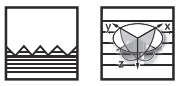
HALFEN HZA CAST-IN CHANNELS, serrated
The benefits at a glance

In addition to their excellent adjustability, Halfen Cast-in channels save considerable installation time. The result – faster construction and therefore increased cost savings.


serrated

3D-Loads

European Technical Assessment ETA-20/1081

HZA Halfen Cast-in channels, cold-rolled, serrated

Safe and reliable

- uniform load bearing capacity in all directions
- European Technical Assessment ETA
- innovative serration on channel lips and T-bolt heads provides additional mechanical interlock connection
- approved for fire-resistant structural elements
- hot-rolled channels, suitable for dynamic loads
- suitable for use in earthquake safety design
- hot-rolled channels are free from inherent stress

Quick and economical

- adjustable anchorage
- bolts instead of welding
- maximum efficiency when installing in rows
- cost-effective installation using standard tools
- optimized pre-planning reduces construction time
- user-friendly installation; no noise, dust and vibration

European Technical Assessment ETA-17/0728

serrated

3D-loads

suitable for dynamic loads

suitable for seismic loading

suitable for applications in safety relevant areas in nuclear facilities

HZA-PS Halfen Cast-in channels, hot-rolled, serrated

European Technical Assessment ETA-20/1081

serrated

3D-loads

suitable for dynamic loads

suitable for seismic loading

HZA DYNAGRIP® Cast-in channels, serrated

HZA-PS CAST-IN CHANNELS
More Information on the HZA-PS is available at:
www.halfen.com ▻ Downloads ▻ Brochures ▻ Technical Product Information

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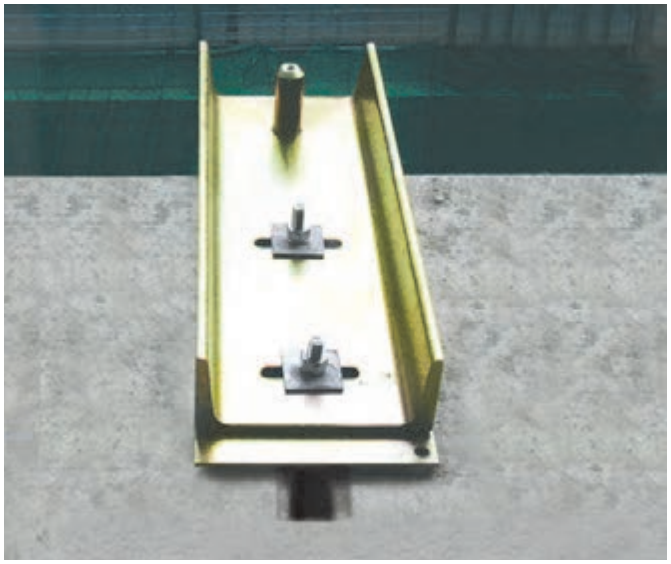
HALFEN HZA CAST-IN CHANNELS

Application Examples: Installations with Halfen HZA Cast-In Channels

CURTAIN WALL



Fixings of a Curtain wall façade, HZA near edge installation

FAÇADES

Fixings for emergency access balconies
(Vertical installation of Halfen Channels)

