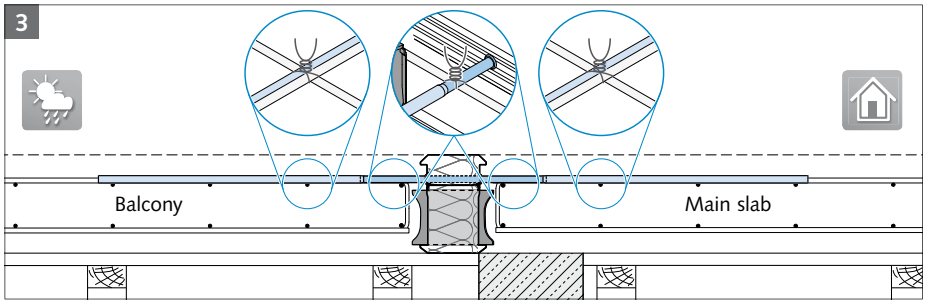
**Indirect support**
For indirect support a suspension reinforcement is placed in addition to the vertical tensile splitting reinforcement (position ④). Please note the respective load bearing capacity values (→ pages 20–26).

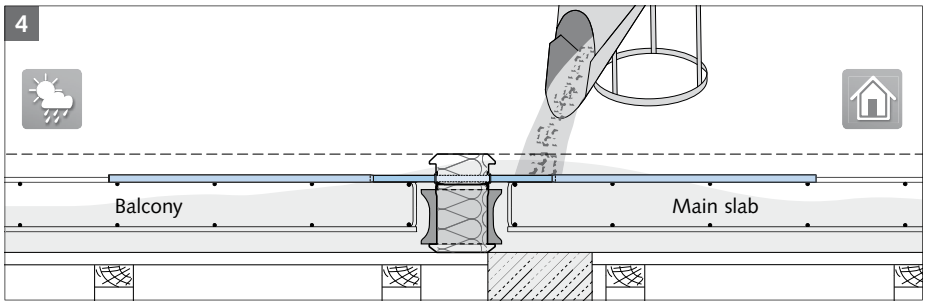
CAD details available are at **www.halfenusa.com**.

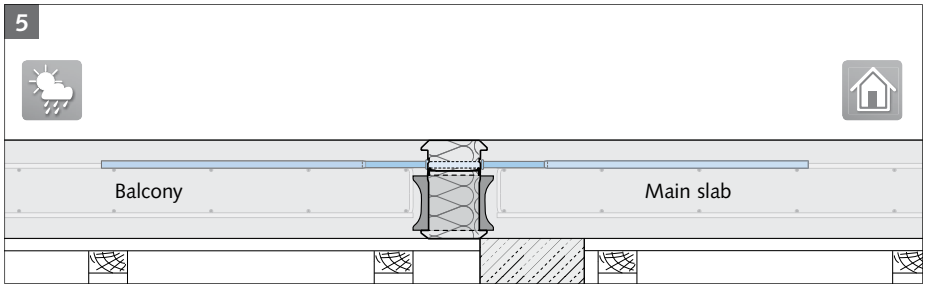
## Installation diagram



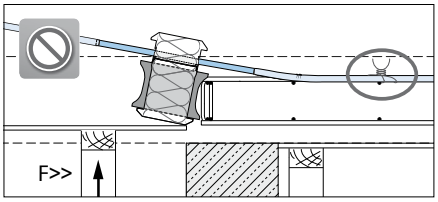




**1** Installation of on-site reinforcement

⚠ The on-site reinforcement must be placed as specified by the structural engineer.

**2** Installation of the HIT unit from above

ⓘ The HIT-MVX unit is symmetrical; therefore, both installation directions are correct (custom solutions may vary).




⚠ Ensure that the formwork is at the correct height!

**3** Fix the HIT Tension bars to on-site reinforcement using tying wire

**4** Pour the concrete

⚠ To ensure the HIT Units are not displaced, pour and compact the concrete evenly. Secure the HIT Units against movement.

**5** Freshly concreted balcony slab on supporting structure

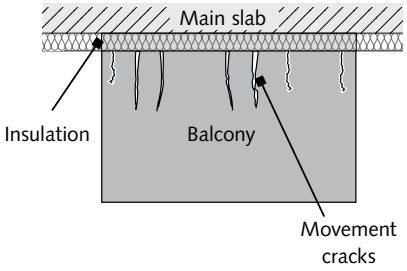
ⓘ For further installation instructions please go to **www.halfenusa.com**.

## Joint spacings

Temperature differences between the building main slab and balcony provoke stresses in the connecting joint due to volume changes as the balcony expands and contracts.

A conventional reinforced continuous slab does not allow any differential movement. This leads to tension space in the concrete and movement cracks to occur.

Concrete cracks expose reinforcement to oxygen and moisture promoting corrosion of the reinforcement. Corrosion of the reinforcement leads to concrete spalling and degradation of the balcony.



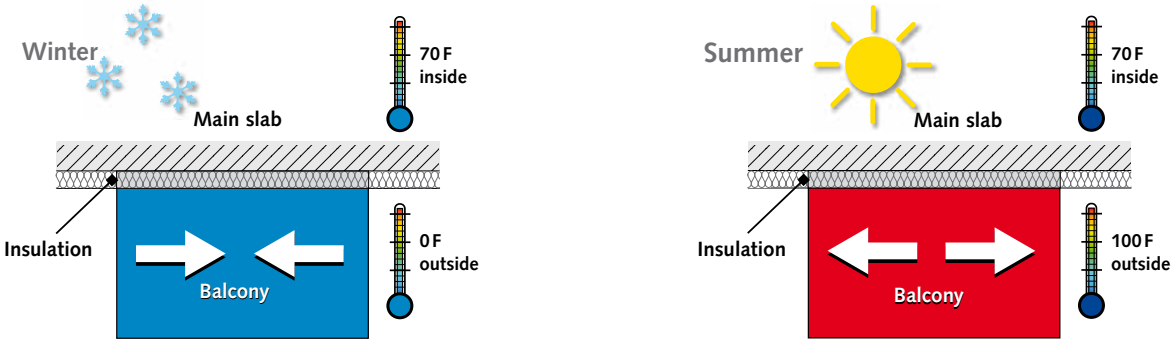

Expansion joints are utilized to limit temperature-induced stresses resulting from volume changes.

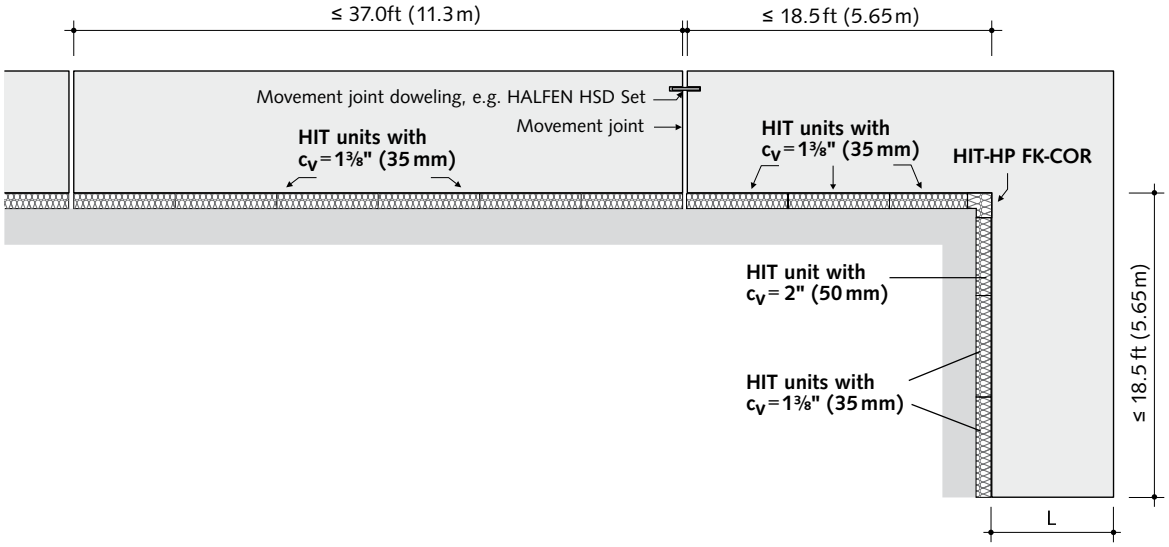
They isolate the balcony segments to allow them to expand or contract without adversely affecting structural integrity or serviceability.

The reduction of cracking extends the lifetime of the balconies lowering maintenance costs. Expansion joints are recommended to be provided in the external balconies as shown below.

In cantilevered balcony slabs the distance between joints is recommended not to exceed ***37.0 ft (11.3 m)*** for HIT.

For interior/exterior corner balcony structures an expansion joint should be planned at least every ***37.0 ft (11.3 m)/2 = 18.5ft (5.65 m)*** for HIT-HP MVX.



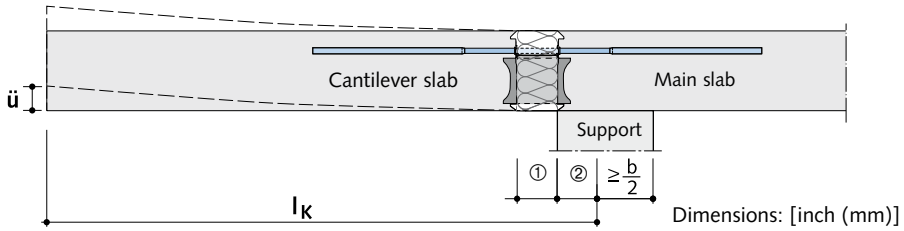
## Deflection of the balcony slab

To limit flexure displacement, HALFEN recommends under-exaggerating the planned drainage flow when casting cantilevered slabs. The calculable increase in camber results from component deformation according to the latest edition of ACI 318 plus the deformation ü of the HIT units.

The coefficient factor for camber increase *ü** refers **only to deformation** in HALFEN HIT units HIT-HP/SP MVX at maximum performance in a quasi-permanent load combination:

When considering the partial safety factor this results in a ratio of the quasi-permanent load-combination $E_{d,perm}$ to the limit of load capacity $R_d$ of: $\mathbf{E_{d,perm} = 0.524\ R_d}$.

The coefficient factor *ü** for camber increase refers to maximum moment load capacity in the HALFEN Insulated connection. It is recommended to consider each present load combination $E_{d,perm}$ when calculating the camber increase *ü*.




Dimensions: [inch (mm)]

① 3⅛" (80 mm) or 4¾" (120 mm)
② 3⅛" (80 mm)
$l_k$ = Cantilever length
b = Support width
ü = Camber

**Imperial units**

$$\ddot{u}\ [in] = \frac{\ddot{u}^* \times l_k\ [in]}{100} \times \frac{m_{max}}{(0.524 \times m_{Rd})}$$

with
- **ü** Camber from HIT components deformation [in]
- **ü*** Camber coefficient [%]
- **$l_k$** Span of cantilever slab [in]
- **$m_{Rd}$** Moment capacity of HIT unit [kip*ft/ft]
- **$m_{max}$** Maximum calculated moment at section due to externally applied loads [kip*ft/ft]

**Metric units**

$$\ddot{u}\ [mm] = \ddot{u}^* \times l_k\ [m] \times 10 \times \frac{m_{max}}{(0.524 \times m_{Rd})}$$

with
- **ü** Camber from HIT components deformation in [mm]
- **ü*** Camber coefficient [%]
- **$l_k$** Span of cantilever slab in [m]
- **$m_{Rd}$** Moment capacity of HIT unit [kNm/m]
- **$m_{max}$** Maximum calculated moment at section due to externally applied loads [kNm/m]

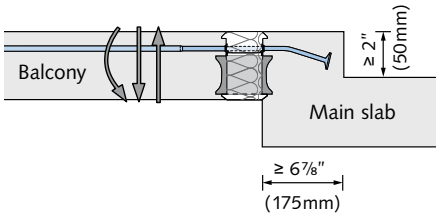
**HIT-HP: Camber coefficient ü* [%] at max. element load bearing capacity ($m_{Rd}$)**

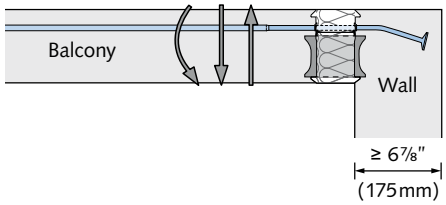
| Unit height h [in (mm)] | | |
|---|---|---|
| Concrete cover [in (mm)] | | ü* [%] for concrete strength ≥ 4,000 psi |
| 1⅜" (35) | 2" (50) | |
| 6¼ (160) | | **1.00** |
| | 7 (180) | 0.96 |
| 6¾ (170) | | 0.91 |
| | 7½ (190) | 0.87 |
| 7 (180) | | **0.84** |
| | 7⅞ (200) | 0.81 |
| 7½ (190) | | 0.78 |
| | 8¼ (210) | 0.75 |
| 7⅞ (200) | | **0.72** |
| | 8⅔ (220) | 0.70 |
| 8¼ (210) | | 0.68 |
| | 9 (230) | 0.65 |
| 8⅔ (220) | | **0.63** |
| | 9½ (240) | 0.62 |
| 9 (230) | | 0.60 |
| | 9⅞ (250) | 0.58 |
| 9½ (240) | | 0.56 |
| | 10¼ (260) | 0.55 |
| 9⅞ (250) | | 0.54 |

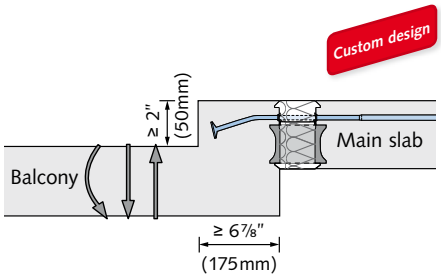
## HIT-MVX-OU

**2**

- For cantilevered balcony slabs with height offset (balcony higher than main slab) or upward wall/beam connections
- Transfer of bending moments and bidirectional shear forces




Dimensions: in (mm)

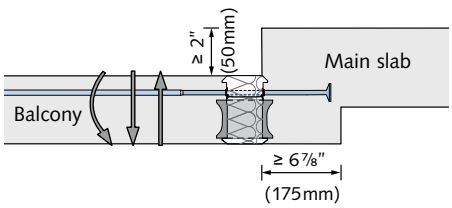
**HIT-HP MVX-OU** – **High Performance** with 3⅛" (80 mm) insulation thickness
**HIT-SP MVX-OU** – **Superior Performance** with 4¾" (120 mm) insulation thickness

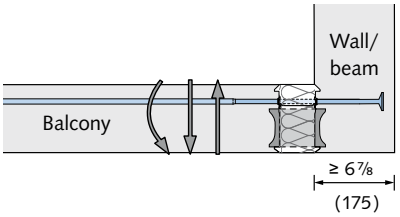
**HIT-HP/SP MVX-OU as custom design**
**→ page 41**

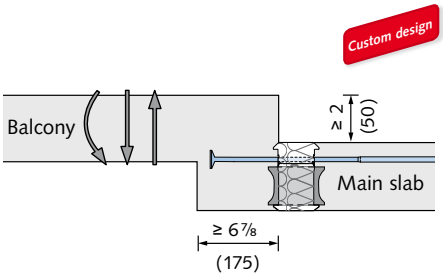
## HIT-MVX OD



- For cantilevered balcony slabs with height offset (balcony lower than main slab) or downward wall/beam connections
- Transfer of bending moments and bidirectional shear forces




Dimensions: in (mm)

**HIT-HP MVX-OD** – **High Performance** with insulation thickness 3⅛" (80 mm)
**HIT-SP MVX-OD** – **Superior Performance** with insulation thickness 4¾" (120 mm)

**HIT-HP/SP MVX-OD as custom design**
**→ see page 41**

## Product types – Load range

The respective load range results from the corresponding combination of TB (tension bar) and CSB (compression shear bearing) Box. The combinations of TB and CSB Box shown in the following table are possible.

