HALFEN MOUNTING CHANNELS AND ACCESSORIES
TECHNICAL PRODUCT INFORMATION

HALFEN MOUNTING CHANNELS AND ACCESSORIES

FRAMING AND MOUNTING SYSTEMS

MT-FBC 14.1-US

NEW!

- Addition of mounting channels HM 55/42, HZM 64/44, HZM 41/27

HALFEN

YOUR BEST CONNECTIONS

Future Proof

HALFEN Mounting Channels allow machinery manufacturers to save money and time using a modular design concept

HALFEN mounting channels are used by machine designers and builders across North America, Europe and Asia. These adjustable mechanical connections offer many benefits over traditional welding or use of hex bolts.

Reduced design time

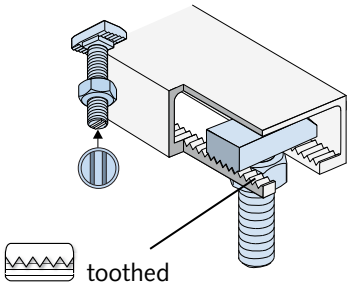
The designer does not need to know the final position of all fixings, or the specification of all equipment to be assembled - the design can be finished with incomplete information.

Wider tolerances

Connection tolerances can be relaxed, with no reduction in precision or performance, leading to lower manufacturing and labor costs.

Mechanical load transmission

Interlocking connection between channel and T-bolt teeth provides positive transmission of loads in all three planes – including the longitudinal direction.



Modularity
HALFEN Mounting Channels are used to design adjustable mechanical connections, and allow machine designers and manufacturers to meet individual client demands for a custom machine, from a common platform.

Shorter delivery times
Build more of a common platform without a customer order. Completion and delivery of the final machine will be faster than the competition.

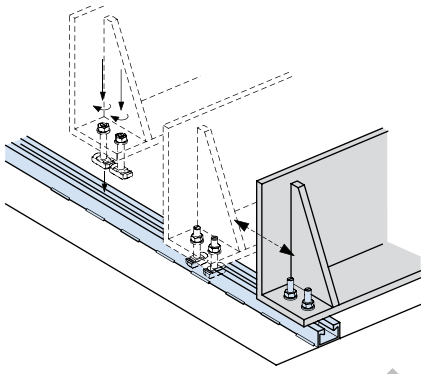
HALFEN HZM DYNAGRIP® Toothed Mounting Channels with HALFEN Toothed T-bolts provide safe three dimensional load capacity and superior dynamic performance.

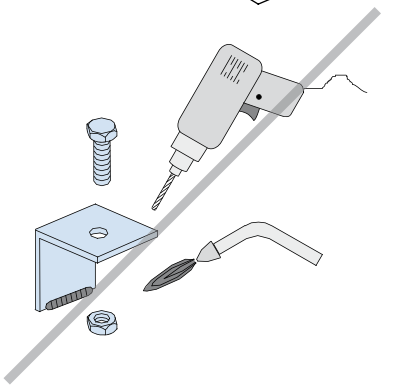
Easily accomodate change
Changes to design or customer requirements, as well as upgrades or change-outs in-service are easily accomodated without the need for mechanical rework, or damage to paint.

Reduced design risk
Load tables available for standard conditions – engineering support provided for custom situations.

The HALFEN Channel mounting system offers many advantages over welding or through-bolting;

- Design and fabrication of steel assemblies can be completed without knowing the final position or specification of items to be fixed
- Manufacturing tolerances can be relaxed with no dimunition of performance, reducing reject rates and the need for skilled labor
- Assemblies can be modified at any time during fabrication or in-service:
  - without cutting, griding or welding
  - with no damage to corrosion protection
  - without producing spatter, swarf or other contaminents
- Change out or upgrade components with only a wrench
- More equipment can be serviced onsite or at the customer's premises
- Skilled labor not required to carry out modifications on site
- Dust free and low noise levels when modification work is done on site
- The need to design and fabricate custom weldments or fixings is eliminated





HALFEN channels are available in:

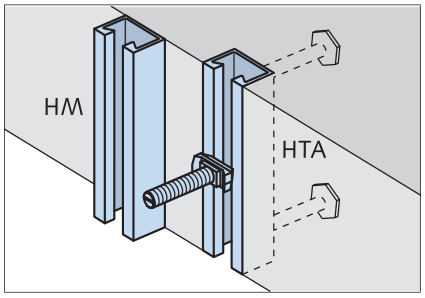
- A large selection of standard profiles with a range of static and dynamic load bearing characteristics, from 500lbs to 10,000lbs per bolt point in tension
- Carbon and stainless steels:
  - mill finish
  - pre-galvanized
  - hot-dip galvanized
  - A2 (304), A4 (316) and HCR (UNS N08926) stainless steel
  - with a full range of t-bolts and other fixing accessories

HALFEN Channels

All hot-rolled HALFEN profiles and some of the light mounting channels are also available as **HALFEN HTA/ HZA Cast-in channels** to provide an adjustable, embedded fixing point in concrete structures or building elements.
Both versions use the same t-bolts and accessories.

You can find more information on HALFEN Channels in our Technical Product Information **"HALFEN Cast-in channels".**

www.halfenUSA.com ► Products ► Anchoring systems ► HTA-Anchor Channels ► Product information



Quality

Quality is a key feature of our products. HALFEN materials and components are subject to stringent quality controls.

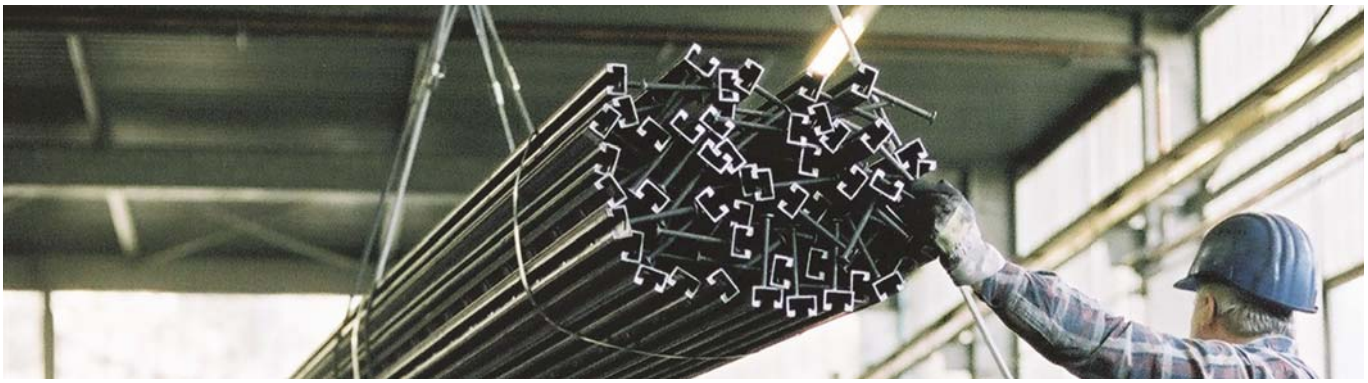
A quality audit by DNV GL confirmed that our quality management system meets the demands of ISO 9001:2008.

QUALITY SYSTEM CERTIFICATION
DNV·GL
ISO 9001

Certificate-no. QS-281 HH

Contents

Contents



Mounting channels HM, HL, HZM and HZL

Hot rolled channels

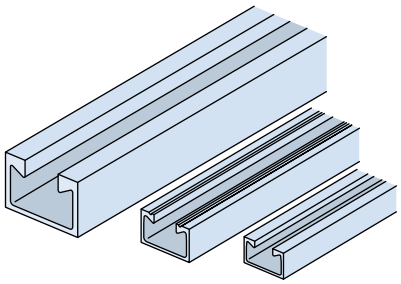
The hot rolling process makes these channels ideally suited to:

- heavy loads
- dynamic loads
- connections requiring very high torque
- welding

Roller-bearing fixing of a cableway

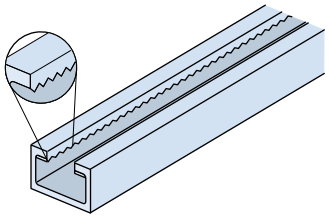
Smooth channels HM

- High tensile loads of up to 10.6 Kips (47 kN) are possible
- High longitudinal loads of up to 3.9 Kips (17kN) are possible using nibbed T-bolts (carbon steel channels)



Toothed channels HZM

- Toothed profile mechanically interlocks with toothed bolt to allow high longitudinal loads of up to 6.1 Kips (27 kN)
- 5 channel sizes for maximum efficiency



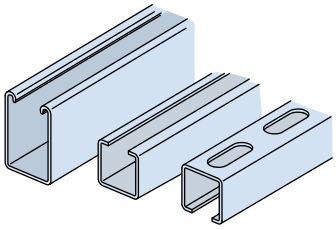
Welding-jig, locomotive construction

Cold-rolled channels

Channels are available with holes (slotted) or without holes (plain).

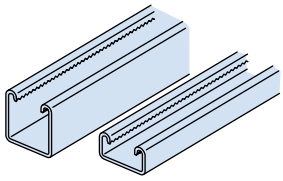
Cold-rolled channels HL, HM

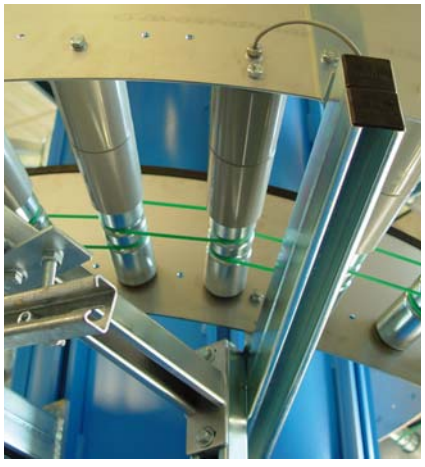
- For lower loads in longitudinal channel direction
- Economic due to large selection of channels



Toothed channels HZL, HZM

- For high loads in longitudinal channel direction
- Non-slip connection for high channel loads





Cantilever fixing on a vertical conveyor system

HALFEN T-bolts HS, HSR and HZS

Type HS

HALFEN T-bolts; plain

- Suitable for all channels
- Load bearing capacity in two directions
- Marked at shank end with one notch

Type HSR

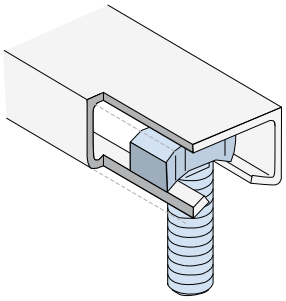
HALFEN T-bolts with nibs

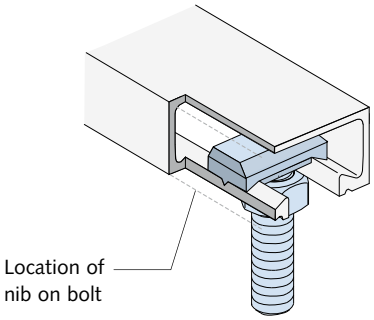
- Only suitable for use in hot-rolled channels from the heavy duty system
- Nibbed; therefore non-slip, load bearing in all directions
- The hook-head bolt prevents turning under vibration
- Marked at shank end with two notches (not available in stainless steel)

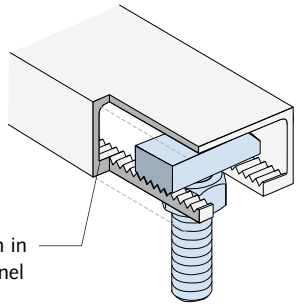
Type HZS

Toothed HALFEN T-bolts

- For toothed channels HZM and HZL
- Toothing also provides positive load bearing transmission in longitudinal channel direction. The risk of slipping is eliminated
- Marked at shank end with two notches

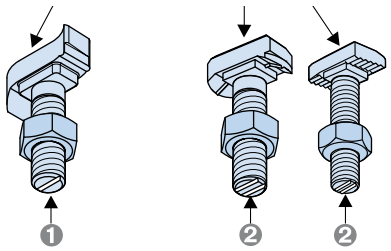






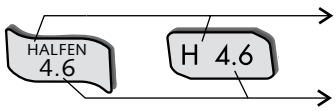
Identifying HALFEN T-bolts

Bolt identification on the bolt head



Notches on the shank tip:

1	2
HS All Types **HZS 41/22** **HZS 41/41**	**HSR** All Types **HZS 29/20** **HZS 38/23** **HZS 53/34** **HZS 64/44**



Strength class 4.6 electroplated or hot-dip galvanized

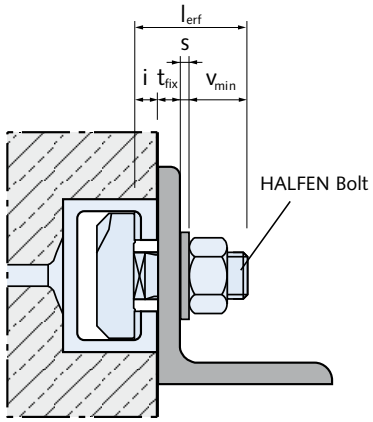
material grade A4 - 50 stainless steel (Type 316, grade 50)

Strength class 8.8 electroplated or hot-dip galvanized

material grade A4 - 70 stainless steel (Type 316, grade 70)

Marking at the shank end of the HALFEN T-bolts: After assembly check the correct orientation of the marking on the shank end of the T-bolts. The notch or notches must be at right angles to the channel length.