INDUSTRIAL PLANT INSTALLATIONS

Pipe supports on vertical HZA Channels

SKI LIFT

Fixing of the drive unit for a ski lift

LIFTS / ELEVATORS

Fixing for guide-rails

INDUSTRIAL BUILDING

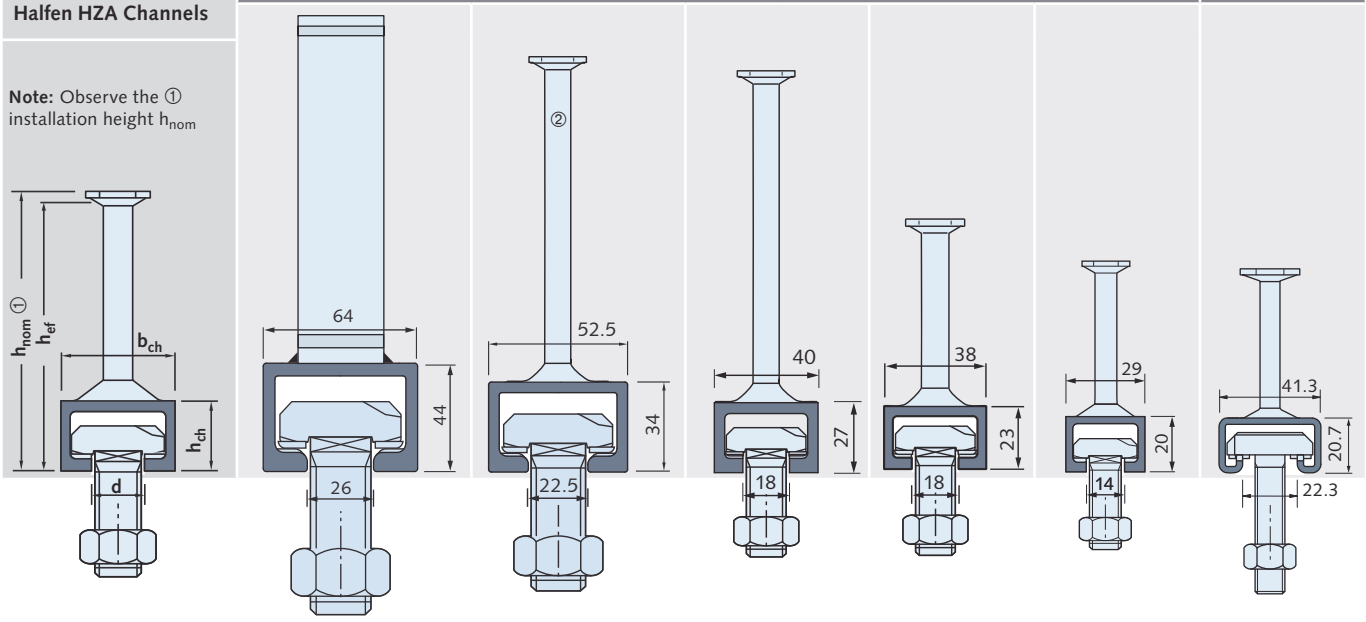
Vertical channels in columns to attach further components

HALFEN HZA CAST-IN CHANNELS
Product Range

Available HZA Channels

Profile	HZA 64/44 DYNAGRIP®	HZA 53/34 DYNAGRIP®	HZA 41/27 DYNAGRIP®	HZA 38/23 DYNAGRIP®	HZA 29/20 DYNAGRIP®	HZA 41/22
Geometry Halfen HZA Channels	hot-rolled					cold-rolled

Note: Observe the ① installation height h_{nom}



① Nominal size and tolerance

		HZA 64/44	HZA 53/34	HZA 41/27	HZA 38/23	HZA 29/20	HZA 41/22
Material material description: see page 12	Steel	■	■	■	■	■	■
	A4	□	□	-	□	-	□
Bolts		HZS 64/44	HZS 53/34	HZS 38/23	HZS 38/23	HZS 29/20	HZS 41/22
Threads		M20-M24	M16-M20	M12-M16	M12-M16	M12	M12-M16
$s_{l,N} = s_{l,V}$ [mm]		128	105	80	76	58	83
Profile load capacity*							
$N^0_{Rd,s,l}$ [kN]	Steel	58.9	45.8	29.8	21.8	12.7	11.2
	NR	52.4	38.9	-	22.2	-	14.5
$V^0_{Rd,s,l,y}$ [kN]	Steel	86.8	56.2	29.8	24.4	11.2	16.5
	NR	52.4	53.1	-	21.7	-	12.6
$V_{Rd,s,l,x}$ [kN]	Steel	39.7	18.3	10.9 (M12) 14.8 (M16)	10.9	7.0	6.7
	NR	38.2	20.5	-	11.5	-	5.6
$M_{Rd,s,flex}$ [Nm]	Steel	6030	3002	1990	1302	759	637
	NR	6889	3137	-	1452	-	651
Geometry							
h_{nom} [mm] ① ②		(187)	161 (165)	155	99	87	85
b_{ch} [mm]		64.0	52.5	40.0	38.0	29.0	41.3
h_{ch} [mm]		44.0	34.0	27.0	23.0	20.0	20.7
I_y [mm⁴]		240300	92600	39000	21100	10200	12600
h_{ef} [mm]		178	155	148	94	82	82
c_{min} [mm]		125	100	75	75	50	50