**Possible combinations of upper and lower element (TB and CSB Boxes)**

| **Unit width B = 9⅞" (25 cm)** | | Number of tension bars $n_{TB}$ | | |
|---|---|---|---|---|
| | | 1 | 2 | 3 |
| Number of compression shear bearings $n_{CSB}$ | 1 | ● | ● | |
| | 2 | ● | ● | ● |

| **Unit width B = 19 11⁄16" (50 cm)** | | Number of tension bars $n_{TB}$ | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Number of compression shear bearings $n_{CSB}$ | 1 | ● | ● | ● | | | |
| | 2 | ● | ● | ● | ● | ● | |
| | 3 | | ● | ● | ● | ● | ● |
| | 4 | | ● | ● | ● | ● | ● |
| | 5 | | | ● | ● | ● | ● |

| **Unit width B = 39⅜" (100 cm)** | | Number of tension bars $n_{TB}$ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | | 4 | | 6 | 8 | 10 | 12 |
| Number of compression shear bearings $n_{CSBw}$ | 2 | | ● | | ● | | ● | | | |
| | 4 | | ● | | ● | | ● | ● | ● | |
| | 6 | | | | ● | | ● | ● | ● | ● |
| | 8 | | | | ● | | ● | ● | ● | ● |
| | 10 | | | | | | ● | ● | ● | ● |
| | 12 | | | | | | | | ● | ● |

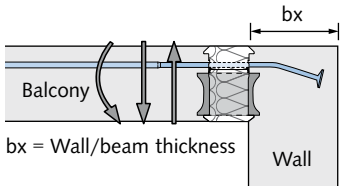
The load bearing capacity values for the selected HIT-HP MVX-OD units can be found on pages 38–40 ● = HP and SP

**Design values for HIT-HP MVX-OU**
The values for HIT-HP MVX-OU are equivalent to those for HIT-HP MVX and can be found on pages 20–25. The complete load class range for concrete strength 3,000 psi, 4,000 psi and 5,000 psi for HIT-HP and HIT-SP can be downloaded at **www.halfenusa.com**.

## Basic types – Ordering example

**HIT-HP** **MVX** - **08 08** - **20** - **100** - **35** - **OU** **175**

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿




**Type designation**

① Product group
② Joint spacing: HP: 3⅛" (80 mm) or SP: 4¾" (120 mm)
③ Connection type
④ Number of tension bars
⑤ Number of CSB
⑥ Unit height [cm]
⑦ Unit width [cm]
⑧ Concrete cover (top) [mm]
⑨ Installation situation (upward height offset)
⑩ Thickness of building element bx [mm]

**bx for standard type:**
6⅞" (175 mm) < bx < 13" (330 mm) **HP**
6⅞" (175 mm) < bx < 12 7⁄16" (290 mm) **SP**
Larger widths available as custom design solutions. Our technical support team is available to assist you in realizing your projects.
**Contact:** engineering@halfenusa.com

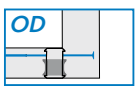
## Available unit heights h

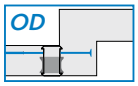
| Concrete cover | 1⅜" (35 mm) | 2" (50 mm) |
|---|---|---|
| Available unit heights | 6¼" – 13¾" (16–35 mm) | 7" – 13¾" (18–35 cm) |

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

### Shear load capacity $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi





| Type / Unit width | | | | | | |
|---|---|---|---|---|---|---|
| | **B = 39⅜" (100 cm)** | **HP MVX-0202-...-OD** | **HP MVX-0204-...-OD** | **HP MVX-0404-...-OD** | **HP MVX-0604-...-OD*** | **HP MVX-0406-...-OD** |
| | B = 19 11⁄16" (50 cm) | HP MVX-0101-...-OD | HP MVX-0102-...-OD | HP MVX-0202-...-OD | HP MVX-0302-...-OD* | HP MVX-0203-...-OD |
| | B = 9⅞" (25 cm) | – | – | HP MVX-0101-...-OD | – | – |
| Design values $v_{Rd}$ | **[kip/ft (kN/m)]** | **2.19 (32.0)** | **4.28 (62.4)** | **4.38 (64.0)** | **2.66 (38.8)** | **6.58 (96.0)** |

### Moment bearing capacity $m_{Rd}$

| Type / Unit width | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **B = 39⅜" (100 cm)** | | **HP MVX-0202-...-OD** | | **HP MVX-0204-...-OD** | | **HP MVX-0404-...-OD** | | **HP MVX-0604-...-OD*** | | **HP MVX-0406-...-OD** | |
| | B = 19 11⁄16" (50 cm) | | HP MVX-0101-...-OD | | HP MVX-0102-...-OD | | HP MVX-0202-...-OD | | HP MVX-0302-...-OD* | | HP MVX-0203-...-OD | |
| | B = 9⅞" (25 cm) | | – | | – | | HP MVX-0101-...-OD | | – | | – | |
| Concrete cover [in (mm)] | 1⅜" (35) | 2" (50) | | | | | | | | | | |
| Design values $m_{Rd}$ **[kip*ft/ft (kNm/m)]** for unit height [in (mm)] | 6¼ (160) | | 2.0 | (8.8) | 2.2 | (9.6) | 4.0 | (17.7) | 5.6 | (24.9) | 4.2 | (18.7) |
| | | 7 (180) | 2.1 | (9.3) | 2.3 | (10.1) | 4.2 | (18.7) | 5.9 | (26.4) | 4.4 | (19.7) |
| | 6¾ (170) | | 2.2 | (9.8) | 2.4 | (10.6) | 4.4 | (19.6) | 6.3 | (27.9) | 4.7 | (20.7) |
| | | 7½ (190) | 2.3 | (10.3) | 2.5 | (11.1) | 4.6 | (20.6) | 6.6 | (29.3) | 4.9 | (21.7) |
| | 7 (180) | | 2.4 | (10.8) | 2.6 | (11.6) | 4.8 | (21.6) | 6.9 | (30.8) | 5.1 | (22.7) |
| | | 7⅞ (200) | 2.5 | (11.3) | 2.7 | (12.0) | 5.1 | (22.5) | 7.3 | (32.3) | 5.3 | (23.7) |
| | 7½ (190) | | 2.6 | (11.8) | 2.8 | (12.5) | 5.3 | (23.5) | 7.6 | (33.8) | 5.5 | (24.6) |
| | | 8¼ (210) | 2.8 | (12.2) | 2.9 | (13.0) | 5.5 | (24.5) | 7.9 | (35.2) | 5.8 | (25.6) |
| | 7⅞ (200) | | 2.9 | (12.7) | 3.0 | (13.5) | 5.7 | (25.5) | 8.3 | (36.7) | 6.0 | (26.6) |
| | | 8⅔ (220) | 3.0 | (13.2) | 3.1 | (14.0) | 5.9 | (26.4) | 8.6 | (38.2) | 6.2 | (27.6) |
| | 8¼ (210) | | 3.1 | (13.7) | 3.3 | (14.5) | 6.2 | (27.4) | 8.9 | (39.7) | 6.4 | (28.6) |
| | | 9 (230) | 3.2 | (14.2) | 3.4 | (15.0) | 6.4 | (28.4) | 9.2 | (41.1) | 6.6 | (29.6) |
| | 8⅔ (220) | | 3.3 | (14.7) | 3.5 | (15.5) | 6.6 | (29.3) | 9.6 | (42.6) | 6.9 | (30.5) |
| | | 9½ (240) | 3.4 | (15.2) | 3.6 | (16.0) | 6.8 | (30.3) | 9.9 | (44.1) | 7.1 | (31.5) |
| | 9 (230) | | 3.5 | (15.6) | 3.7 | (16.5) | 7.0 | (31.3) | 10.2 | (45.6) | 7.3 | (32.5) |
| | | 9⅞ (250) | 3.6 | (16.1) | 3.8 | (17.0) | 7.2 | (32.2) | 10.6 | (47.0) | 7.5 | (33.5) |
| | 9½ (240) | | 3.7 | (16.6) | 3.9 | (17.5) | 7.5 | (33.2) | 10.9 | (48.5) | 7.8 | (34.5) |
| | | 10¼ (260) | 3.8 | (17.1) | 4.0 | (17.9) | 7.7 | (34.2) | 11.2 | (50.0) | 8.0 | (35.5) |
| | 9⅞ (250) | | 4.0 | (17.6) | 4.1 | (18.4) | 7.9 | (35.2) | 11.6 | (51.5) | 8.2 | (36.4) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

### On-site reinforcement $A_{s,req}$ (→ page 43)

| | |
|---|---|
| **Balcony side** | #3 / 10" |

### **Minimum on-site stirrup reinforcement** on main slab side (stirrups are considered as single lap jointed)

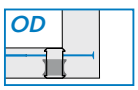
| | | | | |
|---|---|---|---|---|
| **Min. number of stirrups per 40" (one meter)** | **3** | **5** | **7** | **5** |
| **Min $A_{s,req}$** | #4/10" | #4/6.5" | #4/5" | #4/6.5" |

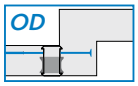
**Minimum transverse reinforcement:** At least one reinforcement bar (#4) must be placed next to the anchor head on the side nearest to the element edge.

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR.

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

**Shear load capacity ±$v_{Rd}$** **Concrete strength:** ≥ 4,000 psi






| Type / Unit width | B = 39⅜" (100 cm) | HP MVX-0606-...-OD | HP MVX-0806-...-OD* | HP MVX-1006-...-OD* | HP MVX-0408-...-OD | HP MVX-0608-...-OD |
|---|---|---|---|---|---|---|
| | B = 19¹¹⁄₁₆" (50 cm) | HP MVX-0303-...-OD | HP MVX-0403-...-OD* | HP MVX-0503-...-OD* | HP MVX-0204-...-OD | HP MVX-0304-...-OD |
| | B = 9⅞" (25 cm) | – | – | – | HP MVX-0102-...-OD | – |
| Design values $v_{Rd}$ | [kip/ft (kN/m)] | **6.58 (96.0)** | **4.83 (70.4)** | **3.14 (45.9)** | **8.56 (124.9)** | **8.77 (128.0)** |

## Moment bearing capacity $m_{Rd}$

| Type / Unit width | B = 39⅜" (100 cm) | | HP MVX-0606-...-OD | | HP MVX-0806-...-OD* | | HP MVX-1006-...-OD* | | HP MVX-0408-...-OD | | HP MVX-0608-...-OD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B = 19¹¹⁄₁₆" (50 cm) | | HP MVX-0303-...-OD | | HP MVX-0403-...-OD* | | HP MVX-0503-...-OD* | | HP MVX-0204-...-OD | | HP MVX-0304-...-OD | |
| | B = 9⅞" (25 cm) | | – | | – | | – | | HP MVX-0102-...-OD | | – | |
| Concrete cover [in (mm)] | 1⅜" (35) | 2" (50) | | | | | | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¼ (160) | | 6.0 | (26.5) | 7.7 | (34.1) | 9.1 | (40.4) | 4.3 | (19.2) | 6.2 | (27.8) |
| | | 7 (180) | 6.3 | (28.0) | 8.1 | (36.0) | 9.6 | (42.9) | 4.5 | (20.2) | 6.6 | (29.3) |
| | 6¾ (170) | | 6.6 | (29.4) | 8.5 | (38.0) | 10.2 | (45.4) | 4.8 | (21.1) | 6.9 | (30.7) |
| | | 7½ (190) | 6.9 | (30.9) | 9.0 | (40.0) | 10.8 | (47.8) | 5.0 | (22.1) | 7.2 | (32.2) |
| | 7 (180) | | 7.3 | (32.4) | 9.4 | (41.9) | 11.3 | (50.3) | 5.2 | (23.1) | 7.6 | (33.7) |
| | | 7⅞ (200) | 7.6 | (33.8) | 9.9 | (43.9) | 11.9 | (52.7) | 5.4 | (24.1) | 7.9 | (35.2) |
| | 7½ (190) | | 7.9 | (35.3) | 10.3 | (45.9) | 12.4 | (55.2) | 5.6 | (25.1) | 8.2 | (36.6) |
| | | 8¼ (210) | 8.3 | (36.7) | 10.8 | (47.8) | 13.0 | (57.7) | 5.9 | (26.1) | 8.6 | (38.1) |
| | 7⅞ (200) | | 8.6 | (38.2) | 11.2 | (49.8) | 13.5 | (60.1) | 6.1 | (27.0) | 8.9 | (39.6) |
| | | 8⅔ (220) | 8.9 | (39.6) | 11.6 | (51.8) | 14.1 | (62.6) | 6.3 | (28.0) | 9.2 | (41.1) |
| | 8¼ (210) | | 9.2 | (41.1) | 12.1 | (53.7) | 14.6 | (65.0) | 6.5 | (29.0) | 9.6 | (42.5) |
| | | 9 (230) | 9.6 | (42.5) | 12.5 | (55.7) | 15.2 | (67.5) | 6.7 | (30.0) | 9.9 | (44.0) |
| | 8⅔ (220) | | 9.9 | (44.0) | 13.0 | (57.7) | 15.7 | (69.9) | 7.0 | (31.0) | 10.2 | (45.5) |
| | | 9½ (240) | 10.2 | (45.5) | 13.4 | (59.6) | 16.3 | (72.4) | 7.2 | (32.0) | 10.6 | (47.0) |
| | 9 (230) | | 10.5 | (46.9) | 13.8 | (61.6) | 16.8 | (74.9) | 7.4 | (32.9) | 10.9 | (48.4) |
| | | 9⅞ (250) | 10.9 | (48.4) | 14.3 | (63.6) | 17.4 | (77.3) | 7.6 | (33.9) | 11.2 | (49.9) |
| | 9½ (240) | | 11.2 | (49.8) | 14.7 | (65.5) | 17.9 | (79.8) | 7.8 | (34.9) | 11.6 | (51.4) |
| | | 10¼ (260) | 11.5 | (51.3) | 15.2 | (67.5) | 18.5 | (82.2) | 8.1 | (35.9) | 11.9 | (52.9) |
| | 9⅞ (250) | | 11.9 | (52.7) | 15.6 | (69.5) | 19.0 | (84.7) | 8.3 | (36.9) | 12.2 | (54.3) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

**On-site reinforcement $A_{s,req}$** (→ page 43)

| | |
|---|---|
| **Balcony side** | #3 / 10" |

**Minimum on-site stirrup reinforcement** on main slab side (stirrups are considered as single lap jointed)

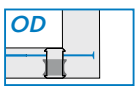
| | | | | | |
|---|---|---|---|---|---|
| **Min. number of stirrups per 40" (one meter)** | **7** | **9** | **11** | **5** | **7** |
| **Min $A_{s,req}$** | #4/5" | #4/4" | #4/3.25" | #4/6.5" | #4/5" |

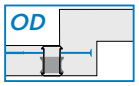
**Minimum transverse reinforcement:** At least one reinforcement bar (#4) must be placed next to the anchor head on the side nearest to the element edge.

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR.