Calculating the T-bolt length l_{req} for HALFEN T-bolts (steel construction)



$$l_{req} = t_{fix} + i + s + v_{min}$$

l_{req} = required T-bolt length
t_{fix} = thickness: attached component
i = channel lip thickness
s = washer thickness → see page 56

v_{min} = m + u
m = nut height EN ISO 4032
u = T-bolt protrusion approx. 5 mm according to DIN 78 (T-bolts M20 - M30 require min. 7 mm)

Dimensions v_{min}

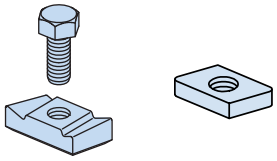
T-bolt diameter	v_{min} = m + u [mm]	[in]
M6	11.0	0.43
M8	12.5	0.49
M10	14.5	0.57
M12	17.0	0.70
M16	20.5	0.81
M20	26.0	1.02
M24	29.0	1.14
M27	31.5	1.24
M30	33.5	1.32

Thickness channel lip i

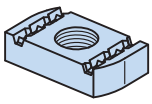
Profile	28/15	29/20	38/17	36/36	38/23	40/22	40/25	41/22	41/27	422	486	49/30	50/30	50/40	52/34	53/34	55/42	64/44	72/48
i [mm]	2.25	5.0	3.0	2.5	5.5	6.0	5.6	7.0	7.0	6.0	6.0	7.39	7.85	7.0	10.5	7.5	12.9	10.0	15.5
i [in]	0.09	0.20	0.12	0.10	0.22	0.24	0.22	0.28	0.28	0.24	0.24	0.29	0.31	0.28	0.41	0.30	0.51	0.39	0.61

Locking plates GWP

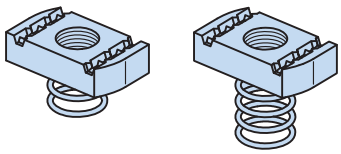
Locking plates (channel nuts) allow any metric T-bolt or threaded rod to be used.



Locking plates with "grip" **(see medium duty framing system, page 44)**. The "serration" grips the channel lips.



Locking plates with spring are used in particular for securing plates or panels **(see medium duty framing system, page 44)**.



Ordering examples

Order example – channels

HM 50/30-HDG-6070

Type
Material
Length (mm)

or use the 12-digit order no. e.g. 0280.200-00003

Order example – HALFEN T-bolts

HS 50/30 M20x100 EP 8.8

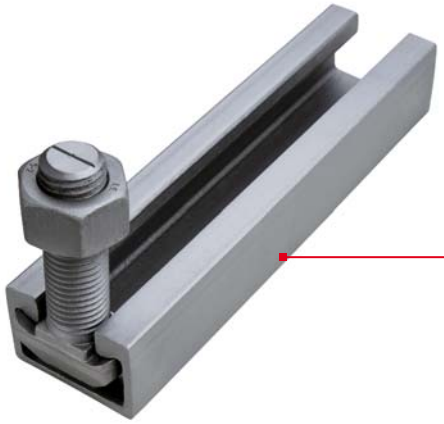
Type
Thread diam.
Length (mm)
Material
Strength class

or use the 12-digit order no. e.g. 0350.090-00081
Order numbers for HALFEN T-bolts can be found in the HALFEN pricelist, available from www.halfen.com.

Framing Channels

The advantages at a glance

Whether for low or very high loads: you will always find a cost effective solution for your requirements in the HALFEN product range of channels and T-bolts.



Heavy duty framing system
Heavy duty channels are predominantly hot-rolled, and are particularly suitable for high or dynamic loads. Some are toothed.

Versatile and adaptable

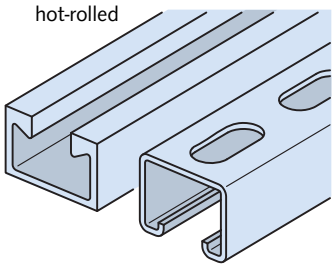
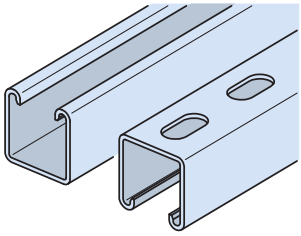
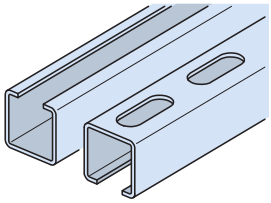
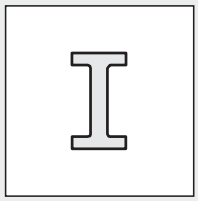
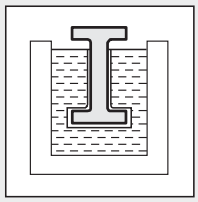
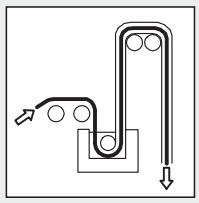
- mechanical connections can be changed at any time
- wide range of application
  - machinery fabrication
  - vehicle manufacturing
  - steel construction
  - industrial buildings, and many other sectors

Medium duty framing system
All medium duty channels have a strut-style slot width, and can be used to build pipe support frames. They are compatible with the innovative Powerclick framing system.

Secure and reliable

- Corrosion protection is not affected by changes to the connection location - at the time of fabrication, or in-service
- wide selection of channels with varying load capacities
- toothed channels for mechanical load transfer connections

Light duty framing system
The light duty channels are an ideal framing solution for low loads.

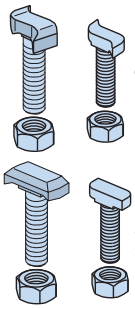
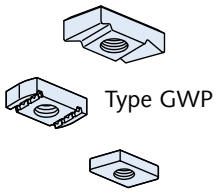
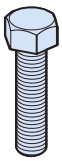
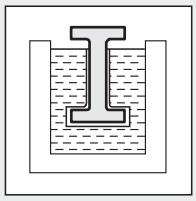
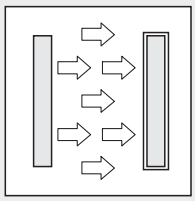
HALFEN Channels		Heavy duty mounting systems	Medium duty framing systems	Light duty mounting systems
				
Material: Order code		Pages 14 - 34	Pages 35 - 44	Pages 45 - 53
 Mill-finished	MF	Hot-rolled Material to ASTM A 283, Gr. D Type HZM: to ASTM A 283, Gr. D Cold-rolled:Material to ASTM A 283, Gr. C Mill-finished	Material to ASTM A 283, Gr. Dor equivalent steel gradeaccording to British Standard BS 1449, Sect. 1.4, 1991 Mill-finished	Material to ASTM A 283, Gr. D Mill-finished
 Hot-dip galvanizedASTM A123 or ASTM A153 suitable for outdoor application	HGD	Hot-rolled Material to ASTM A 283, Gr. D Type HZM: ASTM A 283, Gr. D Cold-rolled:Material to ASTM A 283, Gr. C Hot dip galvanized to ASTM A 123, or ASTM A 153 zinc coating min. 50 µm	Material to ASTM A 283, Gr. Dor equivalent steel gradeaccording to British Standard BS 1449, Sect. 1.4, 1991 Hot dip galvanized, toASTM A 123, or ASTM A 153 zinc coating min. 50 µm	Material to ASTM A 283, Gr. D Hot dip galvanized, DIN EN ISO 1461 zinc coating min. 50 µm
 Strip-galvanized acc. to EN 10142 suitable for indoor application	PG		DX51D + Z275NA, DIN EN 10327 Pre-galvanized, mechanical galvanizing min. 20 µm	DX51D + Z275NA, DIN EN 10327 Pre-galvanized, mechanical galvanizing min. 20 µm
 Stainless steel ASTM A666	A2			Material type 304, ASTM A666 Type 304 annealed
	A4	Material type 316, ASTM A666 type 316 annealed	Material type 316, ASTM A666 Type 316 annealed	Material type 316, ASTM A666 Type 316 annealed
	HCR	HCR = high corrosion resistant stainless steel, material no. 1.4529 or 1.4547 (UNS N08926), acc. to EN 10088, for channels 49/30		HCR = high corrosion resistant stainless steel, material no. 1.4529 or 1.4547 (UNS N08926), DIN EN 10088, for channels 28/15 and 38/17

Stainless steel A4: Chromium is the important element in stainless steel. A specific chromium concentration ensures the generation of a passive layer on the surface of the steel that protects the base material against corrosion. The result is the high corrosion resistance of stainless steel.

HALFEN T-bolts/Accessories

① HALFEN T-bolts with s-shape head for safer assembly. The head shape guarantees better hold, preventing the T-bolt turning in the channel, even coping with manufacturing tolerances in the channel widths. HALFEN supplies both types;
subject to change.

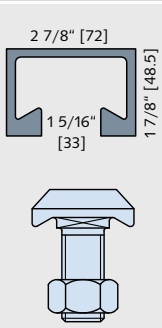
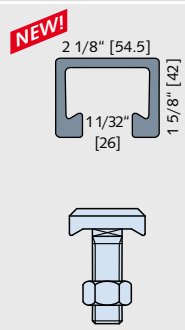
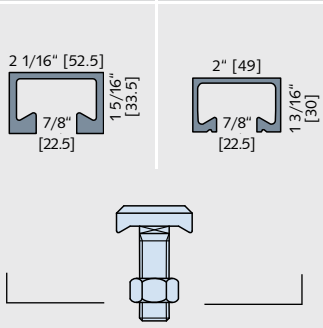
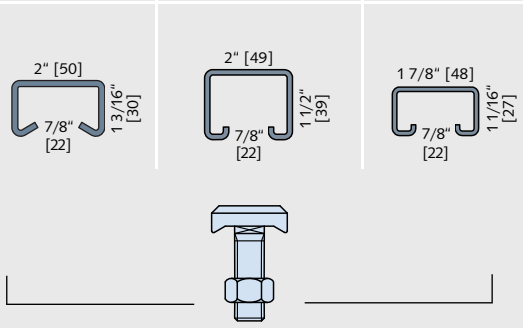
Material: **Order code**

		HALFEN T-bolts	Locking plates	Hexagon bolts	Hexagon nuts
		Types **HS, HSR, HZS** incl. nut  ① Standard s-shaped head alternative shape of T-bolt head Pages 54 - 5	 Type GWP	 Type **HSK** EN ISO 4017 DIN 933 Page 57	 Type **MU** DIN EN ISO 4032 DIN 934 Page 56
 Hot-dip galvanized acc. EN ISO 10684, for threads DIN 267 part 10	**HDG 4.6**	Hot dip Galvanized in accordance with ASTM A123 or A153 strength class 4.6 in accordance with ASTM F568 Gr. 4.6			Hot-dip galvanized acc. to EN ISO 10684 strength 8
	HDG 8.8	Hot dip Galvanized in accordance with ASTM A123 or A153 strength class 8.8 in accordance with ASTM F568 Gr. 8.8			
 Zinc-electroplated acc. to DIN 50961, DIN EN 1403, DIN EN ISO 4042 zinc flake coating	**EP 4.6**	Special zinc plating Cr(VI)-free, min. 12 µm, strength class 4.6 in accordance with ASTM F568 Gr. 4.6	Zinc-electroplated Cr(VI)-free, zinc cover min. 5 µm		Zinc-electroplated Cr(VI)-free, zinc cover min. 5 µm, property class 8
	EP 8.8	Special zinc plating Cr(VI)-free, min. 12 µm, strength class 8.8 in accordance with ASTM F568 Gr. 8.8		Zinc-electroplated Cr(VI)-free, zinc cover ca. 5 µm, property class 8.8	
	zl	Zinc flake coating (only Type HZS 41/41)			
 Stainless steel acc. to EN 10088 resp. DIBt-Certificate Z-30.3-6	**A2**	Type 304 grade 50 according to ASTM F738M, A1-50, AF			Stainless steel type 304
		Type 304 grade 70 according to ASTM F738M, A1-70, AF			
	A4		Stainless steel A4	Stainless steel type 316 grade 70	Stainless steel type 316
		Type 316 grade 50 according to ASTM F738M, A4-50, AF			
		Type 316 grade 70 according to ASTM F738M, A4-70, AF			
	HCR	Material no. 1.4529, Grade HCR-50 according to DIN EN ISO 3506-1 on request			
	FA	Material no. 1.4462 Grade 70			

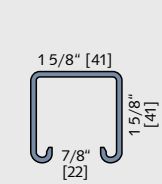
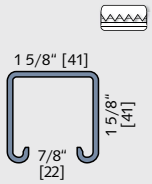
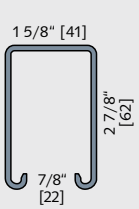
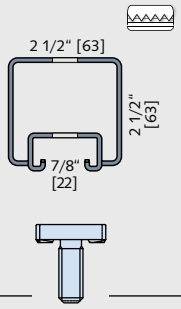
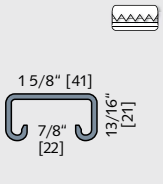
Stainless steel A4: Chromium is the important element in stainless steel. A specific chromium concentration ensures the generation of a passive layer on the surface of the steel that protects the base material against corrosion. The result is the high corrosion resistance of stainless steel.