* Concrete load capacity has to be verified for each individual case (taking the geometric boundary conditions into account).

c_{min} = minimal spacing channel/concrete edge
NR = Stainless steel
s_{slb} = axial spacing for bolts for $N^0_{Rd,s,l}$

$N^0_{Rd,s,l}$ = channel lip load capacity (tension)
$V^0_{Rd,s,l,y}$ = channel lip load capacity (perpendicular shear)
$V_{Rd,s,l,x}$ = channel lip load capacity (longitudinal shear)

① Nominal size and tolerance
② weld-on I- or T-anchors subject to available stock; for these (h_{nom}) values are in brackets

■ **FV** = Steel hot-dip galvanized 1.0038/1.0044
□ **A4** =Stainless steel 1.4571/1.4404
All hot-rolled profiles are suitable for dynamic loads

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HALFEN HZA CAST-IN CHANNELS

Halfen HZA Channels: Standard Lengths/Halfen HZA Channels Curved Solution

Halfen HZA Channels — Standard lengths

Standard lengths* – Length [mm] / Number of anchors

This tables lists the standard lengths of cast-in channel in the Halfen HZA Product range. Our standard lengths are optimized lengths to reduce cut-offs. Order numbers may be found in the current Halfen price list. Other lengths are available on request.

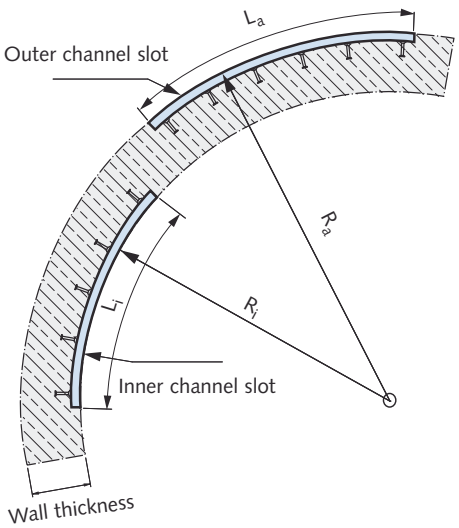
* please contact our technical support for more information

HZA 64/44; 53/34	HZA-PS 64/44; 53/34	HZA 41/27	HZA-PS 41/27	HZA 38/23	HZA-PS 38/23	HZA 29/20	HZA-PS 29/20	HZA 41/22
-	-	-	-	-	-	-	-	100/2
150/2	-	150/2	-	150/2	-	150/2	-	150/2
200/2	200/2	200/2	200/2	200/2	200/2	200/2	200/2	200/2
250/2	-	250/2	-	250/2	-	250/2	-	250/2
300/2	-	300/2	-	300/2	-	300/3	-	300/2
350/3	350/3	350/3	350/3	350/3	350/3	350/3	350/3	350/3
400/3	-	400/3	-	400/3	-	400/3	-	400/3
550/3	550/3	550/3	550/3	550/3	550/3	550/4	550/4	550/3
-	800/4	-	800/4	800/4	800/4	-	800/5	-
1050/5	1050/5	1050/5	1050/5	1050/5	1050/5	1050/6	1050/6	1050/5
-	3030/13	-	3030/13	3030/13	3030/13	3030/16	3030/16	-
6070/25	6070/25	6070/25	6070/25	6070/25	6070/25	6070/31	6070/31	6070/25

We deliver Halfen HZA Cast-in channels in any length from 100 mm to 6070 mm. The number and spacing of the anchors can be freely defined. Please contact us at www.halfen.com or see the back inside cover of this catalogue for contact information.