## Load bearing capacity values $v_{Rd,1}$ / $m_{Rd,1}$ according to ICC-ES ESR-3799

**Shear load capacity ±$v_{Rd}$** **Concrete strength:** ≥ 4,000 psi






| Type / Unit width | | | | | | |
|---|---|---|---|---|---|---|
| | B = 39⅜" (100 cm) | HP MVX-0808-...-OD | HP MVX-1008-...-OD* | HP MVX-0610-...-OD | HP MVX-0810-...-OD* | HP MVX-1210-...-OD* |
| | B = 19¹1⁄16" (50 cm) | HP MVX-0404-...-OD | HP MVX-0504-...-OD* | HP MVX-0305-...-OD | HP MVX-0405-...-OD* | HP MVX-0605-...-OD* |
| | B = 9⅞" (25 cm) | HP MVX-0202-...-OD | – | – | – | – |
| Design values $v_{Rd}$ | [kip/ft (kN/m)] | **8.77 (128.0)** | **5.65 (82.4)** | **10.13 (147.8)** | **7.33 (107.0)** | **3.96 (57.8)** |

**Moment bearing capacity $m_{Rd}$**

| Type / Unit width | | | | | | |
|---|---|---|---|---|---|---|
| | B = 39⅜" (100 cm) | HP MVX-0808-...-OD | HP MVX-1008-...-OD* | HP MVX-0610-...-OD | HP MVX-0810-...-OD* | HP MVX-1210-...-OD* |
| | B = 19¹1⁄16" (50 cm) | HP MVX-0404-...-OD | HP MVX-0504-...-OD* | HP MVX-0305-...-OD | HP MVX-0405-...-OD* | HP MVX-0605-...-OD* |
| | B = 9⅞" (25 cm) | HP MVX-0202-...-OD | – | – | – | – |

| Concrete cover [in (mm)] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1⅜" (35) | 2" (50) | | | | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¼ (160) | | 6.5 | (29.0) | 9.7 | (43.1) | 5.1 | (22.5) | 8.3 | (36.8) | 11.7 | (52.1) |
| | | 7 (180) | 6.9 | (30.5) | 10.2 | (45.6) | 5.3 | (23.7) | 8.7 | (38.8) | 12.4 | (55.1) |
| | 6¾ (170) | | 7.2 | (32.1) | 10.8 | (48.0) | 5.6 | (24.8) | 9.2 | (40.7) | 13.0 | (58.0) |
| | | 7½ (190) | 7.6 | (33.6) | 11.4 | (50.5) | 5.8 | (26.0) | 9.6 | (42.7) | 13.7 | (61.0) |
| | 7 (180) | | 7.9 | (35.2) | 11.9 | (53.0) | 6.1 | (27.1) | 10.0 | (44.7) | 14.4 | (63.9) |
| | | 7⅞ (200) | 8.3 | (36.7) | 12.5 | (55.4) | 6.4 | (28.3) | 10.5 | (46.6) | 15.0 | (66.9) |
| | 7½ (190) | | 8.6 | (38.3) | 13.0 | (57.9) | 6.6 | (29.4) | 10.9 | (48.6) | 15.7 | (69.8) |
| | | 8¼ (210) | 9.0 | (39.8) | 13.6 | (60.3) | 6.9 | (30.6) | 11.4 | (50.6) | 16.4 | (72.8) |
| | 7⅞ (200) | | 9.3 | (41.4) | 14.1 | (62.8) | 7.1 | (31.7) | 11.8 | (52.5) | 17.0 | (75.7) |
| | | 8⅔ (220) | 9.6 | (42.9) | 14.7 | (65.2) | 7.4 | (32.9) | 12.3 | (54.5) | 17.7 | (78.7) |
| | 8¼ (210) | | 10.0 | (44.5) | 15.2 | (67.7) | 7.6 | (34.0) | 12.7 | (56.5) | 18.4 | (81.6) |
| | | 9 (230) | 10.3 | (46.0) | 15.8 | (70.2) | 7.9 | (35.2) | 13.1 | (58.4) | 19.0 | (84.6) |
| | 8⅔ (220) | | 10.7 | (47.6) | 16.3 | (72.6) | 8.2 | (36.3) | 13.6 | (60.4) | 19.7 | (87.5) |
| | | 9½ (240) | 11.0 | (49.1) | 16.9 | (75.1) | 8.4 | (37.5) | 14.0 | (62.4) | 20.3 | (90.5) |
| | 9 (230) | | 11.4 | (50.7) | 17.4 | (77.5) | 8.7 | (38.6) | 14.5 | (64.3) | 21.0 | (93.4) |
| | | 9⅞ (250) | 11.7 | (52.2) | 18.0 | (80.0) | 8.9 | (39.8) | 14.9 | (66.3) | 21.7 | (96.4) |
| | 9½ (240) | | 12.1 | (53.7) | 18.5 | (82.5) | 9.2 | (40.9) | 15.3 | (68.3) | 22.3 | (99.3) |
| | | 10¼ (260) | 12.4 | (55.3) | 19.1 | (84.9) | 9.5 | (42.1) | 15.8 | (70.2) | 23.0 | (102.3) |
| | 9⅞ (250) | | 12.8 | (56.8) | 19.6 | (87.4) | 9.7 | (43.2) | 16.2 | (72.2) | 23.7 | (105.2) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

*Load bearing capacity values for $v_{Rd,2}$ and $m_{Rd,2}$

**On-site reinforcement $A_{s,req}$** (→ page 43)

| | |
|---|---|
| **Balcony side** | #3 / 10" |

**Minimum on-site stirrup reinforcement** on main slab side (stirrups are considered as single lap jointed)

| | | | | | |
|---|---|---|---|---|---|
| **Min. number of stirrups per 40" (one meter)** | **9** | **11** | **7** | **9** | **13** |
| **Min $A_{s,req}$** | #4/4" | #4/3.25" | #4/5" | #4/4" | #4/2.75" |

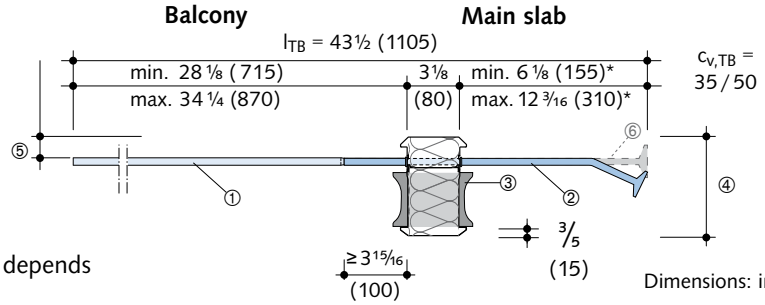
**Minimum transverse reinforcement:** At least one reinforcement bar (#4) must be placed next to the anchor head on the side nearest to the element edge.

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR.

## Product description – Cross-sections

**HIT-HP MVX-OU;**
**with bent anchor head**

**HIT-HP MVX-OD;**
**with straight anchor head** (dashed line)




① Tension section 1: #4
② Tension section 2: ⌀10.5 mm stainless steel
③ Double-symmetrical CSB
④ HIT unit height h
⑤ Concrete cover
⑥ Tension bar with straight anchor head

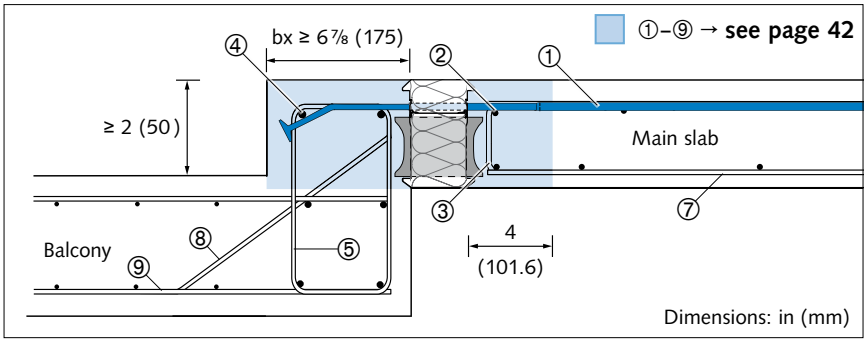
***The total length of the tension bar is predetermined**

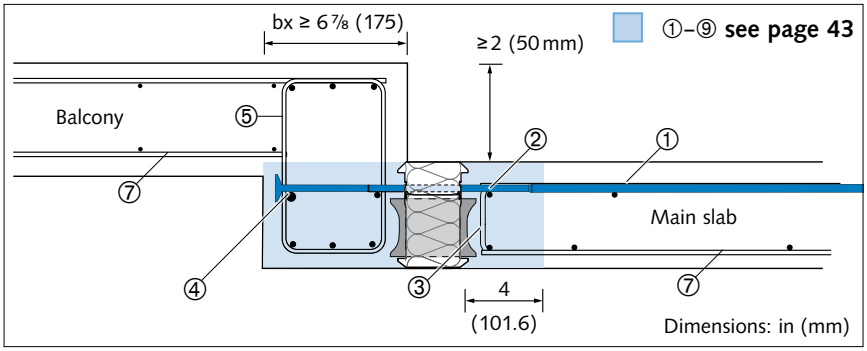
The proportional section length for the main slab side depends on the present geometry:
Building element thickness bx – ¾" (20 mm) concrete cover.
6⅛" (155 mm) ≤ bx – ¾" (20 mm) ≤ 12 3/16" (310 mm) **HIT-HP**
≤ 10⅝" (270 mm) **HIT-SP**

Further special lengths are available on request, see contact details at the back of the catalog.
**Example**: For an element thickness of bx = 6⅞" (175 mm) the tension bar length on the main slab side is 6⅛" (155 mm). This leaves a length of 34¼" (870 mm) for HIT-HP and 32⅝" (830 mm) with HIT-SP units for the balcony side.

## Balcony side anchor head as custom solutions

An anchor head application in a height offset balcony side is possible if the geometric requirements are observed (offset height x ≥ 2" (50 mm), bx ≥ 6⅞" (175 mm)). Beam reinforcement is required and the location of the shear reinforcement (min. #4, in close contact with the anchor heads) must be observed when designing the on-site connection reinforcement (balcony side).



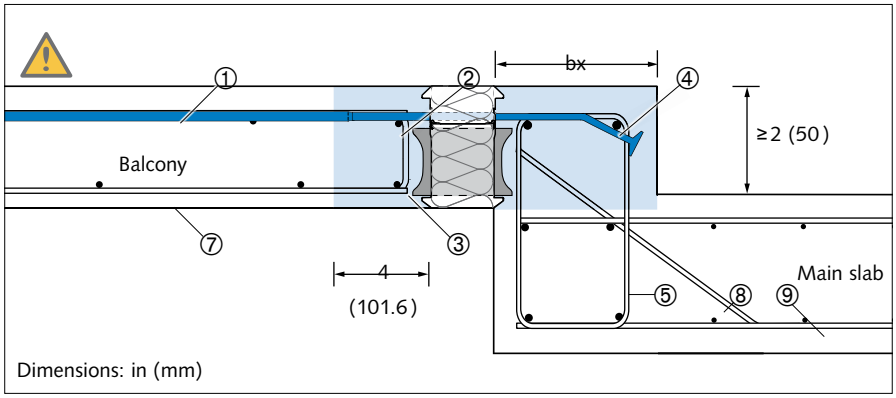




**HIT Custom solutions**

Our engineering team is available to provide support in your project with custom solutions using HALFEN HIT Insulated connections.
**Contact:** engineering@halfenusa.com

## On-site reinforcement

### Upward height offset

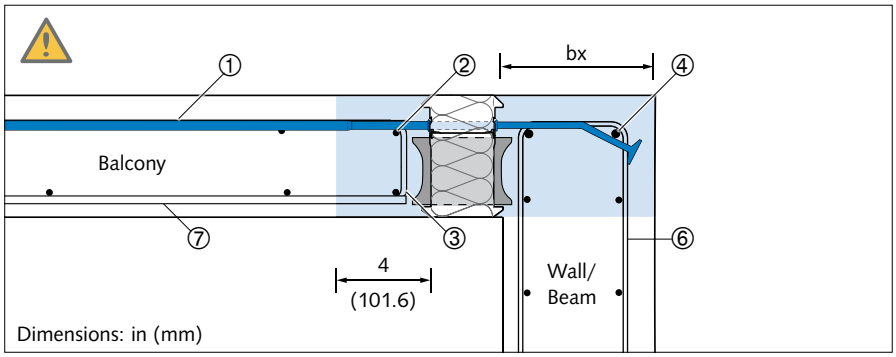



**No construction joints**
permissable in this area:
Balcony side → vertical
Main slab → vertical and horizontal

**bx** = building element thickness

**Design as frame corner!**
Recommended: bx ≥ height HIT unit

### Wall/beam connection, balcony slab higher

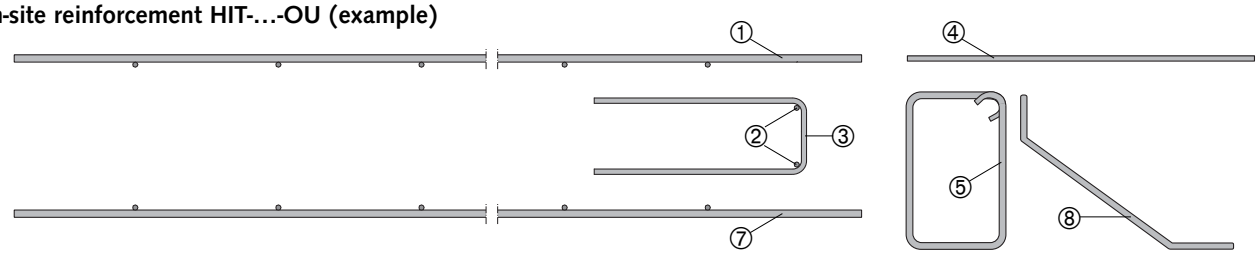



**No construction joints**
permissable in this area:
Balcony side → vertical
Wall side → vertical and horizontal

**bx** = building element thickness

**Design as frame corner!**
Recommended: bx ≥ height HIT unit

### On-site reinforcement HIT-…-OU (example)



### Structural design of on-site reinforcement for the HIT-HP/SP MVX-OU

① Upper connecting reinforcement on balcony side
② Horizontal transverse tensile reinforcement $A_{s,h}$ min. 2× #3, parallel to the joint
③ Vertical tensile splitting reinforcement $A_{s,v}$ min. #3 / 10", → see also pages 38–40*
④ Transverse reinforcement, min. #4; in contact with the anchor bolts
⑤ Required minimum reinforcement for transmitting the loads from the HIT unit, → see also pages 38–40*
⑥ Required minimum reinforcement with required edge enclosure for transmitting the loads from the HIT unit, → see also pages 38–40*

***required minimum reinforcement for HIT-HP MVX-OU type can be taken from the same load type of HIT-HP MVX-OD**

Ensure that the anchor bolts are places behind the vertical structural reinforcement (e.g.stirrup)

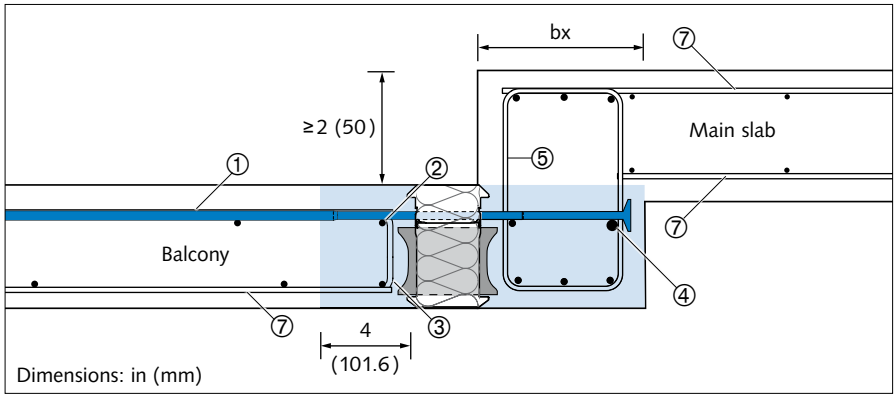
### Specified by the structural engineer:

⑦ Connecting reinforcement
⑧ Diagonal structural reinforcement
⑨ Main slab reinforcement with required edge reinforcement for the main slab

Further reinforcement required due to additional load factors (e.g. beam shear reinforcement or bending reinforcement) must be verified by the structural engineer!