Product Range Overview: Channels and HALFEN T-bolts

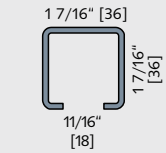
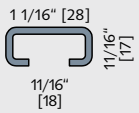
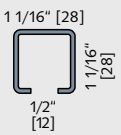
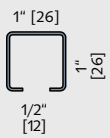
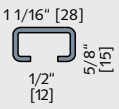
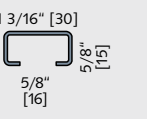
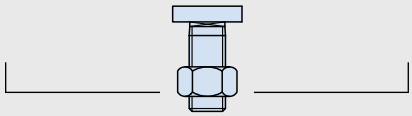
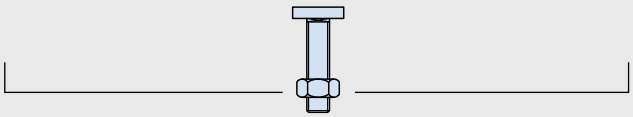
Heavy duty system

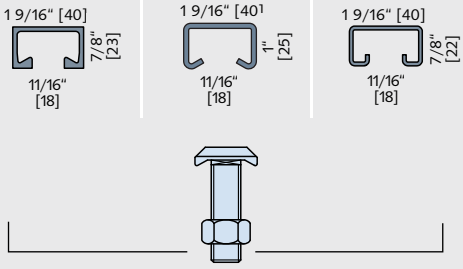
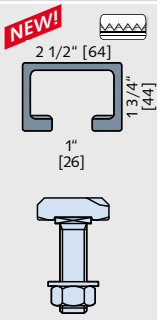
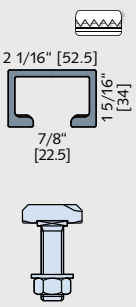
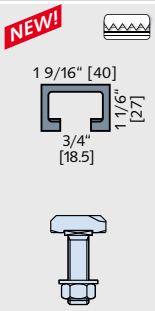
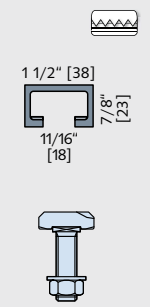
Hot-rolled				Cold-rolled		
HM 72/48	HM 55/42	HM 52/34	HM 50/30	HM 49/30 *	HM 50/40, HL 50/40 *	HM 486 *
						
HS 72/48, HSR 72/48, GWP 72/48	HS 50/30	HS 50/30, HSR 50/30, GWP 50/30		HS 50/30, GWP 50/30 and GWP 50/40		

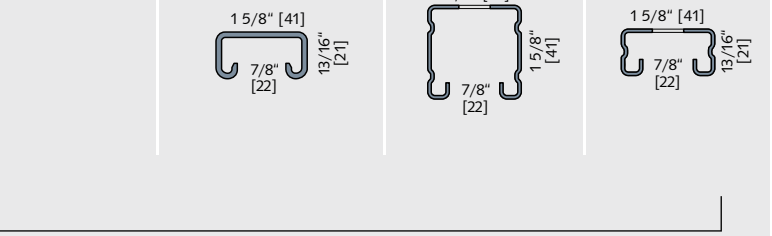
Medium duty system

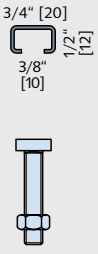
Cold-rolled	Cold-rolled, toothed	Cold-rolled		Cold-rolled, toothed	
HM 41/41, HL 41/41	HZM 41/41, HZL 41/41	HM 41/62, HL 41/62 *	HM 41/83, HL 41/83 *	HZL 63/63	HZM 41/22, HZL 41,22
					
HZS/HS 41/41, HZS 41/22 GWP 41/41, GWP 41/22					

Light duty framing system

Cold-rolled					
HM 36/36, HL 36/36	HM 38/17	HM 28/28, HL 28/28 *	HM 26/26, HL 26/26 *	HM 28/15, HL 28/15	HM 315 *
					
					
HS 38/17, GWP 38/17		HS 28/15, GWP 28/15			GWP 28/15

Hot-rolled	Cold-rolled		Hot-rolled, toothed				
HM 40/22	HM 40/25 *	HM 422 *	HZM 64/44	HZM 53/34	HZM 41/27 *	HZM 38/23	HZM 29/20
							
HS 40/22, HSR 40/22, GWP 40/22			HZS 64/44	HZS 53/34	HZS 38/23	HZS 38/23, HS 38/17	HZS 29/20, HS 28/15

Cold-rolled		
HM 41/22, HL 41/22	HLL 41/41 *	HLL 41/22 *
		

Cold-rolled
HM 20/12, HL 20/12 *

HS 20/12, GWP 20/12

Material and finishes:

- Hot-dip galvanized HDG or mill finish MF
- Pre-galvanized PG
- Stainless steel A4 1.4571/1.4404 (comparable to 316)
- Stainless steel A2 1.4301/1.4307 (comparable to 304)
- Stainless steel HCR 1.4547/1.4529 (comparable to UNS N08926, Alloy 926)

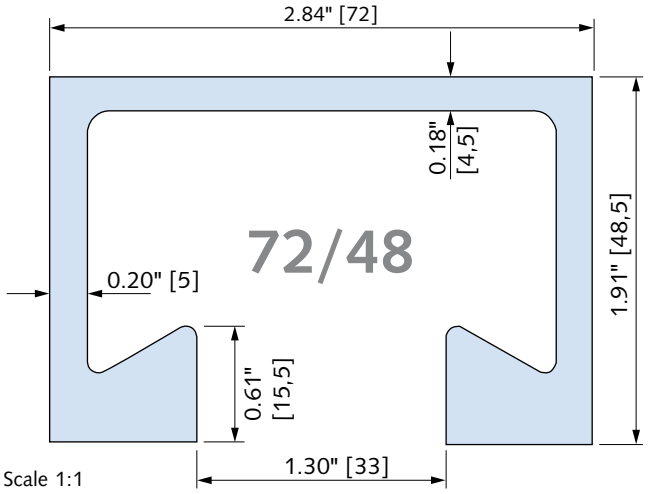
Further information on materials and finishes → see page 10

HZM/HZL toothed profiles

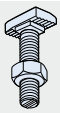
* indicates available on special order, allow 4-8 weeks
Other channels are generally available ex-stock

Mounting channel HM 72/48

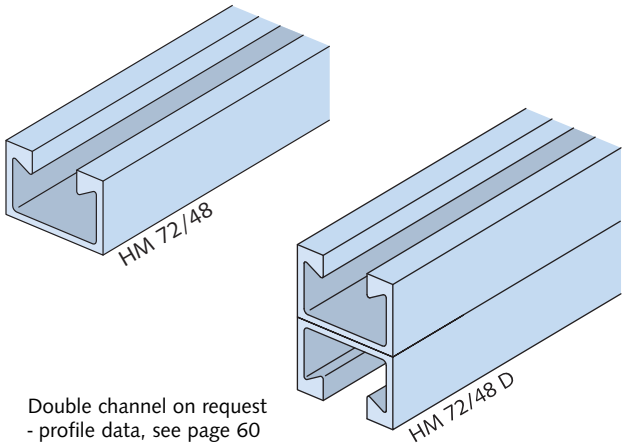
HM 72/48 hot-rolled



Scale 1:1
in [mm]



Suitable HALFEN T-bolt HS 72/48
and HSR 72/48 → see page 15



Double channel on request
- profile data, see page 60

Cross-section properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus	
HM 72/48	280.	[mm]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]
MF	180-00002	239	5.95	1.747	0.840	2.002	0.871	1.413
HDG	180-00003							
A4	180-00001							

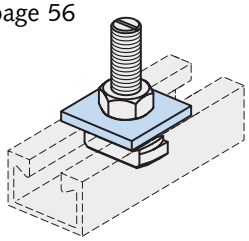
Load capacities

Max. point-load bearing capacity		Bending load capacity at span L		
F_z ① [kips]	e_w [in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
allow. F_z	11.82	allow. F		
10.57		5.01	2.52	1.66

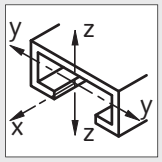
① F_z = max. load bearing capacity of the channel lips - see also page 66

Accessories

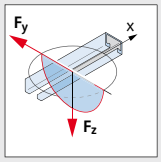
VUS 72/49 Washer
→ see page 56



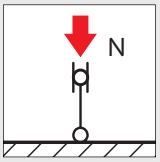
Further design properties



Cross section summary
page 60

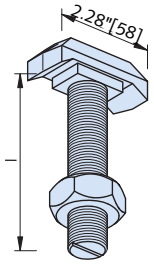


Statics, weld seams
pages 66 - 67

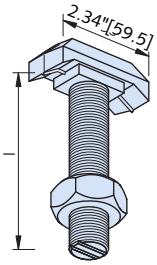


Flexural buckling
page 70

HALFEN T-bolts HS 72/48 and HSR 72/48



HS 72/48
HALFEN T-bolt
incl. nut



HSR 72/48
HALFEN T-bolt with nib incl. nut, for hot-rolled channels in carbon steel MF/HDG

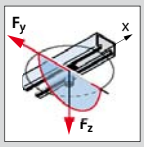
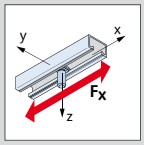
HS 72/48 available T-bolts

Length l in. nom.[mm]	M20	M24	M27	M30	Length l in. nom.[mm]	M20	M24	M27	M30
2" [50]	HDG 4.6	HDG 4.6 A4-50			6" [150]	HDG 4.6	HDG 4.6 EPs 8.8		HDG4.6
2 3/8" [60]	HDG 8.8								
3" [75]	HDG 4.6 EPs 8.8	HDG 4.6 HDG 8.8	HDG 4.6	HDG4.6	8" [200]	HDG 4.6	HDG 4.6		HDG4.6
4" [100]	HDG 4.6 EPs 8.8	HDG 4.6 EPs 8.8 A4-50	HDG 4.6 HDG 8.8	HDG4.6					

HSR 72/48 available T-bolts

Length l in. nom. [mm]	M20
3" [75]	HDG 8.8

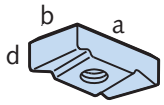
Load bearing capacities for HALFEN T-bolts ①

Thread Ø	Load capacities for HALFEN T-bolts  F [kips] ①				Recommended load capacity per HALFEN T-bolt in channel longitudinal direction  F_x [kips]				Recommended torque  T_{inst} [ft-lb]			
72/48		HS			HSR	HS ②			HSR ν = 3 ③	HS			HSR
		4.6	8.8	A4-50	8.8	4.6	8.8	A4-50	8.8	4.6	8.8	A4-50	8.8
M20	allow. F	5.64	12.59	-	12.59	0.31	1.06	-	1.69	96	266	-	295
M24	allow. F	8.14	18.14	7.15	-	0.45	1.53	0.45	-	148	502	148	-
M27	allow. F	10.59	23.58	-	-	0.58	2.00	-	-	221	738	-	-
M30	allow. F	12.95	-	-	-	0.72	2.45	-	-	295	-	-	-

① Note: do not exceed the max. channel load bearing capacity
② Load capability due to friction
③ Acc. to expert report

Locking plates

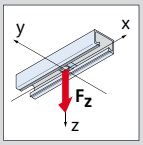
Locking plate GWP 72/48



GWP 72/48 available plates

EP thread	A4 thread	a in [mm]	b in [mm]	d in [mm]
M12	M12	2.44" [62]	1.22" [31]	0.87" [22]
M16	M16			
M20	M20			

Load capacities GWP 72/48

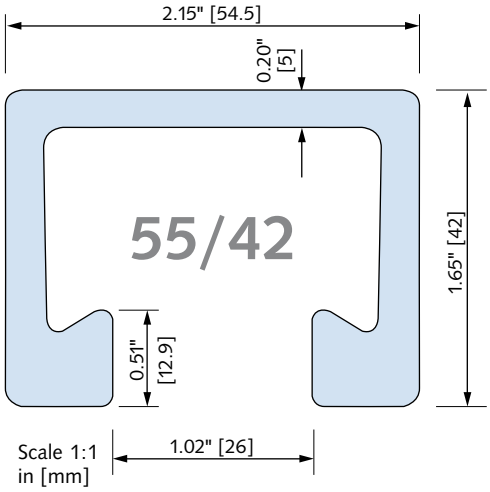


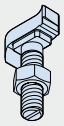
Thread	Load capacity [kips]	
M12	allow. F	2.10
M16	allow. F	3.89
M20	allow. F	4.95

GWP 72/48 locking plates are available with UNC threads, please contact HALFEN USA.

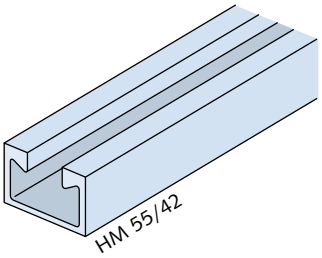
Mounting channel HM 55/42

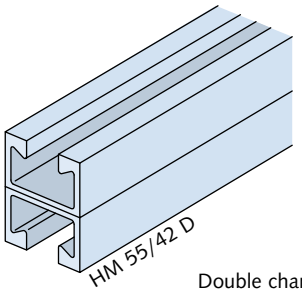
HM 55/42 hot-rolled NEW!