The Halfen Calculation program for Halfen Cast-in channels in accordance with the ETA. The tool is a powerful, user-friendly program for calculation of any channel length, anchor spacing and concrete cover. Free download at www.halfen.com/downloads/software-cad/...

Halfen HZA Channels curved solution



R_i = Radius of inner channel slot
R_a = Radius of outer channel slot
L = Length of channel after bending (maximum 5400 mm)

Areas of application:

- tunnel construction
- reinforced concrete tunnels for utilities
- curved walls
- sewage plants

Curved Halfen Cast-in channels in tunnel segments

Ordering example:
Halfen Cast-in channel, curved
HZA-CS 53/34-Q - A4, R_i = 4000 mm, L = 1050 mm

Smallest radius [m]*

Profile	Material	HZA-CS 64/44	HZA-CS 53/34	HZA-CS 41/27	HZA-CS 38/23	HZA-CS 29/20	HZA-CS 41/22
Inner channel slot: min. R_i	☐	on request	on request	on request	2.60 m	0.85 m	0.70 m
	☐	on request	on request	on request	1.20 m	-	0.70 m
Outer channel slot: min. R_a	☐	on request	on request	on request	1.40 m	1.10 m	2.20 m
	☐	on request	on request	on request	3.50 m	-	4.80 m

☐ hot-dip galvanized ☐ A4 stainless steel

* please contact our technical support for more information

HALFEN HZA CAST-IN CHANNELS
Halfen HZS Bolts

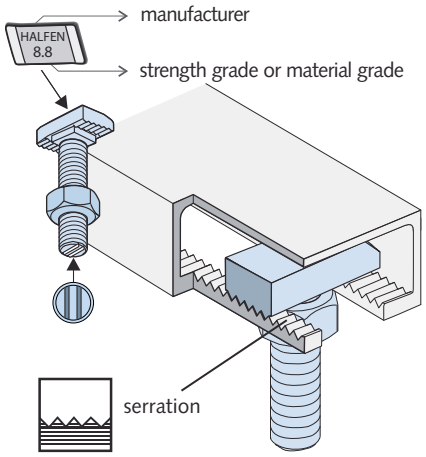
Available Halfen HZS Bolts

CE European Technical Assessment ETA-20/1081

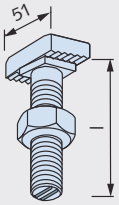
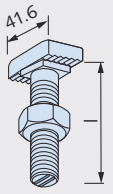
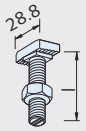
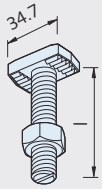
Halfen HZS Bolt, serrated, incl. nut

Please order u-washer separately

- The serration also ensures a positive load transmission in the longitudinal channel direction. The danger of bolt slippage is minimized.
- The bolt is marked on the shaft end with **2 notches.**
- Strength grade or material grade is marked on the bolt heads



Halfen HZS Bolts

Bolt	HZS 64/44		HZS 53/34		HZS 38/23		HZS 29/20	HZS 41/22	
Suitable for profile	64/44		53/34		41/27; 38/23		**29/20**	**41/22**	
Bolts dimensions									
Ø / l [mm]	**M20**	**M24**	**M16**	**M20**	**M12**	**M16**	**M12**	**M12**	**M16**
30	-	-	-	-	GVs8.8	-	GVs8.8	-	-
35	-	-	-	-	-	-	-	A4-50 FV8.8	-
40	-	-	-	-	GVs8.8	GVs8.8	GVs8.8	-	-
50	-	-	-	-	FV8.8* GVs8.8	GVs8.8	FV8.8* GVs8.8	A4-50 FV8.8	A4-50 FV8.8
60	-	-	A4-70 FV8.8* GVs8.8	-	GVs8.8	A4-70 FV8.8 GVs8.8	GVs8.8	-	-
65	-	-	-	FV8.8* A4-70 GVs8.8	-	-	-	-	-
80	A4-70* FV8.8* GVs8.8*	A4-70* GVs8.8*	FV8.8*	FV8.8*	GVs8.8	A4-70 FV8.8* GVs8.8	GVs8.8	A4-50	-
100	-	FV8.8*	A4-70 FV8.8* GVs8.8	A4-70 GVs8.8	GVs8.8	GVs8.8	-	-	FV8.8
125	A4-70* GVs8.8*	-	-	-	-	-	-	-	-
150	-	A4-70* GVs8.8*	-	-	-	GVs8.8	-	-	-