## On-site reinforcement

### Downward height offset



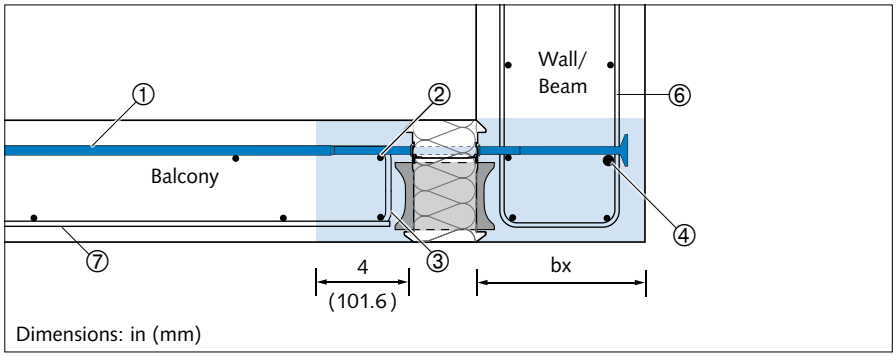
Dimensions: in (mm)

**No construction joints**
permissable in this area:
Balcony side → vertical
Main slab side → vertical and horizontal

**bx** = building element thickness

**Design as frame corner!**
Recommended: bx ≥ HIT Unit height

### Downward wall/beam connection



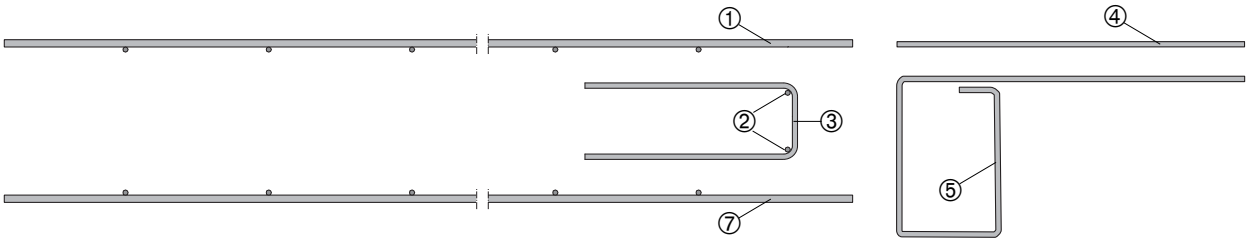
Dimensions: in (mm)

**No construction joints**
permissable in this area:
Balcony side → vertical
Wall side → vertical and horizontal

**bx** = building element thickness

**HIT Unit height!**
Recommended: bx ≥ HIT unit height

### On-site reinforcement HIT-…-OD (example)




### Structural design of on-site reinforcement for HIT-HP/SP MVX-OD

① Upper connecting reinforcement on the balcony side
② Horizontal transverse tensile reinforcement $A_{s,h}$ min. 2× #3, parallel to the joint
③ Vertical tensile splitting reinforcement $A_{s,v}$ min. #3 / 10", → see also pages 38–40
④ Shear reinforcement, min. #4; with close contact to the anchor heads
⑤ Required minimum reinforcement for transmitting the loads from the HIT unit, → see also pages 38–40
⑥ Required minimum reinforcement with required edge reinforcement for transmitting the loads from the HIT unit, → see also pages 38–40

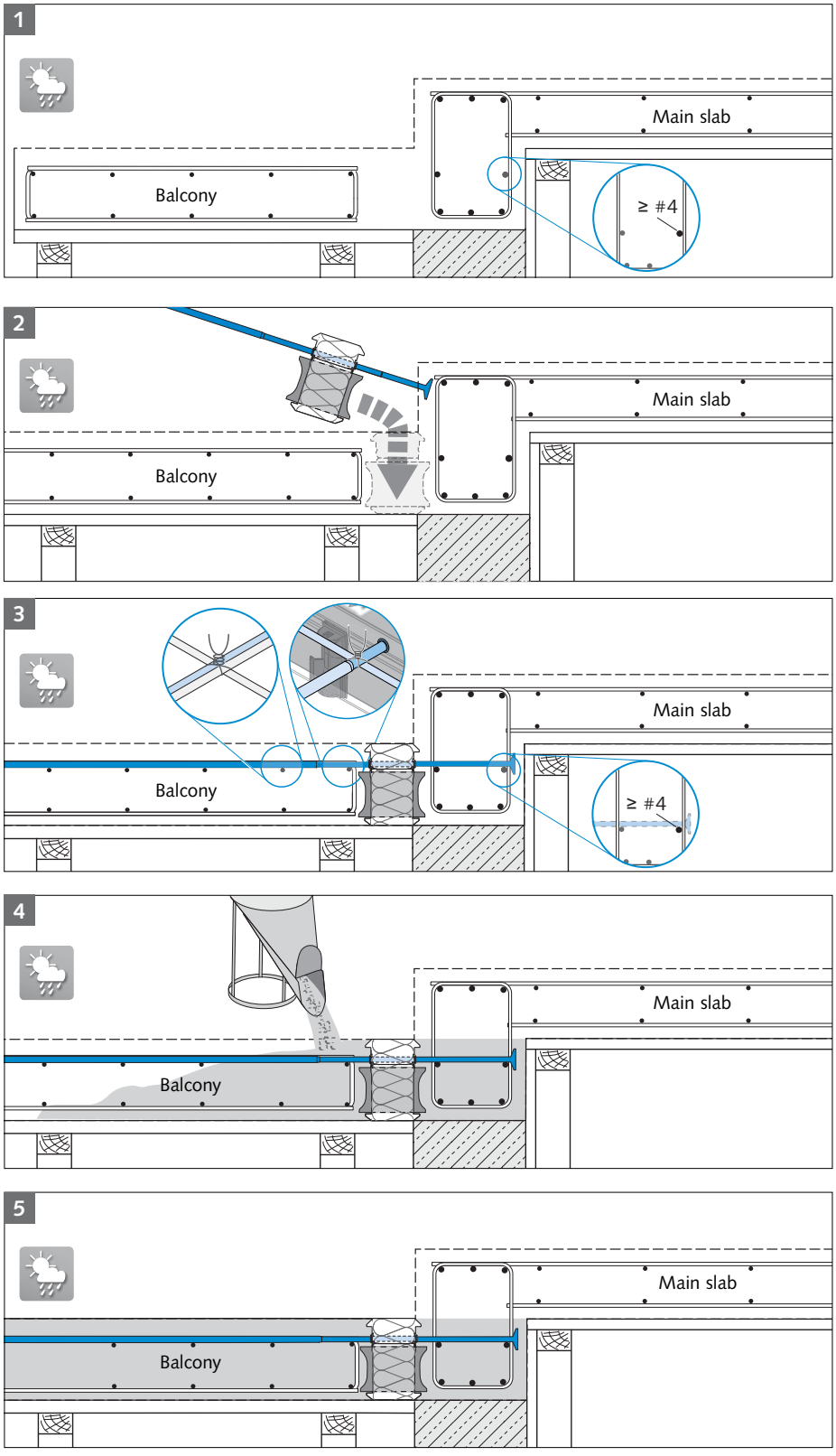
Ensure that the anchor bolts are places behind the vertical structural reinforcement (e.g.stirrup)

### Specified by the structural engineer:

⑦ Connecting reinforcement

Further reinforcement required due to additional load factors (e.g. beam shear reinforcement or bending reinforcement) must be specified by the structural engineer!

## Installation diagram



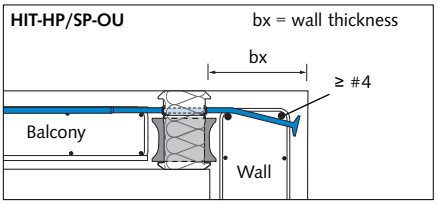

**1 Installation of on-site reinforcement**

⚠ Ensure that the formwork is at the correct height!

⚠ The on-site reinforcement must be placed as specified by the structural engineer.

**2 Installation of the HIT units from above**
Check that the red arrows on the HIT unit are pointing towards the balcony. Ensure that the anchor bolts are placed behind the vertical structural reinforcement (e.g. stirrup). Minimum concrete cover of the anchor bolts has to be ¾" [20 mm].

**3 Fixing of HIT Tension bars to on-site reinforcement using tying wire**
Transverse reinforcement: min. #4, must to be placed with close contact to the anchor bolts.




**4 Pouring the concrete**
Observe required expansion joints
→ see illustrations on pages 42–43

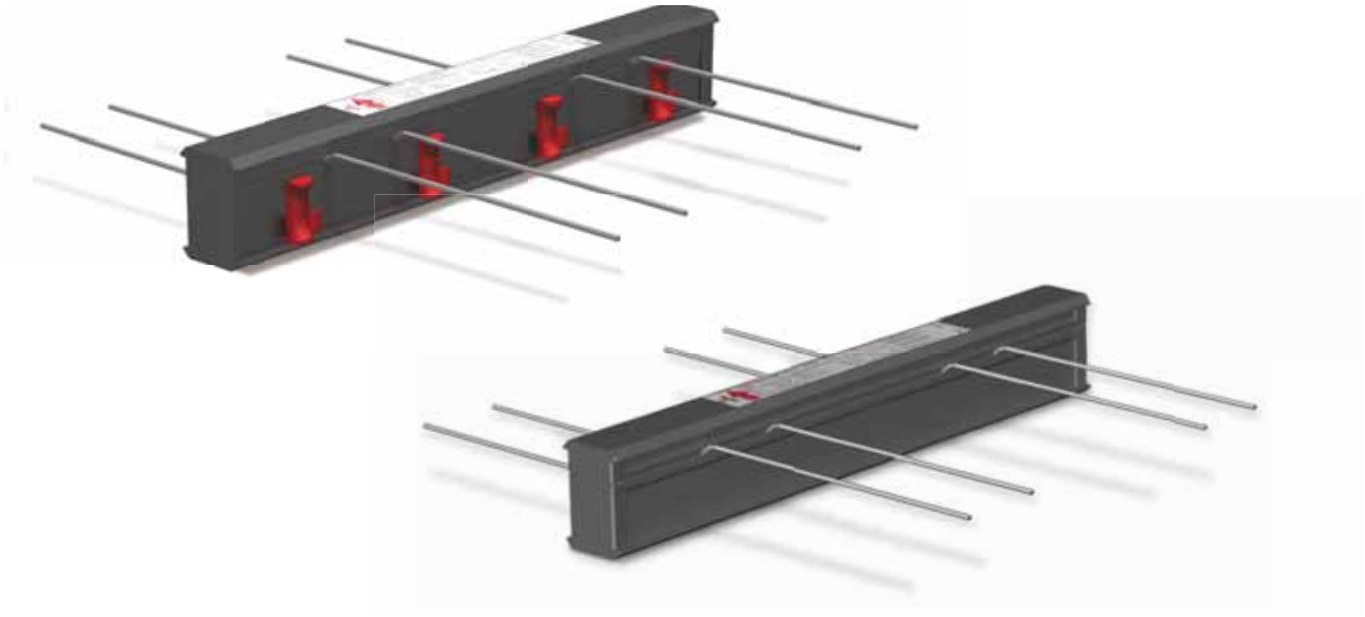
⚠ To ensure the HIT units are not displaced, pour and compact the concrete evenly.

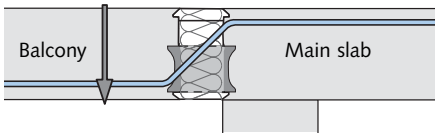
**5 Freshly concreted balcony slab on supporting structure**

## HIT-ZVX

**3**

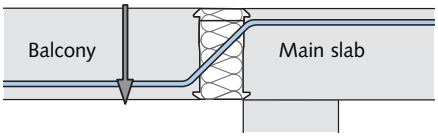
- For simply supported balcony slabs on columns
- Transfers shear forces only





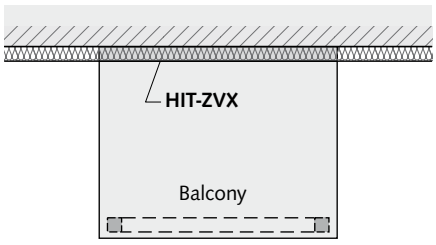

**HIT-HP ZVX – High Performance**
3 ⅛" (80 mm) insulation thickness

**HIT-SP ZVX – Superior Performance**
4 ¾" (120 mm) insulation thickness




**HIT-HP ZVX – High Performance**
3 ⅛" (80 mm) insulation thickness without CSB

**HIT-SP ZVX – Superior Performance**
4 ¾" (120 mm) insulation thickness without CSB



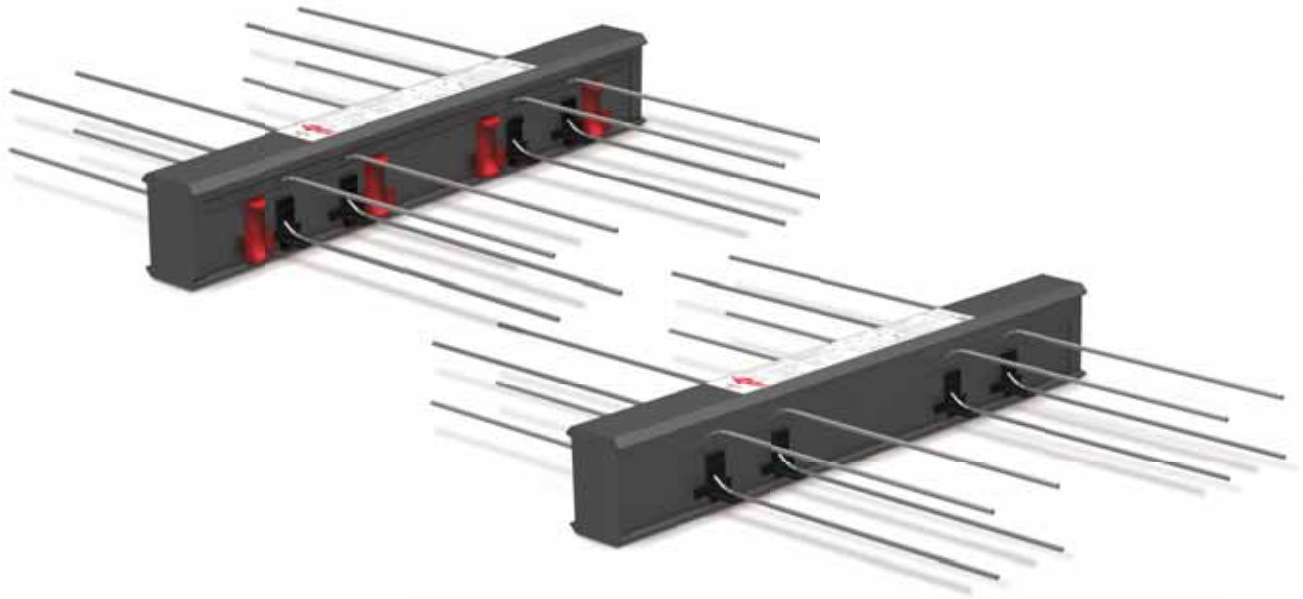

**Application:** Simply supported balcony on columns

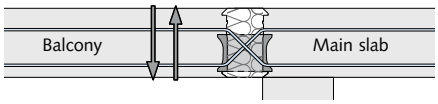
| Content | Type | Page |
|---|---|---|
| Product types / Load range | HIT-HP ZVX | 47 |
| Product description | HIT-HP ZVX | 48 |
| Load bearing capacity values | HIT-HP ZVX | 48 |
| On-site reinforcement | HIT-HP ZVX | 51 |
| Installation diagram | HIT-HP ZVX | 52 |

# HALFEN HIT INSULATED CONNECTION

## HIT-ZDX

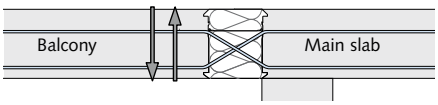
- For simply supported balcony slabs on columns
- Transfers positive and negative shear forces





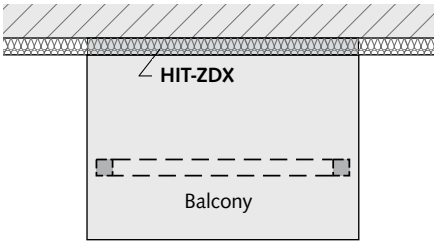

**HIT-HP ZDX – High Performance**
3 1⁄8″ (80 mm) insulation thickness

**HIT-SP ZDX – Superior Performance**
4 3⁄4″ (120 mm) insulation thickness




**HIT-HP ZDX – High Performance**
3 1⁄8″ (80 mm) insulation thickness
without CSB

**HIT-SP ZDX – Superior Performance**
4 3⁄4″ (120 mm) insulation thickness
without CSB




**Application:** Simply supported balcony on columns

## Product types – Load range

The load range selection table illustrates the possible combinations of support elements (shear bars and double-symmetrical CSB) depending on the unit width.