Suitable HALFEN T-bolt HS 50/30, see page 21





Double channel on request - profile data, see page 60

Cross-sectional properties

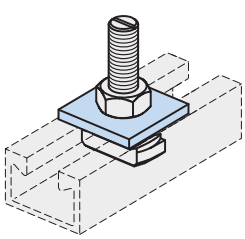
Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	e_w	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
HM 55/42	0280.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]			
MF	290-00001	239	4.54	1.335	0.450	0.872	0.518	0.813	allow. F_z	9.84	allow. F		
HDG	290-00002								8.68		3.78	1.89	1.26

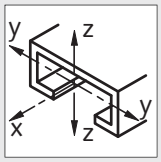
① F_z = max. load bearing capacity of the channel lips - see also page 66

Accessories

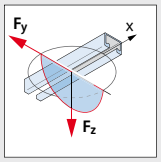
VUS 72/49 Washer
→ see page 56



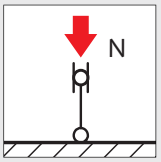
Further design properties



Cross section summary page 60



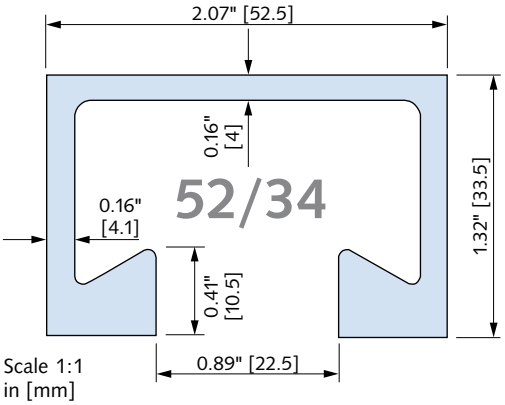
Statics, weld seams pages 66 - 67

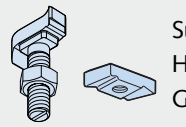


Flexural buckling page 70

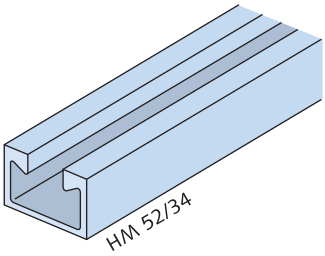
Mounting channel HM 52/34

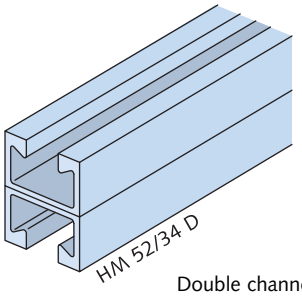
HM 52/34 hot-rolled





Suitable HALFEN T-bolts and locking plates HS 50/30, HSR 50/30, GWP 50/40 and GWP 50/30 → see pages 21 - 22





Double channel on request
- profile data, see page 60

Cross-sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus	
			G	A	I_y	I_z	W_y	W_z
HM 52/34	0280.	[mm]	[lb/ft]	[in²]	[in⁴]	[in⁴]	[in³]	[in³]
MF	190-00002	239	3.35	0.984	0.224	0.570	0.327	0.552
HDG	190-00003							
A4	190-00001							

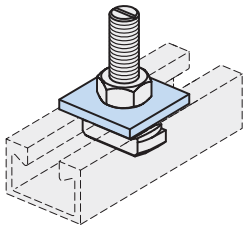
Load capacities

Max. Point-load bearing capacity		Bending load capacity at span L		
		F [kips]		
F_z ①	e_w	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
[kips]	[in]			
allow. F_z	7.87	allow. F		
5.82		1.98	0.99	0.63

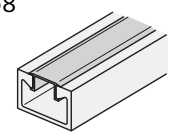
① F_z = max. load bearing capacity of the channel lips - see also page 66

Accessories

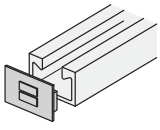
VUS 52/34 Washer
→ see page 56



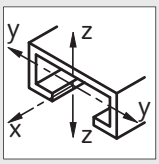
PA - 22 Channel cover
→ see page 58



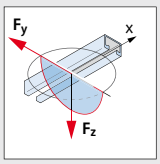
HPE 52/34 Channel end cap
→ see page 58



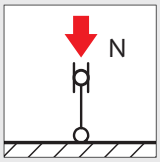
Further design properties



Cross section summary page 60



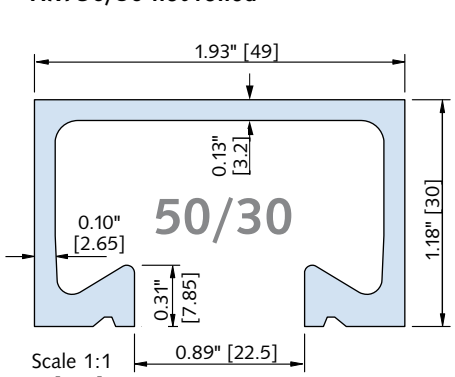
Statics, weld seams pages 66 - 67

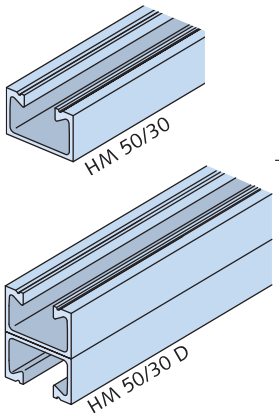


Flexural buckling page 70

Mounting channel HM 50/30 and HM 49/30

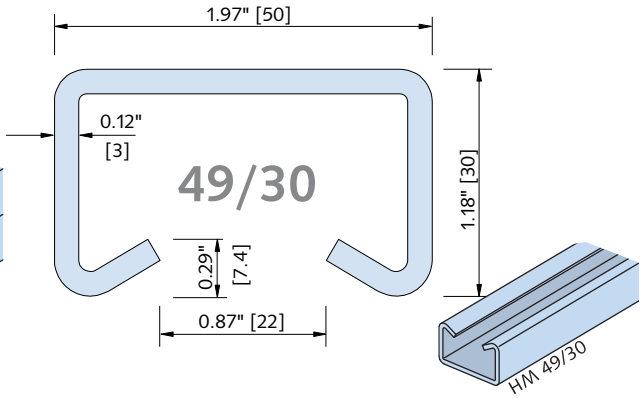
HM 50/30 hot-rolled





Double channel on request - profile data, see page 60

HM 49/30 cold-rolled



Cross-sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus	
HM 50/30	0280.		G	A	I_y	I_z	W_y	W_z
		[in]	[lb/ft]	[in²]	[in⁴]	[in⁴]	[in³]	[in³]
MF	200-00002	239	2.19	0.643	0.126	0.331	0.197	0.343
HDG	200-00003							
A4	200-00001							
HM 49/30	0280.							
MF	220-00001	239	1.94	0.569	0.100	0.318	0.143	0.323
HDG	220-00002							
A2 ②	220-00003							
A4	220-00004							

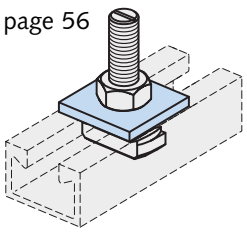
Load capacities

Max. point-load bearing capacity		Bending load capacity at span L		
F_z ①	e_w	F [kips]		
[kips]	[in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
allow. F_z		allow. F		
3.24	7.87	1.21	0.61	0.36
allow. F_z		allow. F		
1.10	18.11	0.97	0.49	0.27

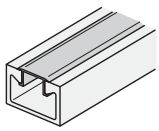
① F_z = max. load bearing capacity of the channel lips; ② Stainless steel A2 on request. Note: HCR for HM 49/30 on request

Accessories

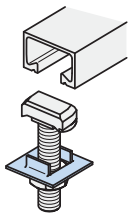
VUS 52/34 Washer
→ see page 56

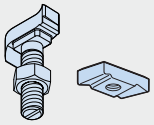


PA - 41 Channel cover
→ see page 58



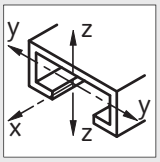
SIC 50/30 Locking washer → see page 56



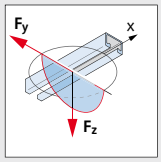


Suitable HALFEN T-bolts and locking plates HS 50/30, HSR 50/30 and GWP 50/30 → see pages 21 - 22

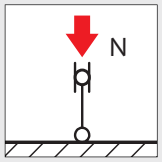
Further design properties



Cross section summary pages 60, 62



Statics, weld seams pages 66 - 67

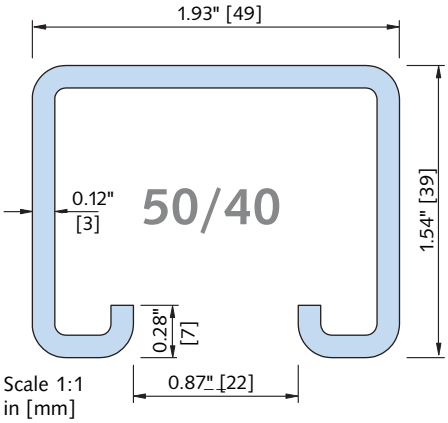


Flexural buckling pages 70 - 71

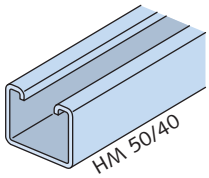
Mounting channel HM and HL 50/40

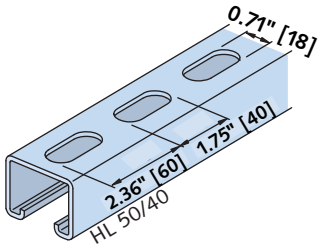
HM 50/40 and HL 50/40 cold-rolled

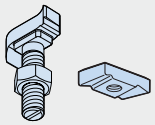
SPECIAL ORDER



Scale 1:1
in [mm]







Suitable HALFEN T-bolts and locking plates
HS 50/30, GWP 50/40
→ see pages 21 - 22

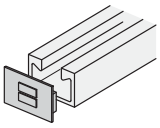
Cross-sectional properties / Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	F [kips]		
HM 50/40	0280.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
MF	090-00002	236.2	2.25	0.660	0.208	0.372	0.242	0.386	allow. F_z 1.21	24.8	allow. F 1.53	0.76	0.52
HDG	090-00003												
A4	090-00001												
HL 50/40	0281.												
MF	100-00001	236.2	2.12	0.578	0.172	0.369	0.223	0.366	allow. F_z 1.21	20.9	allow. F 1.28	0.65	0.43
HDG	100-00002												
A4	100-00003												

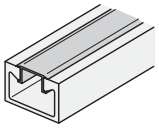
① F_z = max. load bearing capacity of the channel lips

Accessories

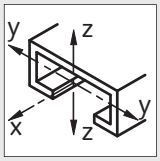
HPE 50/40 Channel end cap
→ see page 58



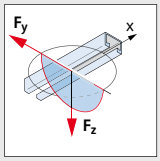
PA - 41 Channel cover
→ see page 58



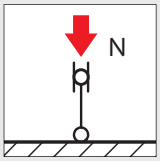
Further design properties



Cross section summary pages 62, 64



Statics, weld seams page 68

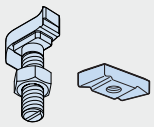


Flexural buckling page 71

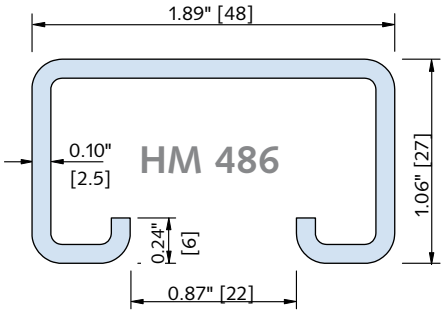
Mounting channel HM 486

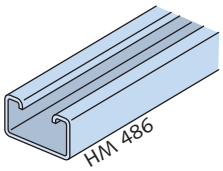
HM 486 cold-rolled

SPECIAL ORDER



Suitable HALFEN T-bolts and locking plates
HS 50/30 and GWP 50/40
→ see pages 21 - 22





Scale 1:1
in [mm]

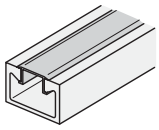
Cross-sectional properties / Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
HM 486	0280.	[in]	[lb/ft]	[in²]	[in⁴]	[in⁴]	[in³]	[in³]	[kips]	[in]			
MF	100-00001	236.2	1.55	0.457	0.071	0.231	0.117	0.245	allow. F_z	18.50	allow. F		
HDG	100-00002								0.79		0.74	0.38	0.20

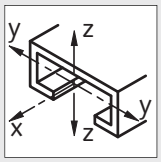
① F_z = load bearing capacity of the channel lips

Accessories

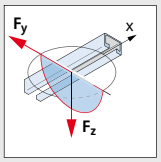
PA - 41 Channel cover
→ see page 58



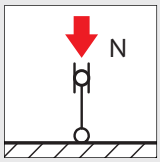
Further design properties



Cross section summary pages 62, 64

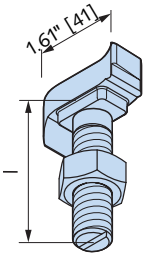


Statics, weld seams page 68



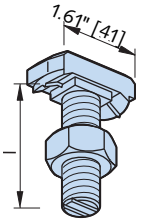
Flexural buckling page 71

HALFEN T-bolts HS 50/30 and HSR 50/30



HS 50/30
HALFEN T-bolt
incl. nut

Li = left-hand thread



HSR 50/30
HALFEN T-bolt with nib, incl. nut, for hot-rolled profiles in carbon steel MF/HDG

HS 50/30 available T-bolts

Length l in [mm]	M10	M12	M16	M20	M24①
1 1/4" [30]	EPs 4.6 HDG4.6	EPs 4.6 A4-70	EPs 4.6 A4-50	-	-
1 3/8" [35]				EPs 4.6	-
1 1/2" [40]	EPs 4.6	EPs 4.6 HDG4.6 A4-70	EPs 4.6 EPs 8.8 HDG4.6 A4-50	-	-
1 3/4" [45]	-	EPs 8.8	-	EPs 4.6 EPs 8.8 A4-50	-
2" [50]	EPs 4.6	EPs 4.6 A4-70	EPs 4.6 HDG4.6 A4-50	-	-
2 1/8" [55]	-	-	-	EPs 4.6 HDG4.6 A4-50	-
2 3/8" [60]	-	EPs 4.6 EPs 8.8	EPs 4.6 EPs 8.8 HDG8.8 A4-50	EPs 8.8	-
2 9/16" [65]	-	-	-	EPs 4.6	-