*on request

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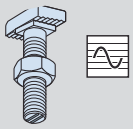
HALFEN HZA CAST-IN CHANNELS
Halfen Bolts: Dimensioning

Halfen HZS Bolts – Load capacity and bending moment

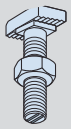
Design resistance HZS with hot-rolled HZA DYNAGRIP® Cast-in channels



DYNAGRIP®
HZA 64/44; HZA 53/34; HZA 41/27; HZA 38/23; HZA 29/20

Material / Strength class		M12	M16	M20	M24
8.8	$N_{Rd,s,s}$ [kN]	44.9	83.7	130.7	188.3
	$V_{Rd,s,s}$ [kN]	27.0	50.2	78.4	113.0
	$M^0_{Rd,s,s}$ [Nm]	84.0	212.8	415.2	718.4
A4-70	$N_{Rd,s,s}$ [kN]	31.6	58.8	91.7	132.1
	$V_{Rd,s,s}$ [kN]	22.7	42.2	66.0	95.1
	$M^0_{Rd,s,s}$ [Nm]	59.0	149.4	291.0	503.8

Design resistance HZS with cold-rolled HZA Cast-in channels

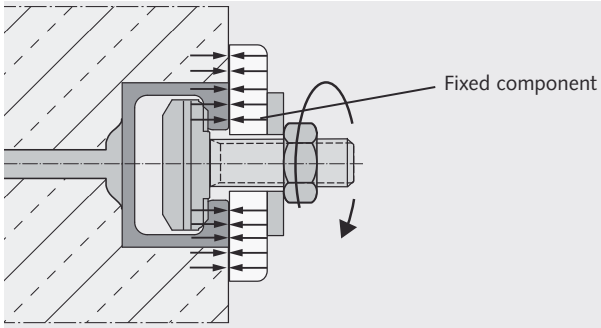


HZA 41/22

Material / Strength class		M12	M16
8.8	$N_{Rd,s,s}$ [kN]	32.3	62.2
	$V_{Rd,s,s}$ [kN]	27.0	50.2
	$M^0_{Rd,s,s}$ [Nm]	84.0	208.8
A4-50	$N_{Rd,s,s}$ [kN]	14.1	22.4
	$V_{Rd,s,s}$ [kN]	10.6	19.8
	$M^0_{Rd,s,s}$ [Nm]	27.7	70.2

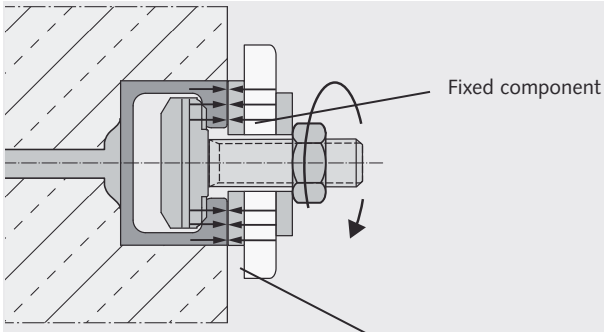
Torque values for Halfen HZS Bolts

Standard
Components are braced against the concrete and anchor channel.
Torque is applied as in the following table and must not be exceeded.



Standard torque values

Steel-Steel
Components are braced against the anchor channels using suitable washers.
Torque is applied as in the following table and must not be exceeded.