For HIT-ZDX units the number of shear bars is given for each load direction (in the following identified as "side").

**Possible combinations of SB (shear bars) and CSB (Compression Shear Bearings)**

| Diameter of the shear bars [mm] | | #3 | | | | | | | | | #4 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Unit width B = 50 cm (19 11/16")** | | 2 | 3 | 4 | 5 | 6 | | | | | 2 | 3 | 4 | 5 | 6 | | | | |
| Number of compression shear bearings $n_{CSB}$ | 0 | ● | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | |
| | 1 | ● | | | | | | | | | ● | | | | | | | | |
| | 2 | ● | ● | ● | | | | | | | ● | ● | ● | | | | | | |
| | 3 | ● | ● | ● | | | | | | | ● | ● | ● | | | | | | |
| **Unit width B = 100 cm (39 3/8")** | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Number of compression shear bearings $n_{CSB}$ | 0 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | 2 | ● | ● | | | | | | | | ● | | | | | | | | |
| | 3 | ● | ● | | | | | | | | | ● | | | | | | | |
| | 4 | ● | | ● | | ● | | | | | ● | | ● | | ● | | | | |
| | 6 | ● | | ● | | ● | | | | | ● | | ● | | ● | | | | |

Load bearing capacity values for selected units can be found on pages 48–50. ● = HP and SP

The complete load class range for concrete grades 3000 psi, 4000 psi and 5000 psi for HIT-HP and HIT-SP can be downloaded from **www.halfenusa.com**.

## Basic types – Ordering example

HIT-HP ZVX - 08 04 - 18 - 100 - 30 - #3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

**Type description**

① Product group
② Joint spacing: HP: 3 1/8" (80 mm) or SP: 4 3/4" (120 mm)
③ Connection type
④ ZVX: No. of shear bars
ZDX: No. of shear bars on each side
⑤ Number of CSB
⑥ Unit height [cm]
⑦ Unit width [cm]
⑧ Lower concrete cover [mm]
⑨ Shear bar size

### HIT Custom solutions

Our technical support team is available to provide support in your project with custom solutions using HALFEN HIT Insulated connections

**Contact:** engineering@halfenusa.com

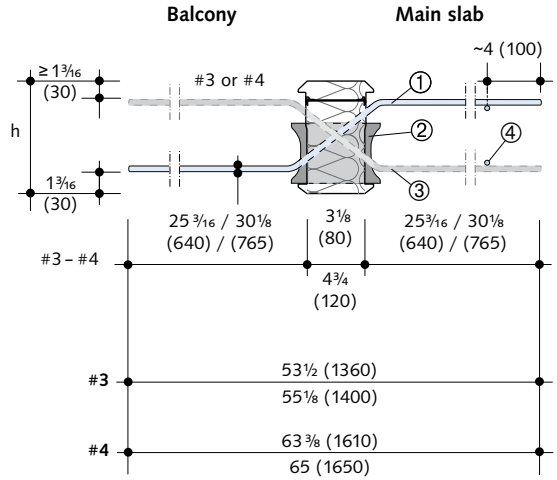
## Available unit heights h

| Concrete cover *top/bottom* | 1 3/16" (30 mm) / ≥ 1 3/16" (30 mm) | |
|---|---|---|
| Diameter of the shear bars | #3 | #4 |
| Available unit heights | 6 3/4 – 13 3/4 (17–35 cm) | 7 – 13 3/4 (18–35 cm) |

## Product description – Cross-sections (Typical applications)

### with CSB

Straight bar type; shear bars #3 or #4

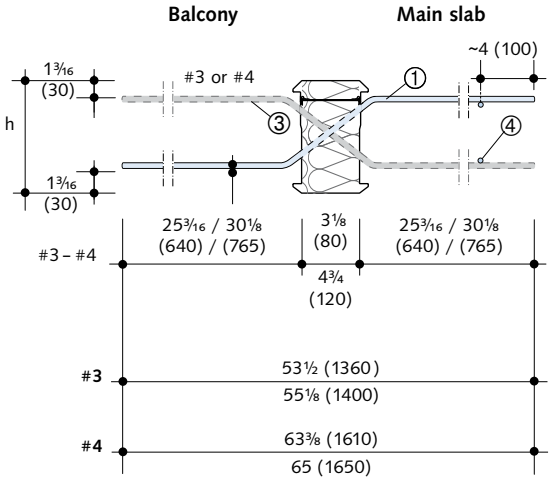



**Dimensions: in (mm)**

① Shear bars for HIT-ZVX units
② Double-symmetrical CSB
③ Shear bars for transferring the shear loads upwards (in the opposite direction) for HIT-ZDX units
④ Installation bar (structural)

### with no CSB for unrestraint connections, e.g. for loggias

Straight bar type; shear bars #3 or #4




**Dimensions: in (mm)**

① Shear bars for HIT-ZVX units
② Double-symmetrical CSB
③ Shear bars for transferring the shear loads upwards (in the opposite direction) for HIT-ZDX units
④ Installation bar (structural)

## Load bearing capacity values according to ICC-ES ESR-3799 — #3 bar size

**ZVX: Shear load capacity** $v_{Rd}$
**ZDX: Shear load capacity** $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi HP

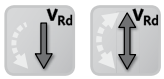
| Type / Unit width | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **B = 39 3/8" (100 cm)** | 0402-...-#3 | | 0404-...-#3 | | 0604-...-#3 | | 0804-...-#3 | | 0806-...-#3 | |
| | B = 19 11/16" (50 cm) | 0201-...-#3 | | 0202-...-#3 | | 0302-...-#3 | | 0402-...-#3 | | 0403-...-#3 | |
| Lower concrete cover [in (mm)] | 1 3/16 (30) | Concrete strength: ≥ 4,000 psi | | | | | | | | | |
| Design values **$v_{Rd}$ [kip/ft (kN/m)]** for unit height [in (mm)] | 6 3/4 (170) | 7.5 | (109.6) | 9.7 | (141.3) | 12.4 | (180.4) | 14.0 | (203.7) | 16.2 | (235.7) |
| | 7"–7 1/2" (180–190) | 7.5 | (109.6) | 9.7 | (141.3) | 12.4 | (180.4) | 15.0 | (219.2) | 17.2 | (251.2) |
| | 7 7/8–9 1/2" (200–240) | 8.4 | (122.1) | 10.1 | (148.1) | 13.6 | (199.2) | 16.7 | (244.3) | 18.9 | (276.3) |
| | >9 1/2 (>240) | 9.3 | (136.4) | 10.5 | (153.0) | 15.1 | (220.6) | 18.7 | (272.8) | 20.7 | (301.5) |

### On-site reinforcement $A_{s,req}$

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Balcony** | | #3 / 10" | | | | | | | | | |
| **Main slab** | direct support | #3 / 10" | | | | | | | | | |
| | indirect support | #3 / 7.75" | | #3 / 7.25" | | #3 / 4.75" | | #3 / 4" | | #3 / 3.5" | |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR.

## Load bearing capacity values according to ICC-ES ESR-3799 — #4 bar size



**ZVX: Shear load capacity** $v_{Rd}$
**ZDX: Shear load capacity** $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi

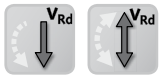

| Type / Unit width | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **B = 39⅜" (100 cm)** | 0404-...-#4 | | 0604-...-#4 | | 0406-...-#4 | | 0606-...-#4 | | 0806-...-#4 | |
| | B = 19 11⁄16" (50 cm) | 0202-...-#4 | | 0302-...-#4 | | 0203-...-#4 | | 0303-...-#4 | | 0403-...-#4 | |
| Lower concrete cover [in (mm)] | 1⅜16 (30) | Concrete strength: ≥ 4,000 psi | | | | | | | | | |
| Design values $v_{Rd}$ **[kip/ft (kN/m)]** for unit height [in (mm)] | 7 (180) | 12.6 | (183.7) | 15.2 | (222.1) | 14.8 | (215.7) | 17.4 | (254.1) | 17.4 | (254.1) |
| | 7½ (190) | 12.6 | (183.7) | 15.8 | (230.4) | 14.8 | (215.7) | 18.7 | (272.5) | 18.7 | (272.5) |
| | 7⅞ (200) | 12.6 | (183.7) | 15.8 | (230.4) | 14.8 | (215.7) | 18.9 | (275.6) | 19.9 | (290.9) |
| | 8¼ (210) | 12.6 | (183.7) | 15.8 | (230.4) | 14.8 | (215.7) | 18.9 | (275.6) | 21.2 | (309.3) |
| | 8⅔ (220) | 13.9 | (203.1) | 18.7 | (272.6) | 15.6 | (228.2) | 20.9 | (304.6) | 22.5 | (327.7) |
| | 9 (230) | 13.9 | (203.1) | 18.7 | (272.6) | 15.6 | (228.2) | 20.9 | (304.6) | 23.7 | (346.0) |
| | 9½ (240) | 13.9 | (203.1) | 18.7 | (272.6) | 15.6 | (228.2) | 20.9 | (304.6) | 25.0 | (364.4) |
| | 9⅞ (250) | 13.9 | (203.1) | 18.7 | (272.6) | 15.6 | (228.2) | 20.9 | (304.6) | 25.6 | (374.2) |


### On-site reinforcement $A_{s,req}$

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Balcony** | | #3 / 10" | | | | | | | | |
| **Main slab** | direct support | #3 / 10" | | | | | | | | |
| | indirect support | #3 / 5.25" | | #3 / 4" | | #3 / 4.75" | | #3 / 3.5" | | #4 / 5" or #3 / 2.75" |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR.

## Load bearing capacity values according to ICC-ES ESR-3799 — #3 and #4 bar size



**ZVX: Shear load capacity** $v_{Rd}$
**ZDX: Shear load capacity** $\pm v_{Rd}$

**Concrete strength:** ≥ 4,000 psi


| Type / Unit width | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **B = 39⅜" (100 cm)** | 0400-...-#3 | | 0600-...-#3 | | 0800-...-#3 | | 1000-...-#3 | | 1200-...-#3 | |
| | B = 19 11⁄16" (50 cm) | 0200-...-#3 | | 0300-...-#3 | | 0400-...-#3 | | 0500-...-#3 | | 0600-...-#3 | |
| Lower concrete cover [in (mm)] | 1⅜16 (30) | Concrete strength: ≥ 4,000 psi | | | | | | | | | |
| Design values $v_{Rd}$ [kip/ft (kN/m)] for unit height [in (mm)] | 6¾ (170) | 5.3 | (77.6) | 8.0 | (116.4) | 9.1 | (132.7) | 9.1 | (132.7) | 9.1 | (132.7) |
| | 7 (180) | 5.3 | (77.6) | 8.0 | (116.4) | 10.4 | (151.1) | 10.4 | (151.1) | 10.4 | (151.1) |
| | 7½ (190) | 5.3 | (77.6) | 8.0 | (116.4) | 10.6 | (155.2) | 11.6 | (169.5) | 11.6 | (169.5) |
| | 7⅞ (200) | 6.2 | (90.1) | 9.3 | (135.2) | 12.4 | (180.3) | 12.9 | (187.9) | 12.9 | (187.9) |
| | 8¼ (210) | 6.2 | (90.1) | 9.3 | (135.2) | 12.4 | (180.3) | 14.1 | (206.3) | 14.1 | (206.3) |
| | 8⅔ (220) | 6.2 | (90.1) | 9.3 | (135.2) | 12.4 | (180.3) | 15.4 | (224.7) | 15.4 | (224.7 ) |
| | 9 (230) | 6.2 | (90.1) | 9.3 | (135.2) | 12.4 | (180.3) | 15.4 | (225.3) | 16.7 | (243.0) |
| | 9½ (240) | 6.2 | (90.1) | 9.3 | (135.2) | 12.4 | (180.3) | 15.4 | (225.3) | 17.9 | (261.4) |
| | 9⅞ (250) | 7.2 | (104.4) | 10.7 | (156.6) | 14.3 | (208.8) | 17.9 | (261.0) | 19.2 | (279.8) |


### On-site reinforcement $A_{s,req}$

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Balcony** | | #3 / 10" | | | | | | | | |
| **Main slab** | direct support | #3 / 10" | | | | | | | | |
| | indirect support | #3 / 10" | | #3 / 7.75" | | #3 / 5.75" | | #3 / 4.5" | | #3 / 4.25" |

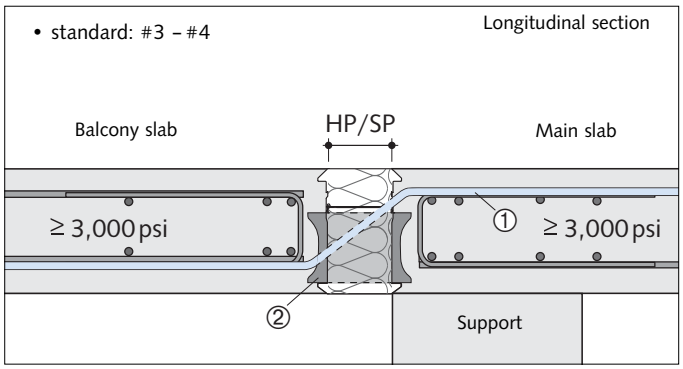
| Type / Unit width | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **B = 39⅜" (100 cm)** | 0400-...-#4 | | 0600-...-#4 | | 0800-...-#4 | | 1000-...-#4 | | 1200-...-#4 | |
| | B = 19 11⁄16" (50 cm) | 0200-...-#4 | | 0300-...-#4 | | 0400-...-#4 | | 0500-...-#4 | | 0600-...-#4 | |
| Lower concrete cover [in (mm)] | 1⅜16 (30) | Concrete strength: ≥ 4,000 psi | | | | | | | | | |
| Design values $v_{Rd}$ [kip/ft (kN/m)] for unit height [in (mm)] | 7 (180) | 8.2 | (119.7) | 10.4 | (151.1) | 10.4 | (151.1) | 10.4 | (151.1) | 10.4 | (151.1) |
| | 7½ (190) | 8.2 | (119.7) | 11.6 | (169.5) | 11.6 | (169.5) | 11.6 | (169.5) | 11.6 | (169.5) |
| | 7⅞ (200) | 8.2 | (119.7) | 12.3 | (179.6) | 12.9 | (187.9) | 12.9 | (187.9) | 12.9 | (187.9) |
| | 8¼ (210) | 8.2 | (119.7) | 12.3 | (179.6) | 14.1 | (206.3) | 14.1 | (206.3) | 14.1 | (206.3) |
| | 8⅔ (220) | 9.5 | (139.1) | 14.3 | (208.6) | 15.4 | (224.7) | 15.4 | (224.7) | 15.4 | (224.7) |
| | 9 (230) | 9.5 | (139.1) | 14.3 | (208.6) | 16.7 | (243.0) | 16.7 | (243.0) | 16.7 | (243.0) |
| | 9½ (240) | 9.5 | (139.1) | 14.3 | (208.6) | 17.9 | (261.4) | 17.9 | (261.4) | 17.9 | (261.4) |
| | 9⅞ (250) | 9.5 | (139.1) | 14.3 | (208.6) | 19.1 | (278.2) | 19.2 | (279.8) | 19.2 | (279.8) |

