HALFEN CAST-IN CHANNELS

Dimensioning HTA-CE and HZA Cast-in Channels

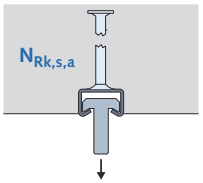
Verification method in accordance with EN 1992-4 / EOTA TR 047

VERIFICATION

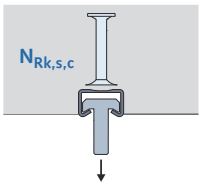
Tension

Steel

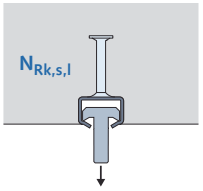
- Steel failure of the anchor



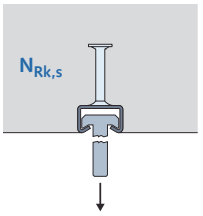
- Failure of channel-anchor connection



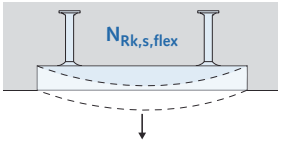
- Local flexure of the channel lip



- Steel failure special bolt

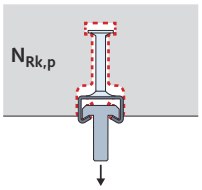


- Failure due to flexure of the channel

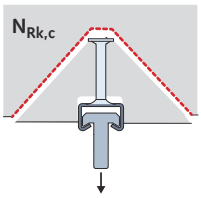


Concrete

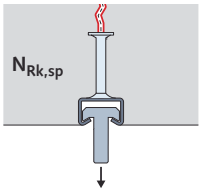
- Pull-out



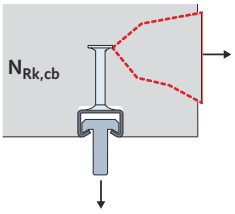
- Concrete cone failure



- Splitting



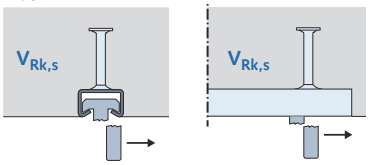
- Blow-out



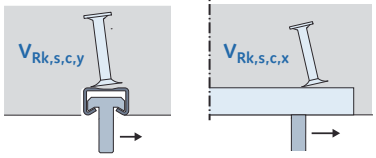
Shear

Steel

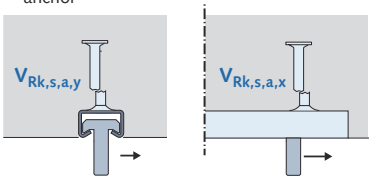
- Steel failure of the bolt



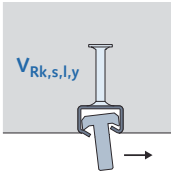
- Failure of channel-anchor connection



- Steel failure of the anchor

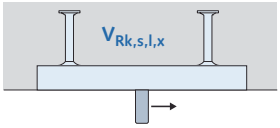


- Local flexure of the channel lip



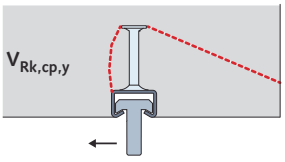
x-direction steel failure cases apply for HZA Channels or HTA with HSR Bolts

- Steel failure of the connection between channel lips and bolt

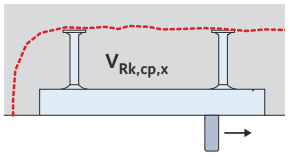


Concrete

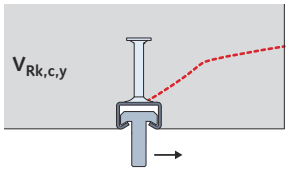
- Concrete pry-out failure



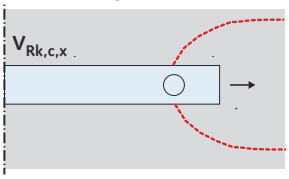
- Concrete pry-out failure



- Concrete edge failure



- Concrete edge failure



Additional verifications / tension

- Steel failure in the supplementary reinforcement
- Failure of the supplementary reinforcement in the breakout cone

Additional verifications / shear

- Special bolt for shear loads with leverage
- Steel failure in the supplementary reinforcement
- Bond failure of reinforcement

Decisive verifications for tension and shear

Superposition of tension and shear loadings

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Calculation basics

The following information is necessary to verify an anchor channel:

- type of Halfen Cast-in channel and material
- length of the Halfen Cast-in channel with number of anchors and spacing
- position of the Halfen Cast-in channel in the concrete, defined by its distance from the lower, upper, left and right edges of the component
- thickness of the concrete elements
- concrete strength class
- condition of the concrete; cracked or verified as non-cracked
- dense reinforcement in the vicinity of the anchor channel
- Halfen T-head bolt thread size
- bolt positions
- tensile load and shear load of each bolt

Technical support

Engineering services and technical support for your individual projects. Our contact information can be found at the end of this catalogue.

The design values under dynamic loads are given at page 27 for HTA-CE and on page 38 for HZA.

Verification method

1. Select channel.

2. Verify local load application (channel lips) for tension, shear and combined loading.

3. Calculate the anchor loads resulting from tensile loads and shear loads according to the load influence model (unfavourable anchor and load position).