Torque values steel-steel

Standard: Recommended torque values T_{inst}

HZA Profile	Halfen Bolt HZS...M [mm]	Torque value T_{inst} [Nm] Steel 8.8	Stainless steel Strength class 50	Stainless steel Strength class 70
41/22	12	30	20	-
	16	40	50	-
29/20	12	35	-	-
38/23	12	55	-	50
	16	75	-	75
41/27	12	75	-	-
	16	125	-	-
53/34	16	135	-	130
	20	165	-	165
64/44	20	315	-	250
	24	375	-	335

Steel-Steel: Recommended torque values T_{inst}

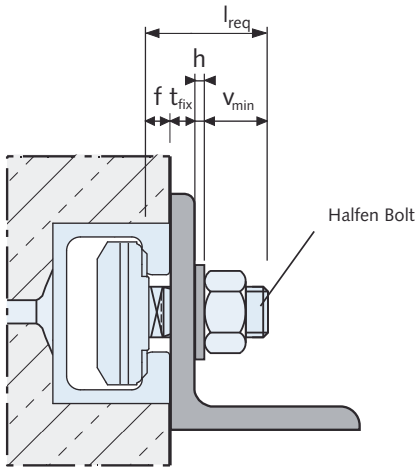
HZA Profile	Halfen Bolt HZS...M [mm]	Torque value T_{inst} [Nm] Steel 8.8	Stainless steel Strength class 50	Stainless steel Strength class 70
41/22	12	50	20	-
	16	140	50	-
29/20	12	75	-	-
38/23	12	75	-	50
	16	185	-	130
41/27	12	75	-	-
	16	185	-	-
53/34	16	185	-	130
	20	360	-	250
64/44	20	360	-	250
	24	625	-	435

Tightening torques are also provided in the installation instructions, included with any box of bolts..
Torque values apply only to bolts in delivery condition (unlubricated).

HALFEN HZA CAST-IN CHANNELS
Minimum Edge Distances and Minimum Bolt Spacing/Bolt Length

Calculating the bolt length l_{req} for Halfen HZS Bolts

$$l_{req} = t_{fix} + f + h + v_{min}$$



Dimensions V_{min}	
Bolt diameter	v_{min} [mm]
M6	11.0
M8	12.5
M10	14.5
M12	17.0
M16	20.5
M20	26.0
M24	29.0
M27	31.5
M30	33.5

Lip dimensions f	
Channel profile	**f [mm]**
64/44	10.0
53/34	7.5
41/27	7.0
38/23	5.5
29/20	5.0
41/22	7.0

l_{req} = required bolt length
t_{fix} = thickness of clamped component
f = profile lip height
h = washer thickness
v_{min} = nut height EN ISO 4032 + overhang approximately 5 mm (≥ M20: 7 mm)

Minimum edge distances and minimum bolt spacing

Anchors must be installed at a minimum distance from the component edges. The distance depends on the selected channel profile. According to the ETA, the spacing between bolts s_{cbo} must not be less than $s_{s,min} = 5 \times d_s$. Reduction of the load bearing capacity is required if $s_{cbo} < s_{sl,N}$* (see table on page 32).

The concrete load-bearing capacity must be verified for each individual case using the Halfen Anchor channel Software!

*$s_{sl,N}$ = centre distance of the bolts subject to $N_{Rd,s,l}$
See tables on page 32