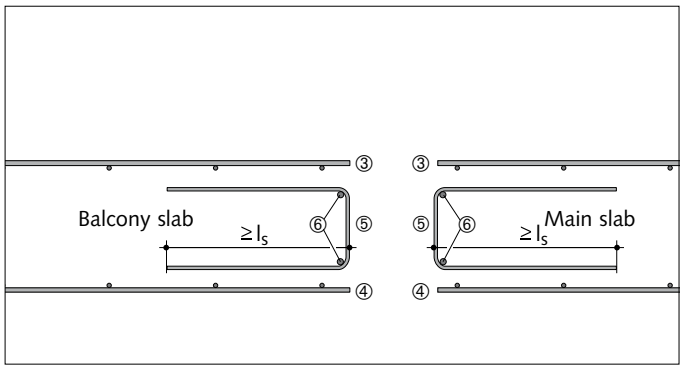

### On-site reinforcement $A_{s,req}$

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Balcony** | | #3 / 10" | | | | | | | | |
| **Main slab** | direct support | #3 / 10" | | | | | | | | |
| | indirect support | #3 / 8.75" | | #3 / 5.75" | | #3 / 4.25" | | #3 / 4.25" | | #3 / 4.25" |

Capacities consider all verifications per ICC-ES ESR-3799. Connecting components and reinforcement shall be verified per the EOR.

## On-site reinforcement



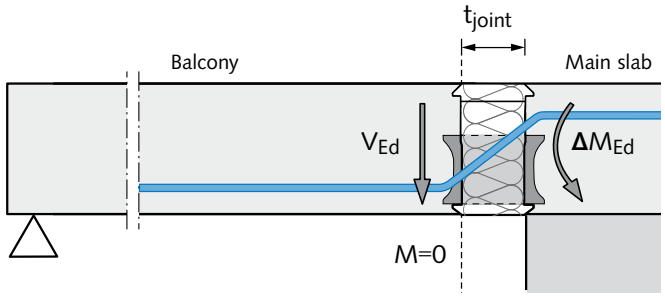

① HIT shear bar (#3 – #4)
② Double-symmetrical CSB
③ Upper connecting reinforcement, steel bars (specified by Structural Engineer)
④ Lower connecting reinforcement, steel bars (specified by Structural Engineer)
⑤ U-bar → $A_{s,req}$, see pages 48–50
⑥ Transverse tensile reinforcement, min. #3

## Moments from eccentric loads

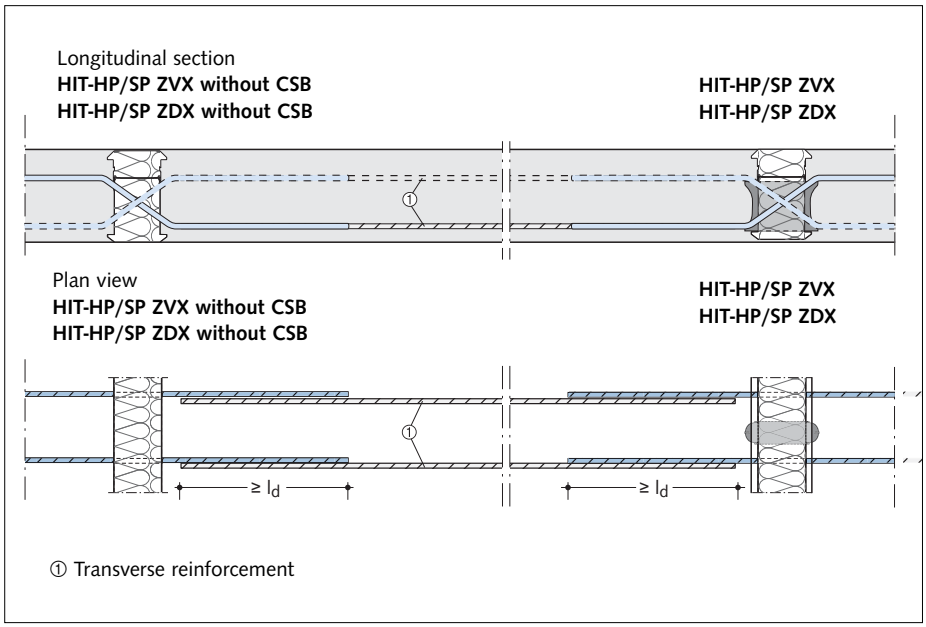
Moments resulting from an eccentric load must be considered when calculating for **HIT-HP/SP ZVX and ZDX with CSB**. The following applies:

$$\Delta M_{Ed} = V_{Ed} \cdot t_{joint}$$

with: $t_{joint}$ = 3⅛″ (80mm: HIT-HP ZVX/ZDX)
$t_{joint}$ = 4¾″ (120mm: HIT-SP ZVX/ZDX)




## On-site transverse reinforcement



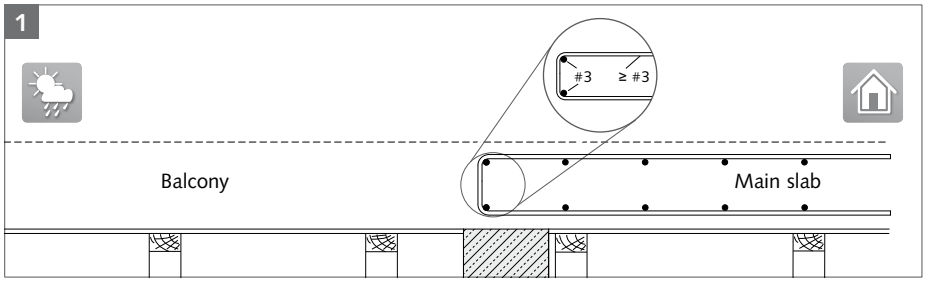

### Transverse reinforcement

When placing the transverse reinforcement in the balcony slab, each shear bar in the HIT unit (HP/SP ZVX or ZDX) must overlap with an on-site reinforcement bar of the same diameter or larger.

The on-site bar must extend to the opposite HIT unit where it must also over-lap with the shear bars.

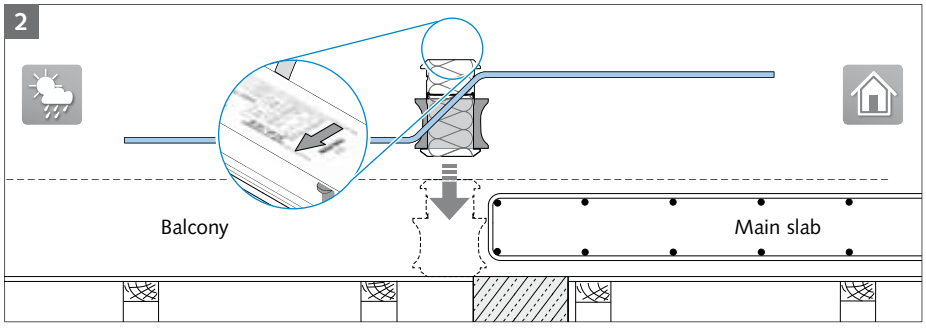
The required lap splice length $l_d$ shall be determined in accordance with the latest edition of ACI 318 referencing the material specification on page 16 and specifications for on site reinforcement.

## Installation diagram

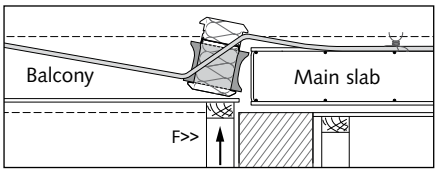



**1 Installation of on-site reinforcement for the main slab**

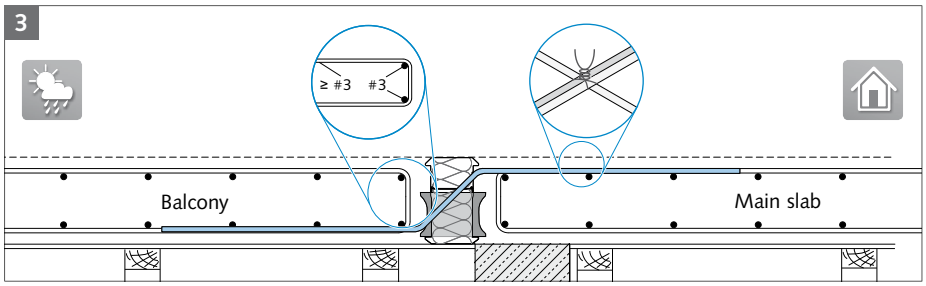
On-site reinforcement as specified by the structural engineer.



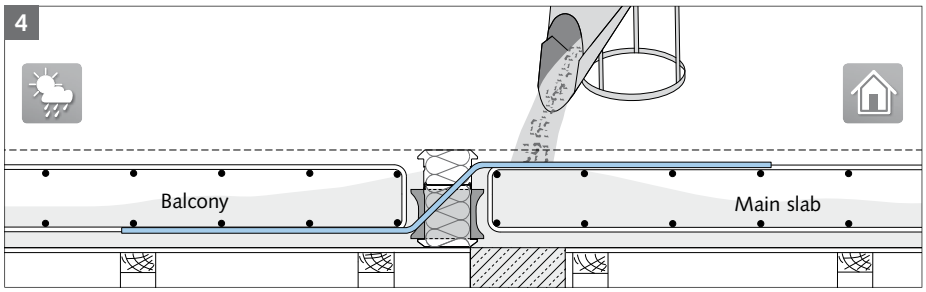

**2 Installation of HIT units from above**
HIT-ZDX units with bar diameters of #3 or #4 are symmetrical and do not have a dedicated installation direction.




Ensure that the formwork is at the correct height!

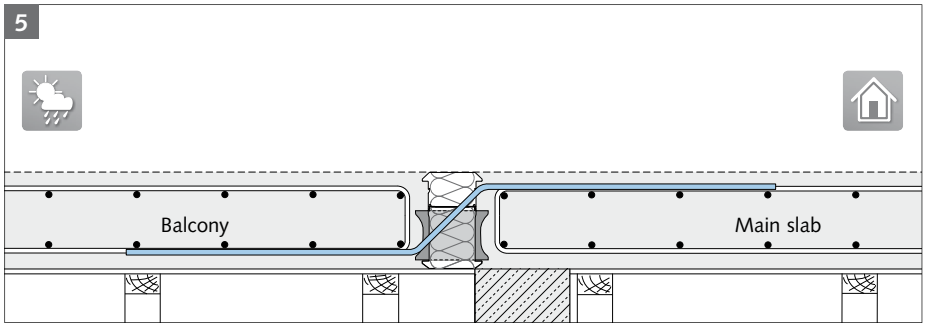



**3 Installation of the on-site reinforcement, balcony side**
Fixing of the shear bars to on-site reinforcement using tying wire.




**4 Pouring the concrete**

To ensure the HIT units are not displaced, pour and compact the concrete evenly.



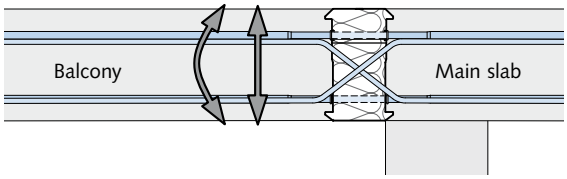

**5 Freshly poured concrete balcony slab on support structure**

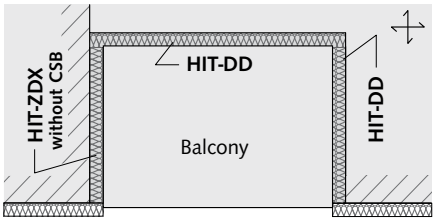
Further installation diagrams for the types HIT-HP ZVX and HIT-HP ZDX can be found in the installation instructions – available for download at our website **www.halfenusa.com**.

## HIT-DD

**4**

- For balcony slabs recessed in the main slab
- Transfers positive and negative moments and shear forces




**Application:** Continuous slab

**HIT-HP DD – High Performance** with 3 ⅛" (80 mm) insulation thickness
**HIT-SP DD – Superior Performance** with 4 ¾" (120 mm) insulation thickness

## Load range

All types are available with shear bar diameters #3 or #4.
The following combinations of shear bars (SB) and tension load bars (TB) are possible:

**Possible combinations of support elements**

| **Unit width B = 9⅞" (25 cm)** | | **No. tension / compression bars $n_{TB}$** | |
|---|---|---|---|
| | | 1 | 2 |
| Number of shear bars $n_{SB}$ | 1 | ● | ● |

| **Unit width B = 19 11/16" (50 cm)** | | **Number of tension /compression bars $n_{TB}$** | | | | |
|---|---|---|---|---|---|---|
| | | 2 | 3 | 4 | 5 | 6 |
| Number of shear bars $n_{SB}$ | 2 | ● | ● | ● | | |
| | 3 | ● | ● | ● | ● | ● |

| **Unit width B = 39⅜" (100 cm)** | | **Number of tension /compression bars $n_{TB}$** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 4 | | 6 | | 8 | 10 | 12 | 14 |
| Number of shear bars $n_{SB}$ | 4 | ● | | ● | | ● | | | |
| | 6 | ● | | ● | | ● | ● | ● | |
| | 7 | | | | | | ● | ● | ● |

Load bearing capacity values for selected units can be found on pages 55–56 ● = HP and SP

The complete load class range for concrete grades 3000 psi, 4000 psi and 5000 psi for HIT-HP and HIT-SP can be downloaded from **www.halfenusa.com**.