Length l in [mm]	M10	M12	M16	M20	M24①
3" [75]	-	-	-	EPs 4.6 A4-50 FA-70	HDG4.6
3 1/4" [80]	-	EPs 4.6 EPs 8.8	EPs 4.6 EPs 8.8 A4-50 A4-70	EPs 8.8	-
3 1/4" [80] Li	-	-	A4-50		-
4" [100]	-	EPs 4.6 A4-50	EPs 4.6 EPs 8.8 HDG4.6	EPs 4.6 EPs 8.8 HDG4.6 A4-50 FA-70	-
5" [125]	-	EPs 4.6	EPs 4.6	EPs 4.6 A4-50	-
6" [150]	-	EPs 4.6	EPs 4.6 HDG4.6 A4-50	EPs 4.6 EPs 8.8 A4-50	-
8"[200]	-	EPs 4.6	EPs 4.6	EPs 4.6	-
12" [300]	-	-	EPs 4.6	EPs 4.6	-

① For HM 55/42 only Note: inch lengths are nominal
High corrosion resistant stainless steeel HCR for HS 50/30 on request

HSR 50/30 available T-bolts

Length l in [mm]	M10	M12	M16	M20
1 1/2"[40]			HDG 8.8	
1 3/4"[45]				EPs 8.8
2 3/8"[60]			EPs 8.8	EPs 8.8

Length l in [mm]	M10	M12	M16	M20
3" [75]				EPs 8.8

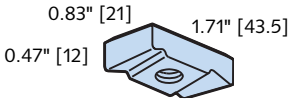
Load bearing capacities for HALFEN T-bolts ①

Thread Ø		Load capacities for HALFEN T-bolts F [kips]						Recommended load capacity per HALFEN T-bolt in channel longitudinal direction F_x [kips]					Recommended torque T_{inst} [Ft-lb]					
50/30		HS					HSR	HS ②				HSR ③	HS					HSR
		4.6	8.8	A4-50	A4-70	FA-70	8.8	4.6	8.8	A4-50; A4-70	FA-70	8.8	4.6	8.8	A4-50	A4-70	FA-70	8.8
M10	allow. F	1.32	2.99	-	-	-	-	0.07	0.25	-	-	-	11	30	-	-	-	-
M12	allow. F	1.93	4.34	1.71	3.64	-	-	0.11	0.36	0.11	-	-	18	52	18	-	-	-
M16	allow. F	3.62	8.07	3.17	6.79	-	8.07	0.20	0.67	0.20	-	1.12	48	133	44	96	-	148
M20	allow. F	5.64	12.59	4.97	-	10.59	12.59	0.31	1.06	0.31	0.31	1.69	96	266	89	-	184	295
M24	allow. F	8.14	-	-	-	-	-	0.45	1.53	-	-	-	170	-	-	-	-	-

① Note: do not exceed the max. channel load bearing capacity ② Load capability due to friction ③ acc. to expert report, v = 3

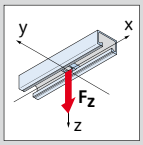
Locking plates GWP 50/30

Locking plate
GWP 50/30



GWP 50/30 available thread sizes		
HDG	EP	A4
-	M8	M8
M10	M10	M10
M12	M12	M12
M16	M16	M16

Load capacities for locking plates 50/30



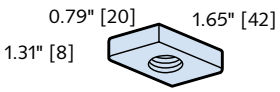
50/30

Thread		Load capacity [kips]
M8	allow. F	0.90
M10	allow. F	1.44
M12	allow. F	2.09
M16	allow. F	2.09

GWP 50/30 locking plates are available with UNC threads, please contact HALFEN USA.

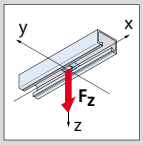
Locking plates GWP 50/40

Locking plate
GWP 50/40



GWP 50/40 available thread sizes	
EP	A4
M6	M6
M8	M8
M10	M10
M12	M12
M16	M16

Load capacities for locking plates 50/40

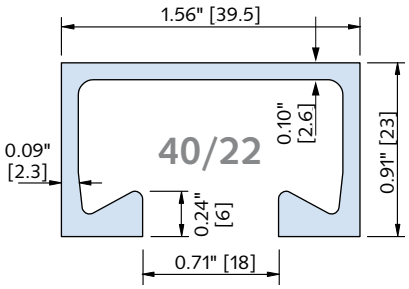


50/40

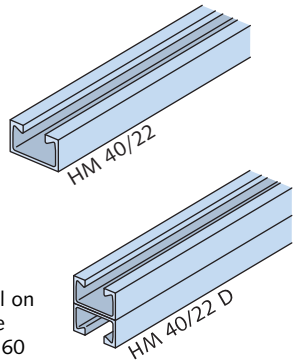
Thread		Load capacity [kips]
M6	allow. F	0.49
M8	allow. F	0.90
M10	allow. F	1.44
M12	allow. F	1.44
M16	allow. F	1.44

Mounting channel HM 40/22, HM 40/25

HM 40/22 hot-rolled



Scale 1:1
in [mm]

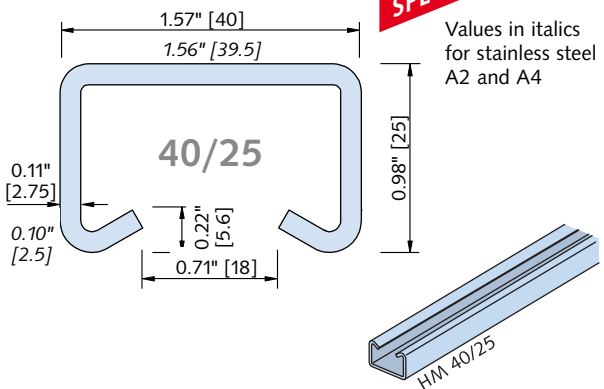


Double channel on request - profile data, see page 60

HM 40/25 cold-rolled

SPECIAL ORDER

Values in italics for stainless steel A2 and A4



Cross-sectional properties

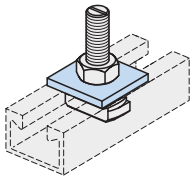
Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	e_w	F [kips]		
HM 40/22	0280.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
MF	210-00002	239	1.41	0.419	0.048	0.139	0.097	0.178	allow. F_z 1.84	5.91	allow. F 0.58	0.29	0.13
HDG	210-00003												
A4	210-00001												
HM 40/25	0280.												
MF	230-00001	239	1.40	0.412	0.049	0.146	0.085	0.186	allow. F_z 0.85	12.99	allow. F 0.58	0.29	0.13
HDG	230-00002												
A2	230-00003												
A4	230-00004												

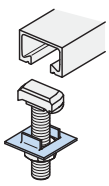
① F_z = max. load bearing capacity for the channel lips - see also page 66

Accessories

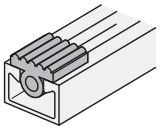
VUS 40/25
Washer
→ see page 56

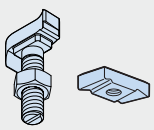


SIC 40/22
Locking washer
→ see page 56



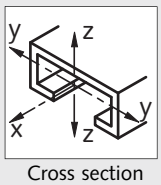
SDM - 36/6
Rubber vibration absorber
→ see catalog MT-FFC



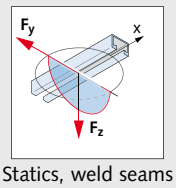


Suitable HALFEN T-bolts and locking plates HS 40/22, HSR 40/22 and GWP 40/22 → see page 25

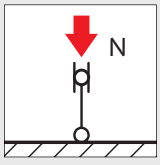
Further design properties



Cross section summary pages 60, 62



Statics, weld seams pages 66 - 67

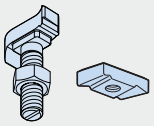


Flexural buckling pages 70 - 71

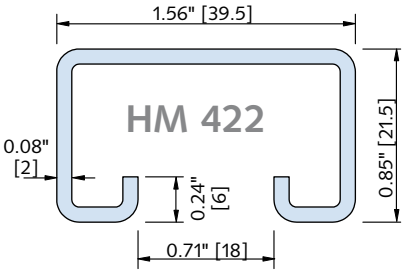
Mounting channel HM 422

HM 422 (C40) cold-rolled

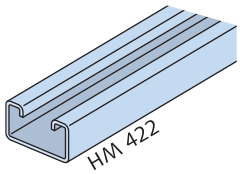
SPECIAL ORDER



Suitable HALFEN T-bolts and locking plates HS 40/22 and GWP 40/22
→ see page 25



Scale 1:1
in [mm]



Cross-sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		elastic section modulus	
HM 422	0280.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]
MF	110-00001	236.2	1.04	0.307	0.031	0.103	0.063	0.132
HDG	110-00002							

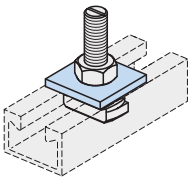
Load capacities

Max. point-load bearing capacity		Bending load capacity at span L		
F_z ① [kips]	≤ e_w [in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
allow. F_z	14.17	allow. F		
0.56		0.40	0.20	0.09

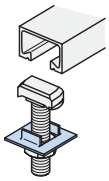
① F_z = max. load bearing capacity of the channel lips

Accessories

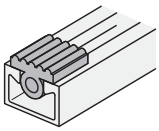
VUS 40/25
Washer
→ see page 56



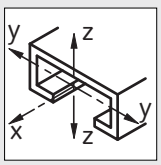
SIC 40/22
Locking washer
→ see page 56



SDM - 36/6
Rubber vibration absorber
→ see catalog MT-FFC

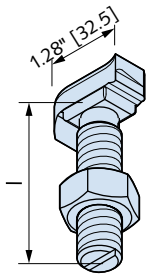


Further design properties



Cross section summary
page 62

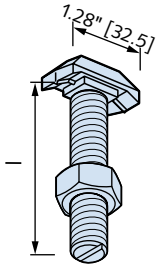
HALFEN T-bolts HS 40/22 and HSR 40/22



HS 40/22
HALFEN T-bolt
incl. nut

Li = left-hand thread

HSR 40/22
HALFEN T-bolt with nib, incl. nut, for hot-rolled profiles in carbon steel MF/HDG



HS 40/20 available T-bolts

Length l in [mm]	M10	M12	M16
3/4" [20]	EPs 4.6	EPs 4.6	
1 1/4" [30]	EPs 4.6 A4-70	EPs 4.6 EPs 8.8 HDG 4.6 A4-50	EPs 4.6 A4-50
1 1/2" [40]	EPs 4.6 A4-70	EPs 4.6 EPs 8.8 A4-50 A4-70	EPs 4.6 A4-50 A4-70
1 3/4" [45]		EPs 8.8	
2" [50]	EPs 4.6 A4-70	EPs 4.6 HDG 4.6 A4-50	EPs 4.6 HDG 4.6 A4-50 A4-70
2 3/8" [60]	EPs 4.6	EPs 4.6 EPs 8.8	EPs 4.6 EPs 8.8 HDG 4.6 A4-50
3 1/4" [80]	EPs 4.6	EPs 4.6 EPs 8.8 A4-50	EPs 4.6 EPs 8.8 A4-50
3 1/4"[80] Li	-	A4-50	A4-50
4" [100]	EPs 4.6	EPs 4.6 EPs 8.8 A4-50	EPs 4.6 HDG 4.6 A4-50
5" [125]	-	EPs 4.6	EPs 4.6
6" [150]	-	EPs 4.6 A4-50	EPs 4.6 A4-50
8" [200]	-	EPs 4.6	EPs 4.6
10" [250]	-	-	EPs 4.6
12" [300]	-	-	EPs 4.6

HSR 40/22 available T-bolts

Length l in [mm]	M10	M12	M16
1 1/2" [40]	-	-	EPs 8.8
2 3/8" [60]	-	-	EPs 8.8

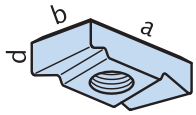
Load bearing capacities for HALFEN T-bolts ①

Thread Ø		Load capacities for HALFEN T-bolts F [kips]					Recommended load capacity per HALFEN T-bolt in channel longitudinal direction ② F_x [kips]					Recommended torque T_{inst} [ft-lb]				
40/22		HS				HSR	HS				HSR ③	HS				HSR
		4.6	8.8	A4-50	A4-70	8.8	4.6	8.8	A4-50	A4-70	8.8	4.6	8.8	A4-50	A4-70	8.8
M10	allow. F	1.33	-	-	2.52	-	0.07	-	-	0.3	-	11	-	-	22	-
M12	allow. F	1.93	4.34	1.71	-	-	0.11	0.36	0.11	-	-	18	52	18	-	-
M16	allow. F	3.62	8.07	3.17	6.79	8.97	0.20	0.67	0.20	0.20	1.12	48	133	44	96	148

① Note: do not exceed the channel load bearing capacity ② Load capability due to friction ③ acc. to expert report, ν = 3

Locking plates GWP 40/22

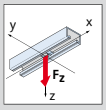
Locking plate GWP 40/22



GWP 40/22 available plates

EP	A4	a in [mm]	b in [mm]	d in [mm]
M5	-	1.38" [35]	0.67" [17]	0.39" [10]
M6	-			
M8	M8			
M10	M10			
M12	M12			0.45" [11.5]

Load capacities for GWP 40/22



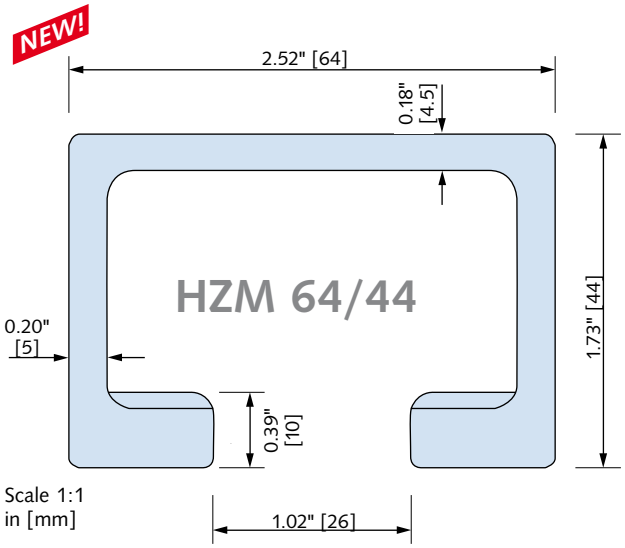
40/22

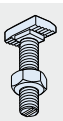
Thread	Load capacity [kips]	
M5	allow. F	0.49
M6	allow. F	0.49
M8	allow. F	0.90
M10	allow. F	1.44
M12	allow. F	2.09

GWP 40/22 locking plates are available with UNC threads, please contact HALFEN USA.