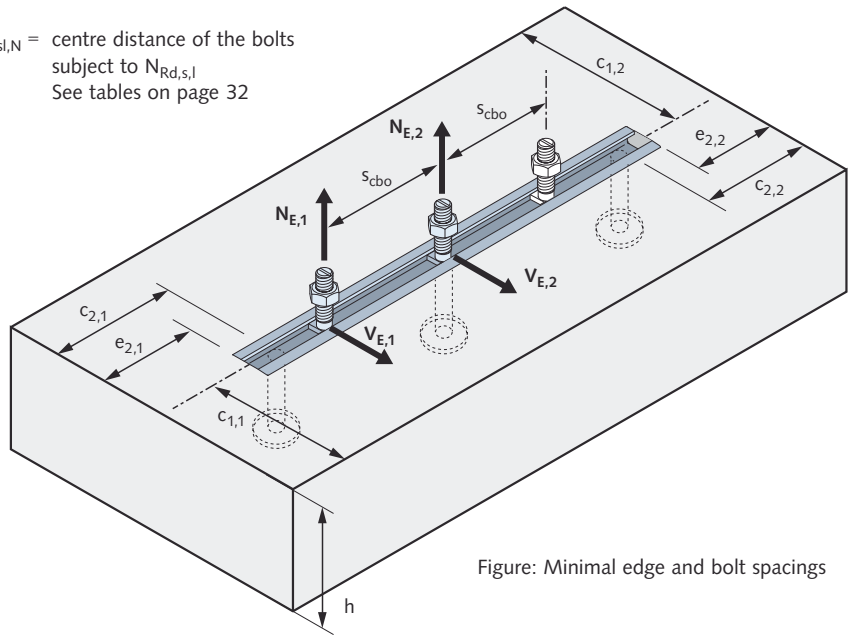


Figure: Minimal edge and bolt spacings

Edge and bolt spacing [mm]				
HZA Profiles	M	$s_{s,min}$	c_{min}	e_{min}
64/44	24	120	125	90
	20	100		
53/34	20	100	100	65
	16	80		
41/27	16	80	75	40
	12	60		
38/23	16	80	75	47
	12	60		
29/20	10	50	50	22
41/22	16	80	50	22
	12	60		

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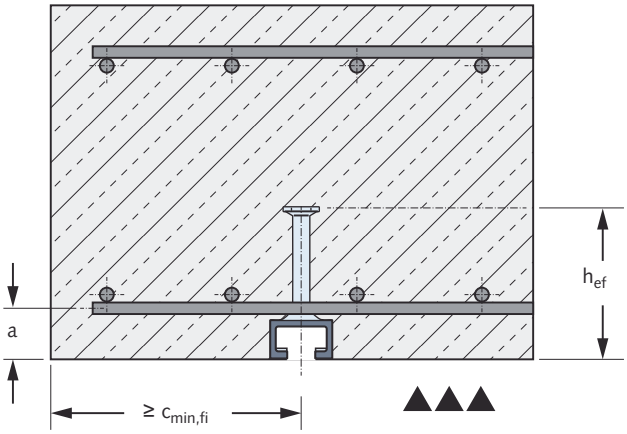
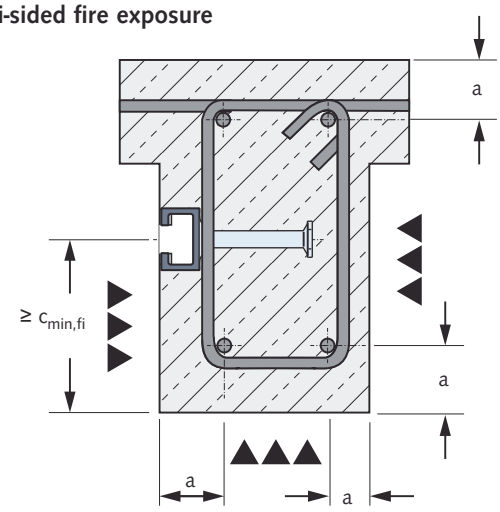
HALFEN HZA CAST-IN CHANNELS
HZA Fire Resistances

Halfen HZA Cast-in channels, serrated have been tested and classified for direct exposure to fire in accordance with EAD 330008 using the Standard ISO time-temperature curve (STC). The values shown in the table below are taken from ETA-20/1081.

Single-sided fire exposure



Multi-sided fire exposure



▲▲▲ fire exposure direction

Fire resistance capacities for HZA Cast-in channels, serrated – steel failure*

	HZA	29/20	38/23		41/27		53/34		64/44		41/22	
Fire protection classes depending design resistances $N_{Rd,s,fi} = V_{Rd,s,fi}$ [kN]	Halfen Bolt	M12	M12	M16	M12	M16	M16	M20	M20	M24	M12	M16
	R30	2.7	3.5	4.5	3.5	4.5	4.5	10.3	10.3	17.0	2.4	2.3
	R60	2.1	2.7	3.3	2.7	3.3	3.3	7.8	7.8	14.8	1.7	1.8
	R90	1.5	1.9	2.1	1.9	2.1	2.1	5.3	5.3	9.9	1.1	1.2
	R120	1.3	1.5	1.5	1.5	1.5	1.5	4.0	4.0	7.4	0.7	1.0
Minimum axial spacing **a** [mm]	R30	25	30		35		40		50		25	
	R60	25	30		35		40		50		25	
	R90	35	35		35		40		50		35	
	R120	50	50		50		50		50		50	
Minimum edge spacing $c_{min,fi}$ [mm]	fire exposure single-sided	164	188		296		310		356		164	
	fire exposure multi-sided	300	300		300		310		356		300	