## Basic types – Ordering example

| HIT-HP | DD | - | 10 07 | - | 18 | - | 100 | - | 35 | - | #3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HIT-HP | DD | - | xx yy | - | hh | - | bbb | - | cc | - | dd |
| ❶ ❷ | ❸ | | ❹ ❺ | | ❻ | | ❼ | | ❽ | | ❾ |

**Type description**
① Product group
② Joint spacing:
HP: 3 ⅛" (80 mm) or
SP: 4 ¾" (120 mm)
③ Connection type
④ No. tension/compression bars
⑤ No. shear bars on each side
⑥ Unit height [cm]
⑦ Unit width [cm]
⑧ Upper concrete cover [mm]
⑨ Shear bar size

### HIT Custom solutions

Our technical support team is available to provide support in your project with custom solutions using HALFEN HIT Insulated connections

**Contact:** engineering@halfenusa.com

## Available unit heights h

| **Lower concrete cover: 1 3/16" (30 mm) / upper concrete cover: 1⅜"(35 mm)** | | |
|---|---|---|
| Diameter of the shear bars | #3 | #4 |
| Available unit heights | 6¾" – 13¾" (17–35 cm) | 7" – 13¾" (18–35 cm) |
| **Lower concrete cover: 1 3/16" (30 mm) / upper concrete cover: 2" (50 mm)** | | |
| Diameter of the shear bars | #3 | #4 |
| Available unit heights | 7½" – 13¾" (19–35 cm) | 7⅞" – 13¾" (20–35 cm) |

## Decoding the type selection: HIT-HP DD, tension/compression bars

| Number of tension/compression bars xx | | 04 | 06 | 08 | 10 | 12 | 14 |
|---|---|---|---|---|---|---|---|
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¼ (160) | | 3.7 (16.3) | 5.5 (24.5) | 7.4 (32.7) | 9.2 (40.8) | 11.0 (49.0) | 12.9 (57.2) |
| | | 7 (180) | 3.9 (17.3) | 5.8 (26.0) | 7.8 (34.6) | 9.7 (43.3) | 11.7 (52.0) | 13.6 (60.6) |
| | 6¾ (170) | | 4.1 (18.3) | 6.2 (27.5) | 8.2 (36.6) | 10.3 (45.8) | 12.3 (54.9) | 14.4 (64.1) |
| | | 7½ (190) | 4.3 (19.3) | 6.5 (28.9) | 8.7 (38.6) | 10.8 (48.2) | 13.0 (57.9) | 15.2 (67.5) |
| | 7 (180) | | 4.6 (20.3) | 6.8 (30.4) | 9.1 (40.5) | 11.4 (50.7) | 13.7 (60.8) | 15.9 (70.9) |

**Specifications**

Main slab thickness: 7″ (180 mm)
Concrete strength: 4,000 psi
Unit height: 7″ (180 mm)
Concrete cover/top: 3⅜″ (35 mm)

Bending moment: $m_{Rd}$ ≥ 11.4 kip*ft/ft
Shear load*: $v_{Rd}$ ≥ 9.3 kip*ft/ft

Calculated number of tension/compression bars (xx): 10
Calculated number of shear bars (yy)*: 07

**Compiled type description:** HIT-HP DD-1007*-18-100-35-10

*Determine the shear bars for HIT-HP DD → see tables on page 56

## Load bearing capacity values according to ICC-ES ESR-3799

**Moment load capacity in both directions ± $m_{Rd}$**

**Concrete strength:** ≥ 4,000 psi

HP

| Number of tension/compression bars xx | | 04 | 06 | 08 | 10 | 12 | 14 |
|---|---|---|---|---|---|---|---|
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | |
| Design values $m_{Rd}$ [kip*ft/ft (kNm/m)] for unit height [in (mm)] | 6¾ (170) | | 4.1 (18.3) | 6.2 (27.5) | 8.2 (36.6) | 10.3 (45.8) | 12.3 (54.9) | 14.4 (64.1) |
| | | 7½ (190) | 4.3 (19.3) | 6.5 (28.9) | 8.7 (38.6) | 10.8 (48.2) | 13.0 (57.9) | 15.2 (67.5) |
| | 7 (180) | | 4.6 (20.3) | 6.8 (30.4) | 9.1 (40.5) | 11.4 (50.7) | 13.7 (60.8) | 15.9 (70.9) |
| | | 7⅞ (200) | 4.8 (21.3) | 7.2 (31.9) | 9.6 (42.5) | 11.9 (53.1) | 14.3 (63.8) | 16.7 (74.4) |
| | 7½ (190) | | 5.0 (22.2) | 7.5 (33.4) | 10.0 (44.5) | 12.5 (55.6) | 15.0 (66.7) | 17.5 (77.8) |
| | | 8¼ (210) | 5.2 (23.2) | 7.8 (34.8) | 10.4 (46.4) | 13.1 (58.1) | 15.7 (69.7) | 18.3 (81.3) |
| | 7⅞ (200) | | 5.4 (24.2) | 8.2 (36.3) | 10.9 (48.4) | 13.6 (60.5) | 16.3 (72.6) | 19.0 (84.7) |
| | | 8⅔ (220) | 5.7 (25.2) | 8.5 (37.8) | 11.3 (50.4) | 14.2 (63.0) | 17.0 (75.6) | 19.8 (88.2) |
| | 8¼ (210) | | 5.9 (26.2) | 8.8 (39.3) | 11.8 (52.3) | 14.7 (65.4) | 17.6 (78.5) | 20.6 (91.6) |
| | | 9 (230) | 6.1 (27.2) | 9.1 (40.7) | 12.2 (54.3) | 15.3 (67.9) | 18.3 (81.5) | 21.4 (95.1) |
| | 8⅔ (220) | | 6.3 (28.1) | 9.5 (42.2) | 12.7 (56.3) | 15.8 (70.4) | 19.0 (84.4) | 22.1 (98.5) |
| | | 9½ (240) | 6.5 (29.1) | 9.8 (43.7) | 13.1 (58.3) | 16.4 (72.8) | 19.6 (87.4) | 22.9 (101.9) |
| | 9 (230) | | 6.8 (30.1) | 10.2 (45.2) | 13.5 (60.2) | 16.9 (75.3) | 20.3 (90.3) | 23.7 (105.4) |
| | | 9⅞ (250) | 7.0 (31.1) | 10.5 (46.6) | 14.0 (62.2) | 17.5 (77.7) | 21.0 (93.3) | 24.5 (108.8) |
| | 9½ (240) | | 7.2 (32.1) | 10.8 (48.1) | 14.4 (64.2) | 18.0 (80.2) | 21.6 (96.2) | 25.2 (112.3) |
| | | 10¼ (260) | 7.4 (33.1) | 11.2 (49.6) | 14.9 (66.1) | 18.6 (82.7) | 22.3 (99.2) | 26.0 (115.7) |
| | 9⅞ (250) | | 7.6 (34.0) | 11.5 (51.1) | 15.3 (68.1) | 19.1 (85.1) | 23.0 (102.1) | 26.8 (119.2) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

## Load bearing capacity values according to ICC-ES ESR-3799


**Shear capacity in both directions ±$v_{Rd}$**

**Concrete strength:** ≥ 4,000 psi

HP

| Number of shear bars yy | | | 04 | 06 | 07 | 04 | 06 | 07 |
|---|---|---|---|---|---|---|---|---|
| Shear bar diameter dd | | | #3 | | | #4 | | |
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | | | | | |
| Design values $v_{Rd}$ [kip/ft (kN/m)] for unit height [in (mm)] | 6¾ (170) | | 5.3 (77.7) | 8.0 (116.5) | 9.2 (134.9) | – | – | – |
| | | 7½ (190) | 5.3 (77.7) | 8.0 (116.5) | 9.3 (135.9) | – | – | – |
| | 7 (180) | | 5.3 (77.7) | 8.0 (116.5) | 9.3 (135.9) | 8.2 (119.8) | 10.6 (154.4) | 10.6 (154.4) |
| | | 7⅞ (200) | 5.3 (77.7) | 8.0 (116.5) | 9.3 (135.9) | 8.2 (119.8) | 11.3 (164.2) | 11.3 (164.2) |
| | 7½ (190) | | 5.3 (77.7) | 8.0 (116.5) | 9.3 (135.9) | 8.2 (119.8) | 11.9 (174.0) | 11.9 (174.0) |
| | | 8¼ (210) | 5.3 (77.7) | 8.0 (116.5) | 9.3 (135.9) | 8.2 (119.8) | 12.3 (179.7) | 12.6 (183.8) |
| | 7⅞ (200) | | 5.3 (77.7) | 8.0 (116.5) | 9.3 (135.9) | 8.2 (119.8) | 12.3 (179.7) | 13.3 (193.5) |
| | | 8⅔ (220) | 5.3 (77.7) | 8.0 (116.5) | 9.3 (135.9) | 8.2 (119.8) | 12.3 (179.7) | 13.9 (203.3) |
| | 8¼ (210) | | 6.2 (90.2) | 9.3 (135.3) | 10.8 (157.9) | 8.2 (119.8) | 12.3 (179.7) | 14.4 (209.6) |
| | | 9 (230) | 6.2 (90.2) | 9.3 (135.3) | 10.8 (157.9) | 8.2 (119.8) | 12.3 (179.7) | 14.4 (209.6) |
| | 8⅔ (220) | | 6.2 (90.2) | 9.3 (135.3) | 10.8 (157.9) | 9.5 (139.2) | 14.3 (208.7) | 15.9 (232.6) |
| | | 9½ (240) | 6.2 (90.2) | 9.3 (135.3) | 10.8 (157.9) | 9.5 (139.2) | 14.3 (208.7) | 16.6 (242.4) |
| | 9 (230) | | 6.2 (90.2) | 9.3 (135.3) | 10.8 (157.9) | 9.5 (139.2) | 14.3 (208.7) | 16.7 (243.5) |
| | | 9⅞ (250) | 6.2 (90.2) | 9.3 (135.3) | 10.8 (157.9) | 9.5 (139.2) | 14.3 (208.7) | 16.7 (243.5) |
| | 9½ (240) | | 6.2 (90.2) | 9.3 (135.3) | 10.8 (157.9) | 9.5 (139.2) | 14.3 (208.7) | 16.7 (243.5) |
| | | 10¼ (260) | 6.2 (90.2) | 9.3 (135.3) | 10.8 (157.9) | 9.5 (139.2) | 14.3 (208.7) | 16.7 (243.5) |
| | 9⅞ (250) | | 7.2 (104.5) | 10.7 (156.8) | 12.5 (182.9) | 9.5 (139.2) | 14.3 (208.7) | 16.7 (243.5) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

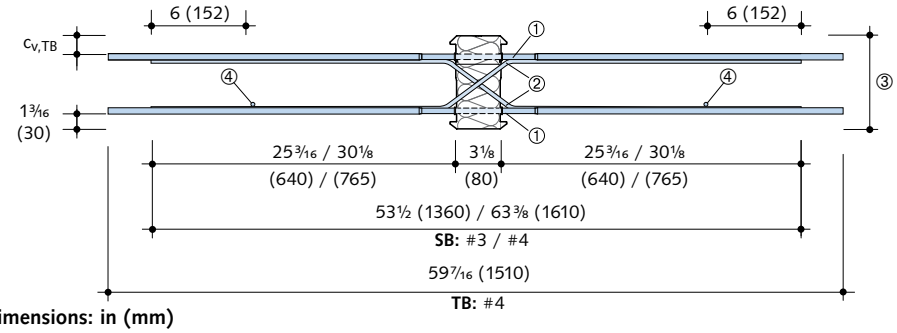
| **vertical hanger reinforcement** | #3 / 10" | #3 / 7.75" | #3 / 6.5" | #3 / 8.75" | #3 / 5.75" | #3 / 4.75" |
|---|---|---|---|---|---|---|

All required verifications have already been considered. The adjacent connecting elements must be verified by the planner.

Most of the units are also available in 9⅞" (25 cm) or 19 11/16" (50 cm) lengths. For further details on load bearing capacities please contact our technical support team engineering@halfenusa.com for contact details.

## Product description – Cross-sections (typical applications)

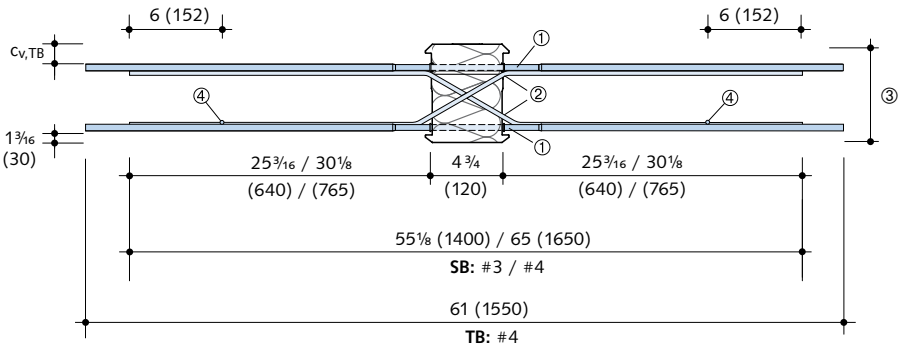
### HIT-HP DD – High Performance




Dimensions: in (mm)

① Tension/compression bars (#4)
② Shear bars (#3, #4)
③ Unit height h
④ Installation bar (structural)

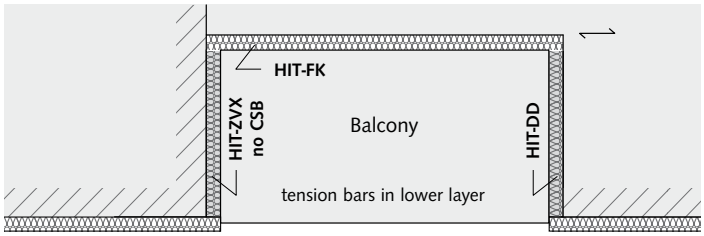
### HIT-SP DD – Superior Performance



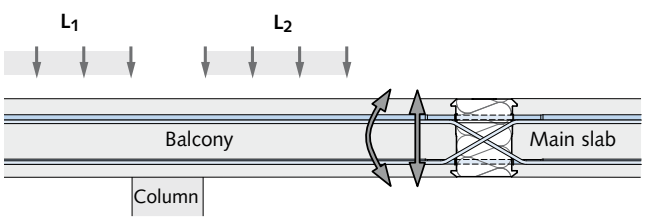

Dimensions: in (mm)

## Application examples

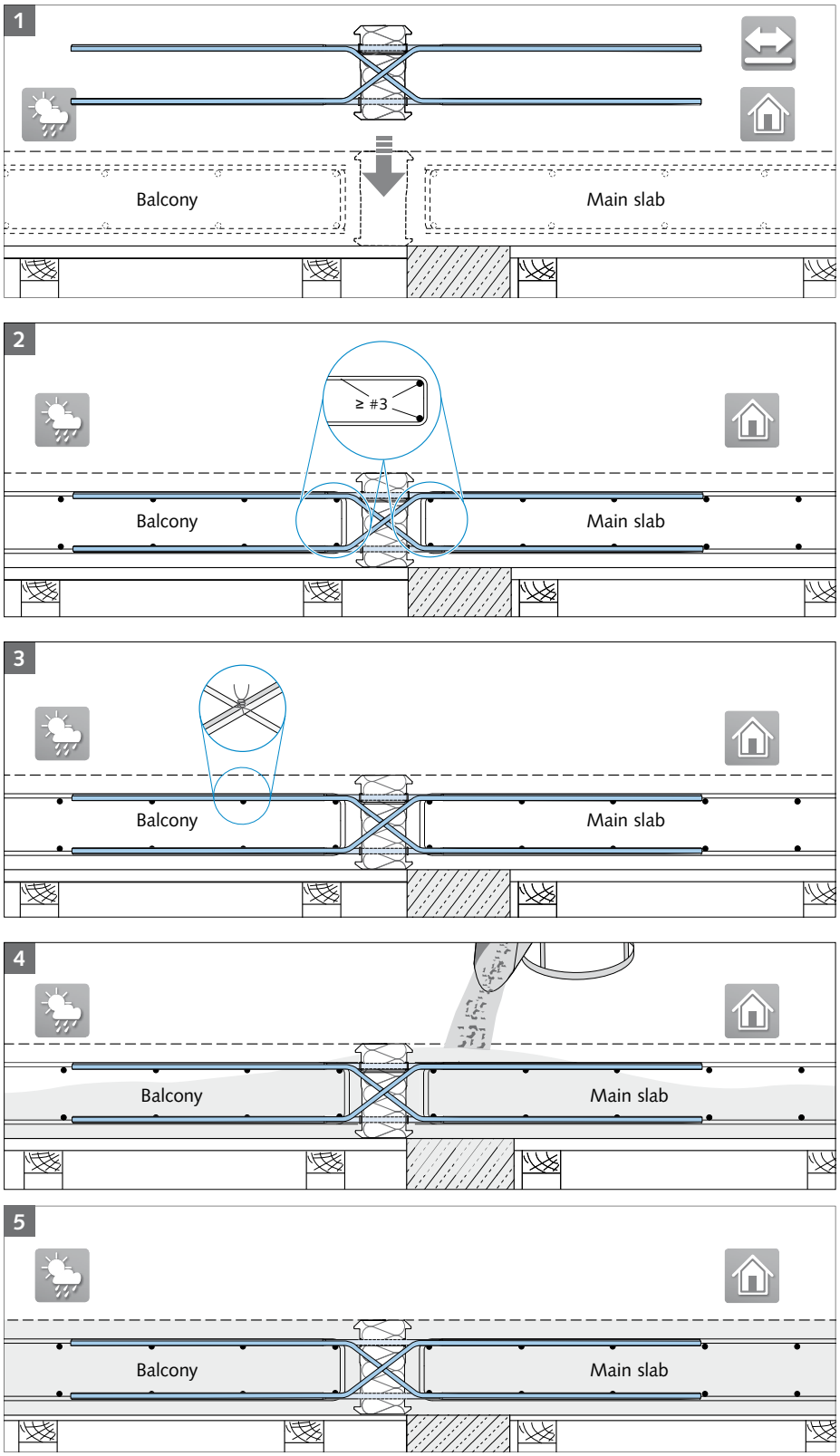
- **Single axis tensioned main slab**
  For balcony slabs recessed within a main slab (continuous mainslab), the insulated connection transfers positive moments, negative moments and shear forces.