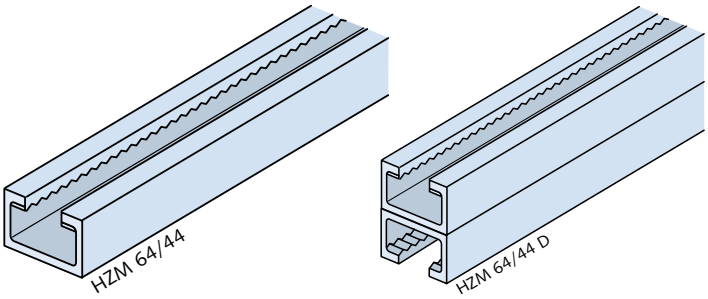
Mounting channel HZM 64/44

HZM 64/44 hot-rolled, toothed





Suitable HALFEN T-bolts
HZS 64/44 → see page 27



Double channel on request
- profile data, see page 60

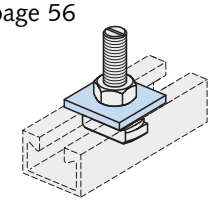
Cross-sectional properties / Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	39.4"	78.7"	118.1"
HZM 64/44	0284.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	[1.0]	[2.0]	[3.0]
MF	080-00002												
HDG	080-00003	239	4.80	1.411	0.573	1.296	0.632	1.028	allow. F_z 8.57	9.84	allow. F 5.58	2.79	1.60
A4	080-00001												

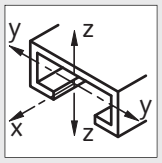
① F_z = max. load bearing capacity of the channel lips - see also page 66

Accessories

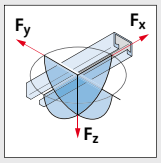
VUS 72/48
Washer
→ see page 56



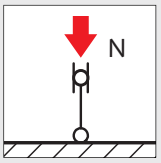
Further design properties



Cross section summary page 60

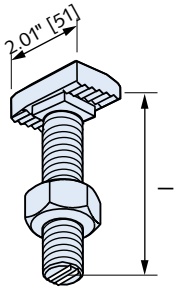


Statics, weld seams pages 66 - 67



Flexural buckling page 70

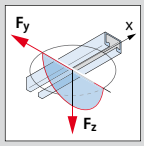
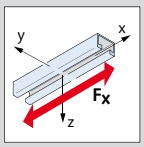
HALFEN T-bolts HZS 64/44



HZS 64/44
HALFEN T-bolt,
toothed
incl. nut

HZS 64/44 available T-bolts		
Length l in. nom [mm]	**M20**	**M24**
3 1/4" [80]	EPs 8.8 A4-70	EPs 8.8 A4-70
5" [125]	EPs 8.8 A4-70	-
6" [150]	-	EPs 8.8 A4-70

Load bearing capacities for HALFEN T-bolts ①

	Load capacities for HALFEN T-bolts 		Max. load capacity per HALFEN T-bolt in channel longitudinal direction 		Recommended torque 	
Thread Ø		**F** [kips] ①		**F_x** [kips] ①		**T_{inst}** [ft-lb]
64/44		**HZS**		**HZS**		**HZS**	
		8.8	**A4-70**	**8.8**	**A4-70**	**8.8**	**A4-70**
M20	**allow. F**	12.68	8.27	6.07	6.07	258	258
M24	**allow. F**	18.25	8.72	6.07	6.07	332	332

① Note: do not exceed the max. channel load bearing capacity

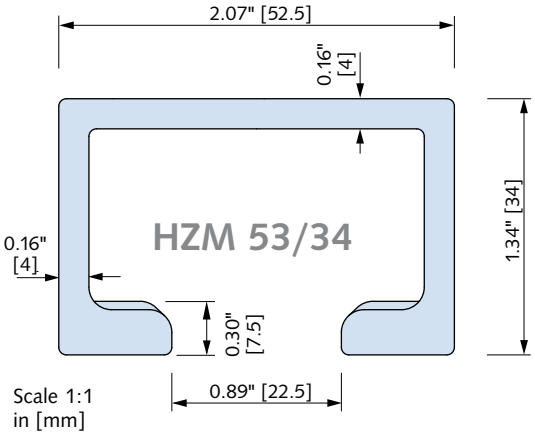
In case of simultaneously loading in all directions (longitudinal -x, transverse -y, centrical tension -z) the resultant load must not exceed the load bearing capacity given in the table.

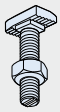
$$\sqrt{F_x^2 + F_y^2 + F_z^2} \leq \text{allow. } F$$

F_x, F_y, F_z = existing loads
allow. F = allowable load bearing capacity of the T-bolt

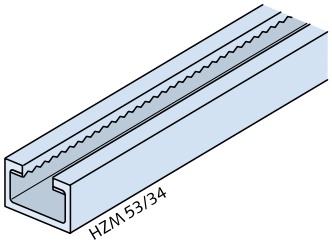
Mounting channel HZM 53/34

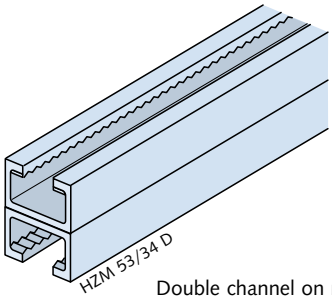
HZM 53/34 hot-rolled, toothed





Suitable HALFEN T-bolts HZS 53/34
→ see page 29





Double channel on request
- profile data, see page 60

Cross-sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elalstic section modulus	
HZM 53/34	0284.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]
MF	070-00002	239	3.11	0.911	0.221	0.557	0.302	0.539
HDG	070-00003							
A4	070-00001							

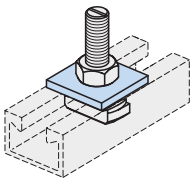
Load capacities

Max. point-load bearing capacity		Bending load capacity at span L		
F_z ① [kips]	≤ e_w [in]	39.4" [1.0]	78.7" [2.0]	118.1" [3.0]
allow. F_z	7.87"	allow. F		
6.95		2.79	1.39	0.61

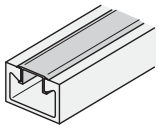
① F_z = max. load bearing capacity of the channel lips - see also page 66

Accessories

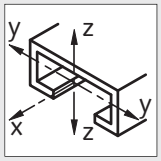
VUS 52/34
Washer
→ see page 56



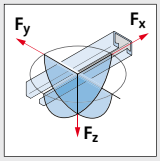
PA - 22
Channel cover
→ see page 58



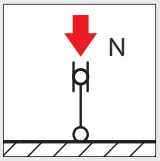
Further design properties



Cross section
summary page 60

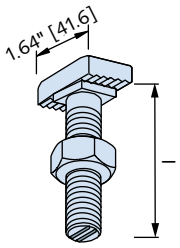


Statics, weld seams
pages 66 - 67



Flexural buckling
page 70

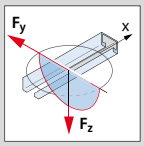
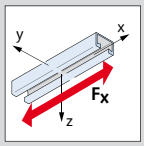
HALFEN T-bolts HZS 53/34



HZS 53/34
HALFEN T-bolt,
toothed
incl. nut

HZS 53/34 available T-bolts		
Length l in nom. [mm]	**M16**	**M20**
2 3/8" [60]	EPs 8.8 A4-70	-
2 9/16" [65]	-	EPs 8.8 A4-70
4" [100]	EPs 8.8 A4-70	EPs 8.8 A4-70

Load bearing capacities for HALFEN T-bolts ①

Thread Ø		Load capacities for HALFEN T-bolts  F [kips] ①		Max. load capacity per T-bolt in channel longitudinal direction  F_x [kips] ①		Recommended torque  T_{inst} [Ft-lb]	
53/34		**HZS**		**HZS**		**HZS**	
		8.8	**A4-70**	**8.8**	**A4-70**	**8.8**	**A4-70**
M16	**allow. F**	8.12	5.31	4.95	4.27	148	148
M20	**allow. F**	12.68	8.27	4.95	4.27	258	258

① Note: do not exceed the max. channel load bearing capacity

In case of simultaneously loading in all directions (longitudinal -x, transverse -y, centrical tension -z) the resultant load must not exceed the load bearing capacity given in the table.

$$\sqrt{F_x^2 + F_y^2 + F_z^2} \leq \text{allow. F}$$

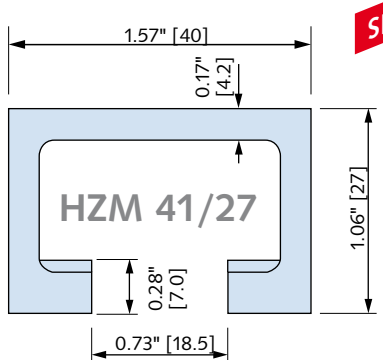
F_x, F_y, F_z = existing loads
allow. F = allowable load bearing capacity of the T-bolt

Mounting channel HZM 41/27

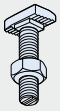
HZM 41/27 hot-rolled, toothed

NEW!

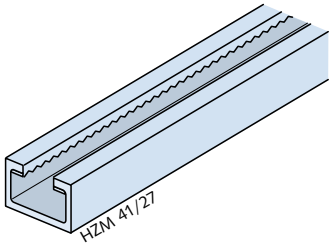
SPECIAL ORDER

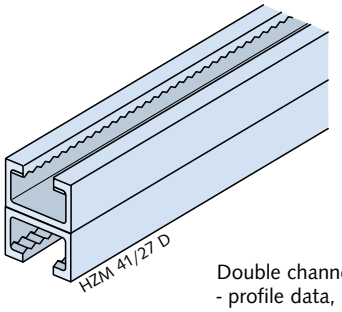


Scale 1:1
in [mm]



Suitable HALFEN T-bolts HZS 38/23
→ see page 32





Double channel on request
- profile data, see page 60

Cross-sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus	
HZM 41/27	0284.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]
MF	090-00002	239	2.27	0.668	0.094	0.228	0.157	0.290
HDG	090-00001							

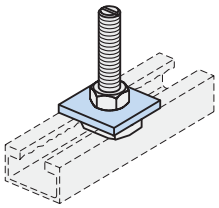
Load capacities

Max. point-load bearing capacity		Bending load capacity at span L		
F_z ① [kips]	≤ e_w [in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
allow. F_z	7.87"	allow. F		
4.00		1.53	0.58	0.27

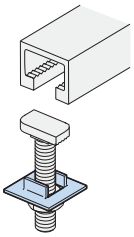
① F_z = max. load bearing capacity of the channel lips - see also page 66

Accessories

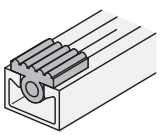
VUS 40/25
Washer
→ see page 56



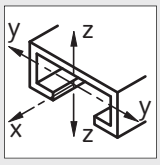
SIC 38/23
Locking washer
→ see page 56



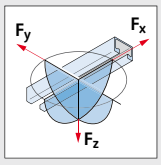
SDM - 36/6
Rubber vibration absorber
→ see catalog MT-FFC



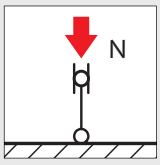
Further design properties



Cross section summary page 60



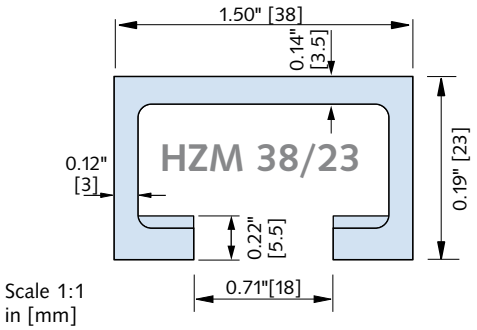
Statics, weld seams pages 66 - 67



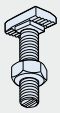
Flexural buckling page 70

Mounting channel HZM 38/23

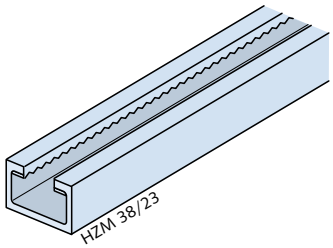
HZM 38/23 hot-rolled, toothed

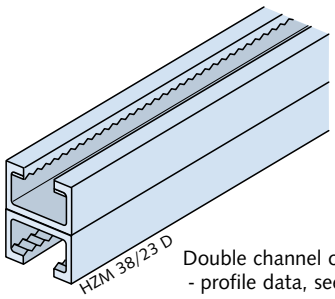


Scale 1:1
in [mm]