Load capacities are valid for serrated Halfen HZA Cast-in channels made of steel and stainless steel.
* Concrete load capacity under fire exposure has to be verified for each individual case in accordance with EOTA TR 047 for strength classes C20/25 to C50/60.

HALFEN HZA CAST-IN CHANNELS
Dynamic Loads

HZA Channels; design resistance for n = 2 × 10 ^{6} load cycles

Profile HZA	Type	$\Delta N_{Rd,s,0,n}$	$N_{lod,s,n}$	Allowable bolts	Material
38/23	FV	3.4	6.2	M16	8.8
41/27		3.4	6.2	M16	
53/34		5.9	9.2	M20	
64/44		8.7	20.2	M24	

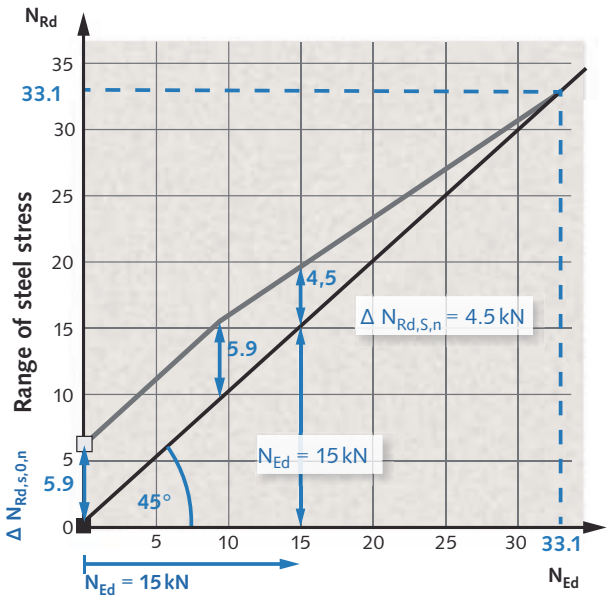
Example (also see diagram to the right):
Profile HZA 53/34 - FV (serrated, hot-dip galvanized), for n = 2 × 10^6 load cycles:

N_{Rd} = 59.6 ÷ 1.8 = 33.1 (taken from the ETA)

N_{Ed} from permanent load = 15 kN (assumption)

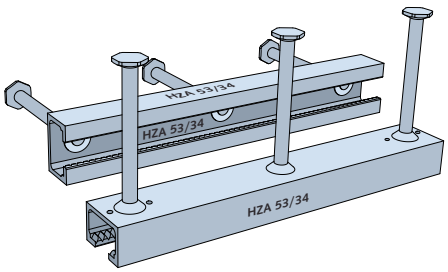
$\Delta N_{Rd,E,n}$ = (33.1 − 15.0) × 5.9/(33.1 − 9.2) = 4.5 kN

Diagram: HZA 53/34 - FV for n = 2 × 10^6 load cycles



Tender text example

Halfen HZA type Channel 53/34 - FV - 350 - KF



Halfen HZA Channel, serrated 53/34 DYNAGRIP with serrated channel lips for adjustable fixing of components,

in accordance with European Technical Assessment ETA-20/1081, 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 HZA 53/34 - FV - 350 - KF
with
$N_{Rk,s,c}$ = 59 kN = char. resistance, steel failure (tension), connection channel anchor
$\Delta_{NRk,s,lo,n}$ = 8,0 kN = char. fatigue resistance (2 × 10^6 load cycles), steel failure (tension),

FV = Corrosion protection, hot-dip galvanized
350 = Channel length [mm] with 3 anchors,
KF = Foam strip filler,

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

CE
ETA - 20/1081

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