- **Centrally supported cantilevered balcony**
  With variable load situations (see $L_1$ and $L_2$) positive and negative moments and shear forces in the balcony connection are to be expected.



## Installation diagram



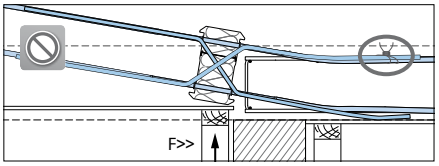

**1 Positioning the HIT unit from above**

The HIT-DD unit is symmetrical; therefore both installation directions are correct

**2 Installing on-site reinforcement**

The on-site reinforcement must be placed as specified by the structural engineer

**3 Fixing the tension bars and the shear bars to on-site reinforcement using tying wire**




Ensure the formwork is at the correct height!

**4 Pour the concrete**

To ensure the HIT units are securly installed, pour and compact the concrete evenly. Ensure all HIT units are securely fixed.

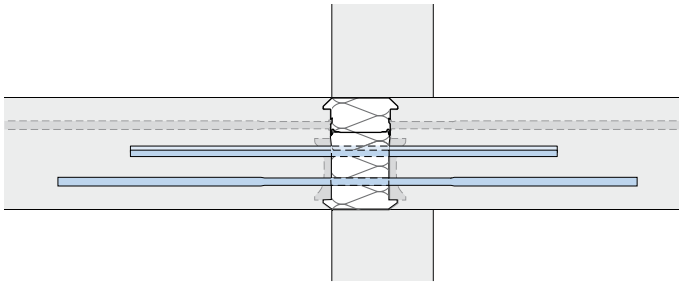
**5 Freshly concreted balcony slab on supporting structure**

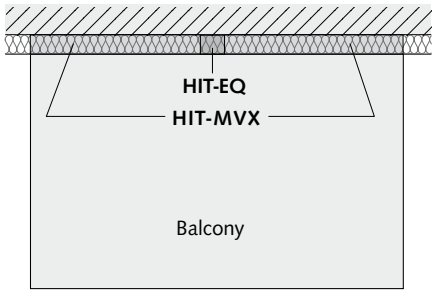
For further installation instructions please visit **www.halfenusa.com**.

## HIT-EQ

**5**

- Symmetrical complementary unit for seismic zone application
- Transfer of horizontal forces parallel and/or perpendicular to the insulation plane
- Transfer of uplift forces




**HIT-HP EQ** – **High Performance** with 3⅛" (80 mm) insulation thickness
**HIT-SP EQ** – **Superior Performance** with 4¾" (120 mm) insulation thickness

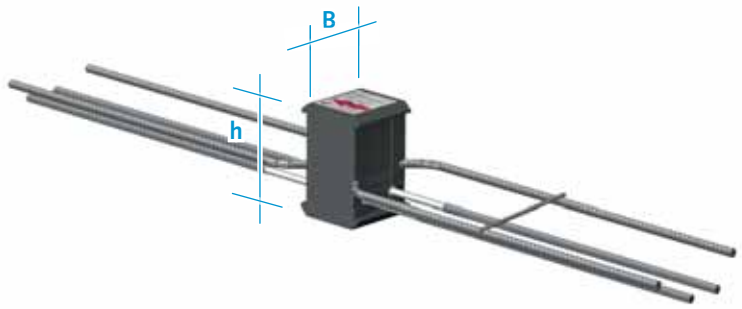
**Application**: Cantilevered balcony

| Content | Type | Page |
|---|---|---|
| Product variations | HIT-HP EQ2 | 60 |
| Load bearing capacities | HIT-HP EQ2 | 61 |

## Ordering example

| | | | | | | |
|---|---|---|---|---|---|---|
| **HIT-HP** | **EQ2** | - | **hh** | - | **010** |
| **HIT-SP** | **EQ2** | - | **hh** | - | **015** |

❶ ❷ ❸ ❹ ❺




**Type designation**

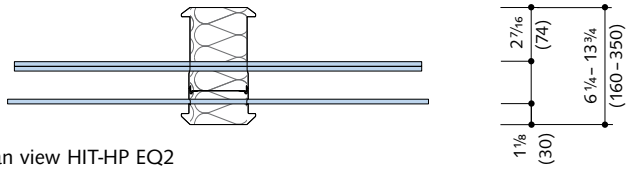
① Product group
② Joint spacing:
HP: 3 ⅛" (80 mm) or
SP: 4 ¾" (120 mm)
③ Connection type
④ Unit height [cm]
⑤ Unit width [cm]

## Load bearing capacities and dimensions

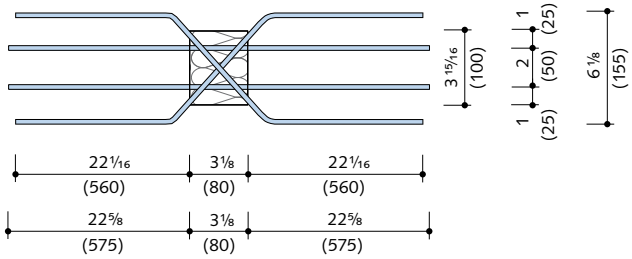
**Horizontal forces parallel and perpendicular to the insulation plane**

| HIT-HP EQ2 Components | | | Design values | |
|---|---|---|---|---|
| Reinforcement | | Unit width B | Concrete strength: ≥ 4,000 psi | |
| Shear bars | Tension/ compression bars | HIT-HP [in (mm)] | $H_{Rd}$ ∥ [kip (kN)/ per unit] | $H_{Rd}$ ⊥ [kip (kN)/ per unit] |
| 2× #4 | 1× #4 | 3 15/16 (100) | ±7.65 (34.8) | ±21.65 (98.4) |

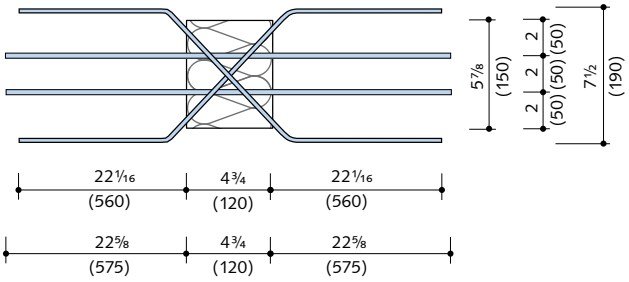
Vertical section cut HP/SP EQ2




Plan view HIT-HP EQ2




Plan view HIT-SP EQ2




Dimensions: in (mm)

| HIT Type | HP |
|---|---|
| Insulation thickness | 3 ⅛" (80 mm) |
| Unit width B | 3 15/16" (100 mm) |
| Available unit heights h | 6 ¼" (160 mm) – 13 ¾" (350 mm) |

## Load bearing capacity values according to ICC-ES ESR-3799


**Lifting moment**

**Concrete strength:** ≥ 4,000 psi


| Type / Unit width | HIT-HP EQ | | EQ2 | |
|---|---|---|---|---|
| Concrete cover [in (mm)] | 1⅜ (35) | 2 (50) | | |
| Design values **$M_{Rd}$ [kip*ft/unit (kNm/unit)]** for unit height [in (mm)] | 6¼ (160) | | 6.11 | (8.5) |
| | | 7 (180) | 6.46 | (9.0) |
| | 6¾ (170) | | 6.82 | (9.4) |
| | | 7½ (190) | 7.17 | (9.9) |
| | 7 (180) | | 7.53 | (10.4) |
| | | 7⅞ (200) | 7.88 | (10.9) |
| | 7½ (190) | | 8.24 | (11.4) |
| | | 8¼ (210) | 8.59 | (11.9) |
| | 7⅞ (200) | | 8.95 | (12.4) |
| | | 8⅔ (220) | 9.30 | (12.9) |
| | 8¼ (210) | | 9.66 | (13.4) |
| | | 9 (230) | 10.01 | (13.9) |
| | 8⅔ (220) | | 10.37 | (14.4) |
| | | 9½ (240) | 10.72 | (14.9) |
| | 9 (230) | | 11.08 | (15.3) |
| | | 9⅞ (250) | 11.43 | (15.8) |
| | 9½ (240) | | 11.79 | (16.3) |
| | | 10¼ (260) | 12.14 | (16.8) |
| | 9⅞ (250) | | 12.50 | (17.3) |

Load bearing capacity values for further types can be found at **www.halfenusa.com** or on request. See inside back cover for contact information.

Lifting moment +$M_{Rd}$ only in combination with HIT-MVX units

## HIT-FK



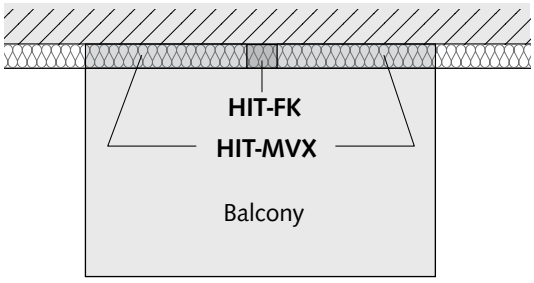
- Filler without support elements as a complementary element in all applications
- Mineral wool construction product class A1; used as an insulating material

**HALFEN HIT-FK** filler units are non-structural filler units.

They are used as complementary insulating elements to ensure a continuous thermal barrier is provided.

The HIT-FK units can be ordered in 3.3 ft (1.0 m) lengths and cut to fit.

**Top view:** Main slab with attached corbelled parapet

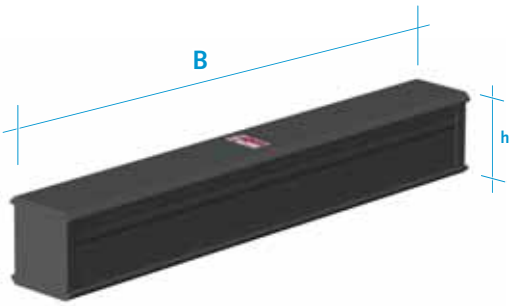



**HIT-HP FK** – **High Performance**
with 3 ⅛" (80 mm) insulation thickness
**HIT-SP FK** – **Superior Performance**
with 4 ¾" (120 mm) insulation thickness

**Ordering example for HIT Filler unit**

| HIT-HP | FK | - 16 | - 025 |
|---|---|---|---|
| ❶ ❷ | ❸ | ❹ | ❺ |

**Type designation**
① Product group
② Joint spacing:
HP: 3 ⅛" (80 mm) or
SP: 4 ¾" (120 mm)
③ Connection type
④ Unit height [cm]
⑤ Unit width [cm]



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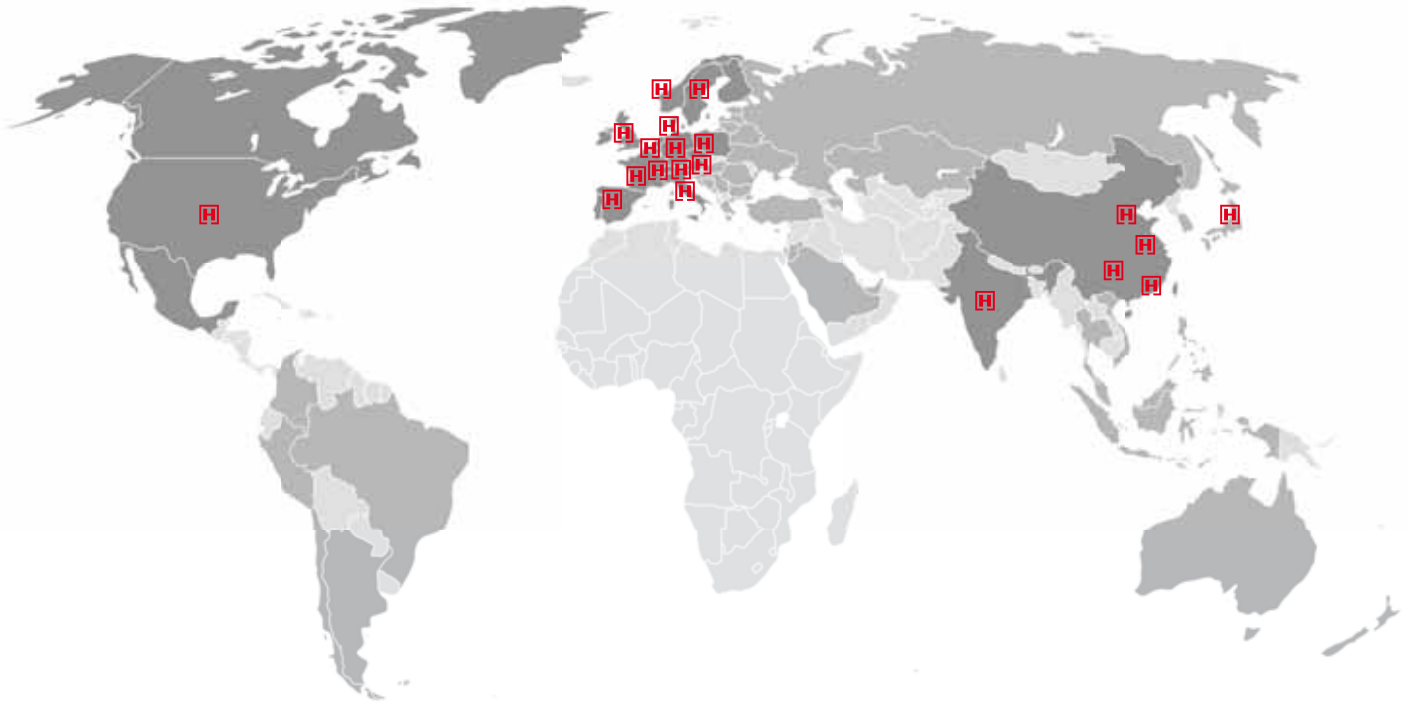

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| | | | |
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