Suitable HALFEN T-bolts HZS 38/23 and HS 38/17 → see page 32





Double channel on request
- profile data, see page 60

Cross-sectional properties

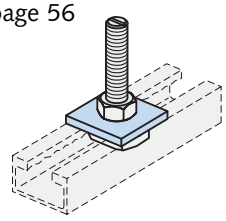
Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z	F_z ≤ e_w	F [kips]		
HZM 38/23	0284.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	F_z ① [kips]	[in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
MF	060-00001	239	1.63	0.481	0.051	0.148	0.097	0.198	allow. F_z	7.87"	allow. F		
HDG	060-00003								2.88		0.94	0.31	0.13
A4	060-00002												

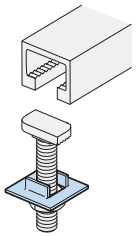
① F_z = max. load bearing capacity of the channel lips - see also page 66

Accessories

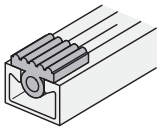
VUS 40/25
Washer
→ see page 56



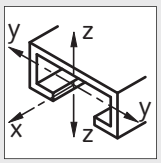
SIC 38/23
Locking washer
→ see page 56



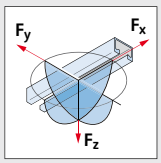
SDM - 36/6
Rubber vibration absorber
→ see catalog MT-FFC



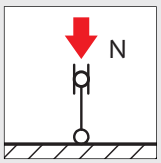
Further design properties



Cross section summary page 60

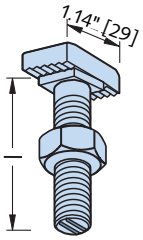


Statics, weld seams pages 66 - 67

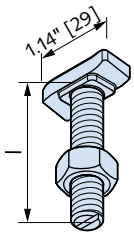


Flexural buckling page 70

HALFEN T-bolts HZS 38/23 and HS 38/17



HZS 38/23
HALFEN T-bolt
toothed incl. nut



HS 38/17
HALFEN T-bolt
incl. nut

Li = left-hand thread

High corrosion resistant steel HCR for HS 38/17 on request

HZS 38/23 available T-bolts

Length l in [mm]	M12	M16	Length l in [mm]	M12	M16
1 1/4" [30]	EPs 8.8	EPs 8.8	3 1/8" [80]	EPs 8.8	EPs 8.8 A4-70
1 1/2" [40]	EPs 8.8	EPs 8.8	4" [100]	EPs 8.8	EPs 8.8
2" [50]	EPs 8.8	EPs 8.8	5" [125]	EPs 8.8	EPs 8.8
2 3/8" [60]	EPs 8.8	EPs 8.8 HDG 8.8 A4-70	6" [150]	EPs 8.8	EPs 8.8
			8" [200]	-	EPs 8.8
			12" [300]	-	EPs 8.8

HS 38/17 available T-bolts

Length l in [mm]	M10	M12	M16	Length l in [mm]	M10	M12	M16
3/4" [20]	EPs 4.6	EPs 4.6	EPs 4.6①	2 3/8" [60]	EPs 4.6 A4-70	EPs 4.6 EPs 8.8 A4-70	EPs 4.6 EPs 8.8 HDG 8.8 A4-50
1" [25]	-	A4-70	A4-50①				
1 1/4" [30]	EPs 4.6 HDG 4.6 A4-70	EPs 4.6 HDG 4.6 A2-70 A4-70	EPs 4.6 HDG 4.6 A2-50① A4-50	2 3/4" [70]	-	HDG 8.8	
				3 1/8" [80]	EPs 4.6	EPs 4.6 A4-70	EPs 4.6 A4-50 A4-70①
1 1/2" [40]	EPs 4.6 A4-70	EPs 4.6 A2-70 A4-70	EPs 4.6 HDG 4.6 A2-50① A4-50	3 1/8" [80] Li	-		A4-50
				4" [100]	EPs 4.6	EPs 4.6 A4-50	EPs 4.6 HDG 4.6 A4-50
2" [50]	EPs 4.6 A4-70	EPs 4.6 HDG 4.6 A2-70 A4-70	EPs 4.6 HDG 4.6 A4-50	5" [125]	-	EPs 4.6	EPs 4.6
				6" [150]	EPs 4.6	EPs 4.6 A4-50①	EPs 4.6 A4-50
				8" [200]		EPs 4.6 A4-50①	EPs 4.6 A4-50①

① on request Note: inch lengths shown are nominal

Load bearing capacities for HALFEN T-bolts ①

Thread Ø		Load capacities for HALFEN T-bolts F [kips] ①				Max. load capacity per T-bolt in channel longitudinal direction F_x [kips] ①	Recommended torque T_{inst} [Ft-lb]		
38/23		HZS				HZS	HZS		
		8.8		A4-70		For all strength classes	8.8	A4-70	
M12	allow. F	4.36		-		2.70	59	-	
M16	allow. F	8.12		5.31		2.70	89	89	
38/17		HS				HS	HS		
		4.6	8.8	A2-50; A4-50	A2-70; A4-70	-	4.6	8.8	A2-50; A4-50	A2-70; A4-70
M10	allow. F	1.33	2.99	1.17	2.52	Please use HZS bolts if longitudinal load resistance required.	11	30	11	22
M12	allow. F	1.93	4.34	1.71	3.64		18	52	18	37
M16	allow. F	3.62	8.07	3.17	6.79		48	133	44	96

① Note: do not exceed the max. channel load bearing capacity

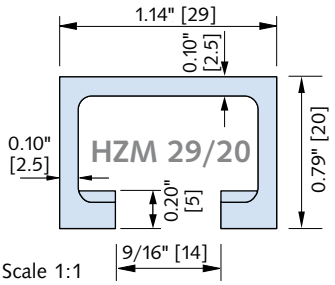
In case of simultaneously loading in all directions (longitudinal -x, transverse -y, centrical tension -z) the resultant load must not exceed the load bearing capacity given in the table.

$$\sqrt{F_x^2 + F_y^2 + F_z^2} \leq \text{allow. F}$$

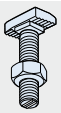
F_x, F_y, F_z = existing loads
allow. F = allowable load bearing capacity of the T-bolt

Mounting channel HZM 29/20

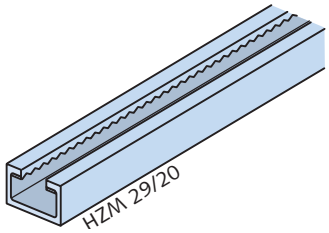
HZM 29/20 hot-rolled, toothed

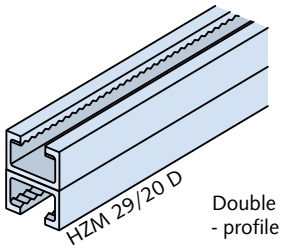


Scale 1:1
in [mm]



Suitable HALFEN T-bolt HZS 29/20 and HS 28/15 → see page 34





Double channel on request
- profile data, see page 60

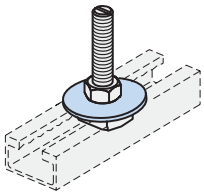
Cross-sectional properties / Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
HZM 29/20	0284.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	F_z ① [kips]	≤ e_w [in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
MF	050-00001	239	1.04	0.308	0.025	0.058	0.056	0.102	allow. F_z	5.91"	allow. F		
HDG	050-00003								1.75		0.54	0.16	0.07

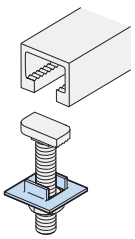
① F_z = max. load bearing capacity of the channel lips - see also page 66

Accessories

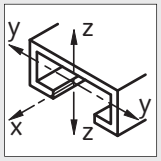
US DIN 9021
Washer
→ see page 56



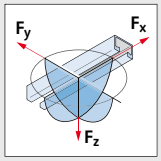
SIC 29/20
Locking washer
→ see page 56



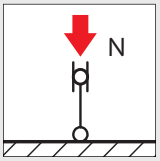
Further design properties



Cross section summary page 60

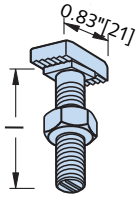


Statics, weld seams pages 66 - 67



Flexural buckling page 70

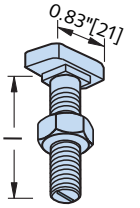
HALFEN T-bolts HZS 29/20 and HS 28/15



HZS 29/20
HALFEN T-bolt
toothed incl. nut

HZS 29/20 available T-bolts

Length l in [mm]	M12	Length l in [mm]	M12
1 1/4" [30]	EPs 8.8	5" [125]	EPs 8.8
1 1/2" [40]	EPs 8.8	6" [150]	EPs 8.8
2" [50]	EPs 8.8	8" [200]	EPs 8.8
2 3/8" [60]	EPs 8.8	10" [250]	EPs 8.8
3 1/8" [80]	EPs 8.8	12" [300]	EPs 8.8
4" [100]	EPs 8.8		



HS 28/15
HALFEN T-bolt
incl. nut

High corrosion resistant stainless steel HCR for HS 28/15 on request

HS 28/15 available T-bolts

Length l in [mm]	M6	M8	M10	M12	Length l in [mm]	M6	M8	M10	M12
5/8" [15]	EPs 4.6	EPs 4.6	EPs 4.6		2" [50]		EPs 4.6	EPs 4.6 HDG4.6 A2-70 A4-70	EPs 4.6
3/4" [20]	EPs 4.6	EPs 4.6 EPs 8.8 A2-70	EPs 4.6 A2-70 A4-70		2 3/8" [60]		EPs 4.6	EPs 4.6 EPs 8.8 A4-70	
1" [25]	EPs 4.6	EPs 4.6 A2-70	EPs 4.6 A2-70 A4-70		3 1/8" [80]		EPs 4.6	EPs 4.6 A4-70	EPs 4.6
3 1/4" [30]	EPs 4.6	EPs 4.6 A2-70 A4-70	EPs 4.6 HDG4.6 A2-70 A4-70	EPs 4.6	4" [100]		EPs 4.6	EPs 4.6 A4-50	
1 3/8" [35]				EPs 4.6	5" [125]			EPs 4.6 A4-50	
1 1/2" [40]	EPs 4.6	EPs 4.6	EPs 4.6 HDG8.8 A2-70 A4-70		6" [150]		EPs4.6①	EPs 4.6 A4-50	
					8" [200]			EPs 4.6 A4-50	

① on request

Load bearing capacities for HALFEN T-bolts ①

Thread Ø		Load capacities for HALFEN T-bolts F [kips] ①				Max. load capacity per T-bolt in channel longitudinal direction F_x [kips] ①	Recommended torque T_{inst} [Ft-lb]			
29/20		HZS				HZS	HZS			
		8.8				8.8	8.8			
M12	allow. F	4.36				1.80	59			
28/15		HS				HS	HS			
		4.6	8.8	A2/A4-50	A2/A4-70	-	4.6	8.8	A2/A4-50	A2/A4-70
M6	allow. F	0.49	-	-	-	Please use HZS bolts if longitudinal load resistance required	2.2	-	2.2	-
M8	allow. F	0.90	1.87	-	1.24		6	20	6	11
M10	allow. F	1.44	2.99	1.17	2.52		11	40	11	22
M12	allow. F	2.09	-	-	-		18	70	18	37

① Note: do not exceed the max. channel load bearing capacity

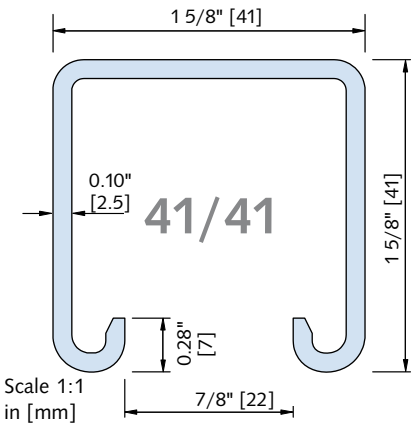
In case of simultaneously loading in all directions (longitudinal -x, transverse -y, centrical tension -z) the resultant load must not exceed the load bearing capacity given in the table.

$$\sqrt{F_x^2 + F_y^2 + F_z^2} \leq \text{allow. F}$$

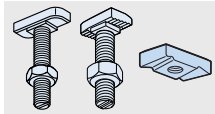
F_x, F_y, F_z = existing loads
allow. F = allowable load bearing capacity of the T-bolt

Framing channels HM 41/41 and HL 41/41

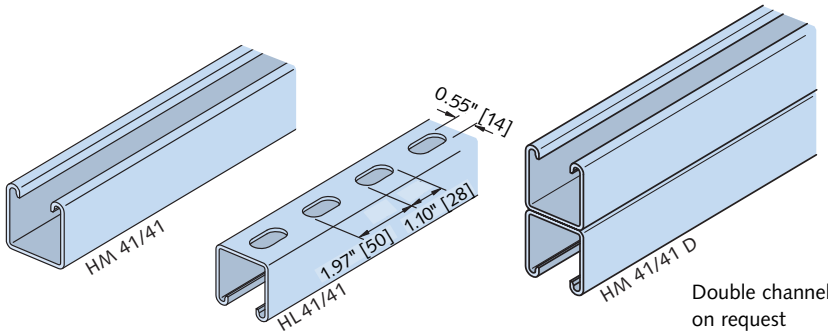
HM 41/41 and HL 41/41 cold-rolled



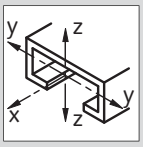
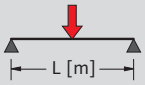
Scale 1:1
in [mm]



Suitable HALFEN T-bolts HS 41/41, HZS 41/41, HZS 41/22 and locking plates → see pages 43 - 44