4. Verify the connection between anchor and channel (tension loading).

5. Verify anchor pull-out failure (tension loading).

6. Verify concrete cone failure (tension loading).

7. Verify pry-out failure (loading in shear).

8. Verify concrete edge failure (loading in shear) considering a possible structural edge reinforcement.

If verification is negative, determine required additional reinforcement.

9. Verify concrete failure for combined loading, (combination of 6. and 7. as well as combination of 6. and 8.).

If last verification is negative, determine required additional reinforcement.

A free, simple to use calculation software to simplify planning can be downloaded at **www.halfen.com**.

HALFEN CAST-IN CHANNELS
Dimensioning HTA-CE and HZA Cast-in Channels

Halfen HTA-CE/HZA Software

The Halfen Calculation program for Halfen Cast-in channels according to the ETA provides the user with a convenient and very powerful calculation tool.

Verifications
EN1992-4 and EOTA TR047 require a wide range of verifications for cast-in channels and the concrete used. These verifications are processed by the user-friendly dimensioning Software. In just a few seconds the user is provided with a list of suitable Halfen Cast-in channels for the relevant load situation.

Boundary conditions
The calculation takes into account all necessary boundary conditions, typical examples being:

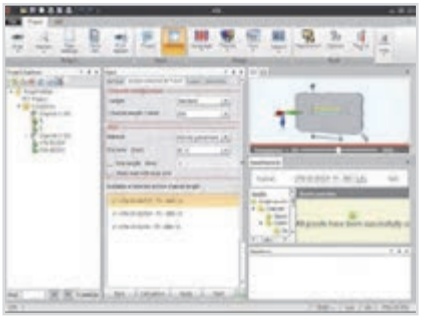
- cracked or non-cracked concrete
- the geometry of the concrete components, in particular the distances from the channel to the component edge
- various reinforcement patterns
- consideration of several dimensioning or characteristic loads
- position of the loads with a definable adjustment range, and the option of shifting the defined bolt pattern along the complete channel length
- verification of the required Halfen T-head bolts and if required also for stand-off installations
- verification of longitudinal forces in Halfen HZA serrated cast-in channels

Input
The geometry and loads are entered interactively. Entries are displayed promptly in a 3D graphic. Entries can also be changed directly in the graphic. Click on the load, the measurement or the component line you want to change to make the required modification.

Input loads
In addition to direct input of bolt loads, it is also possible to calculate the resulting loads by entering the actions/loads caused by secondary components (for example, curtain wall applications).

Results
After calculation, the software output provides either the results for a preselected profile, or in the case of automatic selection a list of all suitable profiles. Profiles and T-bolts with in-complete verifications are high-lighted in red.

Screenshot 1: The Halfen Anchor Channel Software start screen


Screenshot 2: Input screen, Halfen Anchor Channel Software

Screenshot 3: Interactive 3D display

Screenshot 4: Results list

All software can be found under: **www.halfen.com ▻ Downloads ▻ Software/CAD/BIM**

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HALFEN CAST-IN CHANNELS
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Halfen HTA-CE/HZA Software

Visual control
All verifications for the current channel profile are listed in a tree structure. Green check-marks indicate successful verifications. Red check-marks indicate unsatisfactory verifications.

For further visual control a progress bar on the right indicates the status of the verification process. Here too, red bars mean that a load has been exceeded, while green bars symbolize verifications that meet the criteria.

Detailed calculation information (with load positions, section sizes and utilization factors) can also be selected in a tree menu.

After selecting a Halfen Cast-in channel and suitable bolts, the dimensioning results can be imported into the data list and saved.

Print-outs
Print-outs are possible in a brief and in a verifiable long version. The long version includes all decisive verifications, a diagram of necessary reinforcement and a 2D graphic of the geometry and load.

The latest version of the dimensioning program is available for download on the Internet at **www.halfen.com**.

System requirements:

- Windows 11, Windows 10, Windows 8,
- Microsoft .NET Framework 4.7.2 or higher version (Download possible at www.halfen.de)

Screenshot 5: Overview of results

Screenshot 6: Print preview

The Halfen design software also contains calculation kernels for verifications according to ICC and AS 5216.

Tender text example

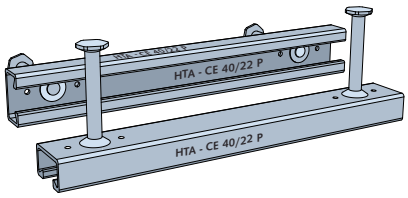
Halfen HTA-CE type Channel 40/22P - FV - 300 - KF

Halfen HTA-CE Channel 40/22P with smooth channel lips for adjustable fixing of components,

according to European Technical Assessment ETA-09/0339, suitable for anchoring in reinforced or non-reinforced standard concrete in a strength class of at least C12/15 and a maximum C90/105 in accordance with EN 206 under static, quasi-static, dynamic loading as well as fire exposure.

Type HTA-CE 40/22P - FV - 300 - KF
with
$N_{Rk,s,c}$ = 29 kN = char. resistance, steel failure (tension), connection channel anchor
FV = Corrosion protection, hot-dip galvanized
300 = Channel length [mm] with 2 anchors,
KF = Foam strip filler,

or equivalent; deliver and install according to the manufacturer's instructions.



CE
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