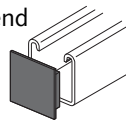
Double channel on request

Cross sectional properties									Load capacities				
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
											F [kips] 		
Material	Article no.		G	A	I_y	I_z	W_y	W_z	F_z ①	≤ e_w	19.7"	39.4"	59.1"
HM 41/41	0280.	[in]	[lb/ft]	[in²]	[in⁴]	[in⁴]	[in³]	[in³]	[kips]	[in]	[0.5 m]	[1.0 m]	[1.5 m]
MF	080-00001	236.2	1.79	0.527	0.179	0.227	0.198	0.279	allow. F_z	19.3"	allow. F		
SV	080-00002												
HDG	080-00003								1.26		1.26	0.63	0.43
A4	080-00004												
HL 41/41	0281.										19.7"	39.4"	59.1"
MF	010-00001	236.2	1.65	0.462	0.146	0.220	0.173	0.270	allow. F_z	16.5"	[0.5 m]	[1.0 m]	[1.5 m]
SV	010-00003										allow. F		
HDG	010-00002								1.26		1.06	0.52	0.36
A4	010-00004												
HM 41/41 D	0280.										39.4"	59.1"	78.7"
MF	150-00001	236.2	3.59	1.056	0.903	0.454	0.555	0.558	allow. F_z	19.29"	[1.0 m]	[1.5 m]	[2.0 m]
HDG	150-00003										allow. F		
A4	150-00002								1.26		1.71	1.15	0.85

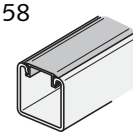
① F_z = max. load bearing capacity of the channel lips

Accessories

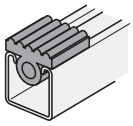
HPE 41/41 Channel end cap → see page 58



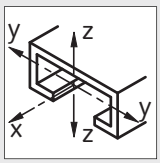
PA - 41 Channel cover → see page 58



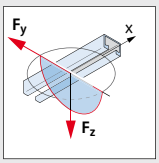
SDM - 41/8
Rubber vibration absorber → see catalog MT-FFC



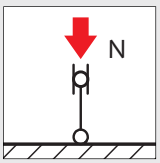
Further design properties



Cross section summary pages 62, 64



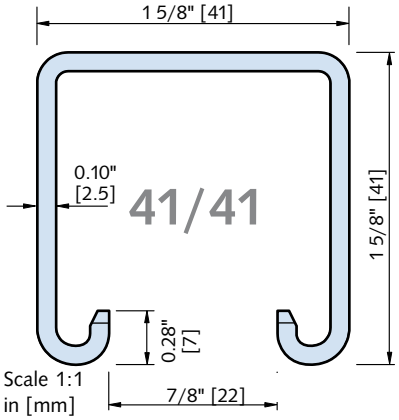
Statics, weld seams page 68

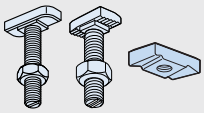


Flexural buckling page 71

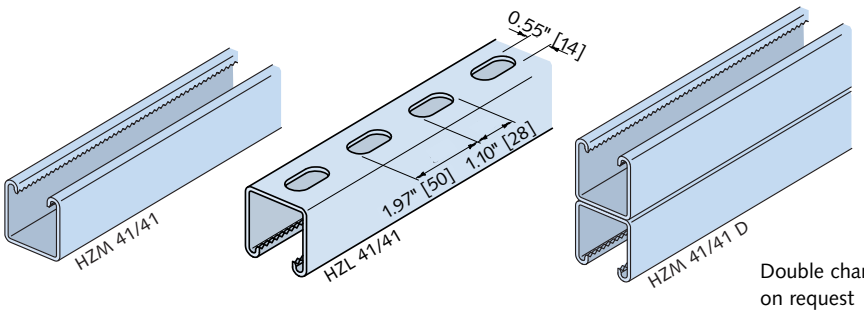
Framing channel HZM 41/41 and HZL 41/41

HZM resp. HZL 41/41 cold-rolled, toothed





Suitable HALFEN T-bolts HS 41/41, HZS 41/22 and locking plates → see pages 43 - 44



Double channel on request

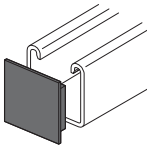
Cross sectional properties / Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	19.7"	39.4"	59.1"
HZM 41/41	0284.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	[0.5 m]	[1.0 m]	[1.5 m]
MF	010-00001	236.2	1,77	0.521	0.176	0.225	0.192	0.277	allow. F_z	18.5"	allow. F		
HDG	010-00002												
A4	010-00003								1.26		1.24	0.61	0.40
HZL 41/41	0283.										19.7"	39.4"	59.1"
MF	010-00001	236.2	1.65	0.450	0.141	0.217	0.164	0.267			[0.5 m]	[1.0 m]	[1.5 m]
HDG	010-00002								allow. F_z	16.1"	allow. F		
A4	010-00003								1.26		1.01	0.52	0.34
HZM 41/41 D	0284.										39.4"	59.1"	78.7"
MF	030-00001	236.2	3.54	1.040	0.876	0.450	0.539	0.553			[1.0 m]	[1.5 m]	[2.0 m]
HDG	030-00002								allow. F_z	18.5"	allow. F		
A4	030-00003								1.26		1.66	1.10	0.83

① F_z = max. load bearing capacity of the channel lips

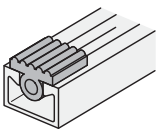
Accessories

HPE 41/41
Channel end cap
→ see page 58

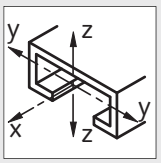


PA - 41 Channel cover
→ see page 58

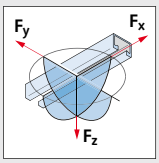
SDM - 41/8
Rubber vibration absorber
→ see catalog MT-FFC



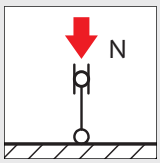
Further design properties



Cross section summary pages 62, 64



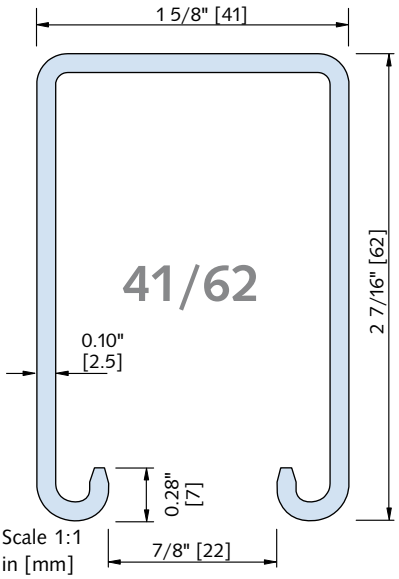
Statics, weld seams page 68



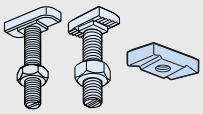
Flexural buckling page 71

Mounting channel HM 41/62 and HL 41/62

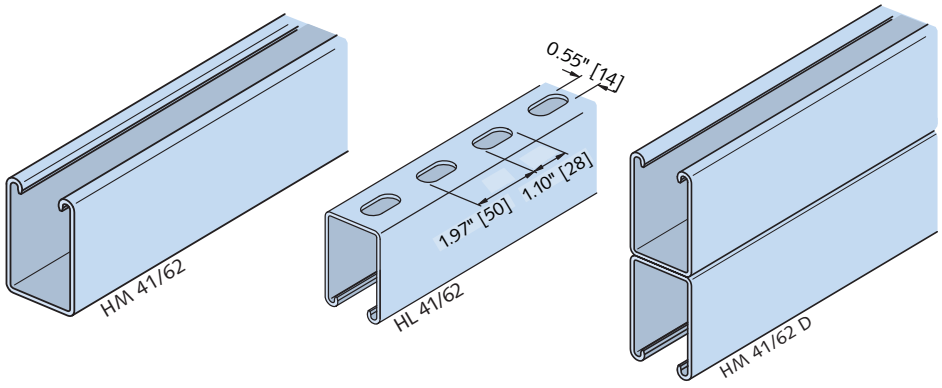
HM and HL 41/62 cold-rolled



SPECIAL ORDER

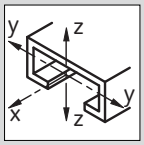
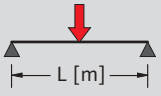


Suitable HALFEN T-bolts HS 41/41, HZS 41/41, HZS 41/22 and locking plates → see pages 43 - 44



Double channel on request

Note on span L: take appropriate measures to prevent failure caused by bulging, tilting and buckling

Cross sectional properties									Load capacities				
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
											F [kips] 		
Material	Article no.		G	A	I_y	I_z	W_y	W	F_z ①	≤ e_w	39.4"	78.7"	118.1"
HM 41/62	0280.	[in]	[lb/ft]	[in²]	[in⁴]	[in⁴]	[in³]	[in³]	[kips]	[in]	[1.0 m]	[2.0 m]	[3.0 m]
MF	140-00002	236.2	2.34	0.688	0.504	0.320	0.379	0.394	allow. F_z	36.2"	allow. F		
HDG	140-00003								1.26		1.19	0.58	0.36
HL 41/62	0281.										39.4"	78.7"	118.1"
MF	040-00001	236.2	2.11	0.618	0.415	0.313	0.334	0.385		31.9"	[1.0 m]	[2.0 m]	[3.0 m]
SV	040-00003								allow. F_z		allow. F		
HDG	040-00002								1.26		1.01	0.49	0.29
HM 41/62 D	0280.										39.4"	59.1"	78.7"
MF	170-00001	236.2	4.68	1.376	2.712	0.641	1.111	0.788		36.2"	[1.0 m]	[1.5 m]	[2.0 m]
HDG	170-00002								allow. F_z 1.26		allow. F 3.44	2.29	1.73

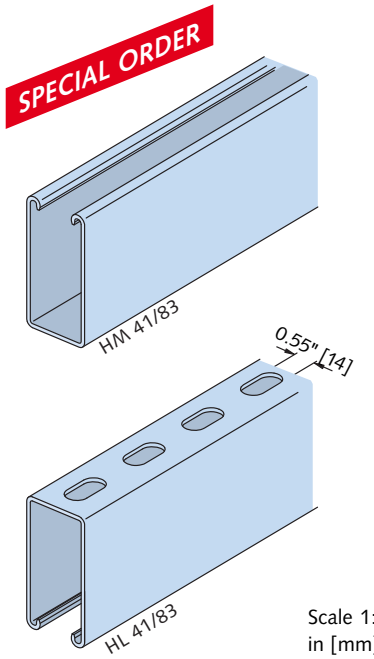
① F_z = max. load bearing capacity of the channel lips

Accessories: PA - 41 Channel cover, see page 58; **SDM - 41/8** Rubber vibration absorber, see Technical Product Information: "HALFEN Flexible Framing Connections" MT-FFC.

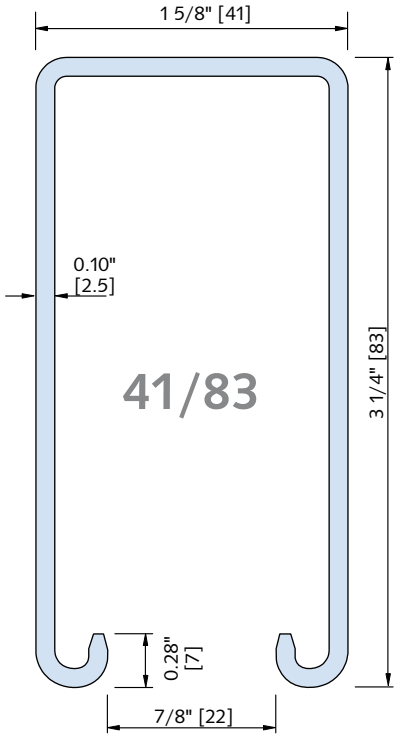
Further design properties: Cross section summary → pages 62, 64

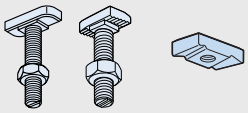
Mounting channel HM 41/83 and HL 41/83

HM 41/83 and HL 41/83 cold-rolled



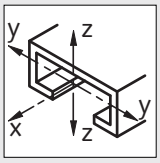
Scale 1:1
in [mm]





Suitable HALFEN T-bolts HS 41/41, HZS 41/41, HZS 41/22 and locking plates → see pages 43 - 44

Further design properties



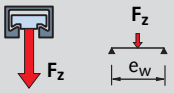
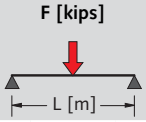
Cross section summary
pages 62, 64

Note on span L:
take appropriate measures to prevent failure caused by bulging, tilting and buckling

Cross sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus	
			G	A	I_y	I_z	W_y	W_z
HM 41/83	0280.	[in]	[lb/ft]	[in²]	[in⁴]	[in⁴]	[in³]	[in³]
MF	130-00002	236.2	2.88	0.848	1.053	0.414	0.605	0.509
SV	130-00001							
HDG	130-00003							
HL 41/83	0281.							
MF	030-00004	236.2	2.64	0.778	0.891	0.407	0.540	0.500
SV	030-00006							
HDG	030-00005							

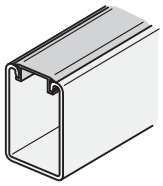
Load capacities

Max. point-load bearing capacity		Bending load capacity at span L		
		F [kips] 		
F_z ①	≤ e_w	39.4"	78.7"	118.1"
[kips]	[in]	[1.0 m]	[2.0 m]	[3.0 m]
allow. F_z	58.3"	allow. F		
1.26		1.89	0.94	0.63
allow. F_z	52.4"	allow. F		
1.26		1.64	0.83	0.54

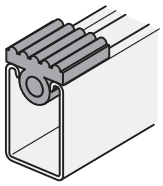
① F_z = max. load bearing capacity of the channel lips

Accessories

PA - 41
Channel cover
→ see page 58

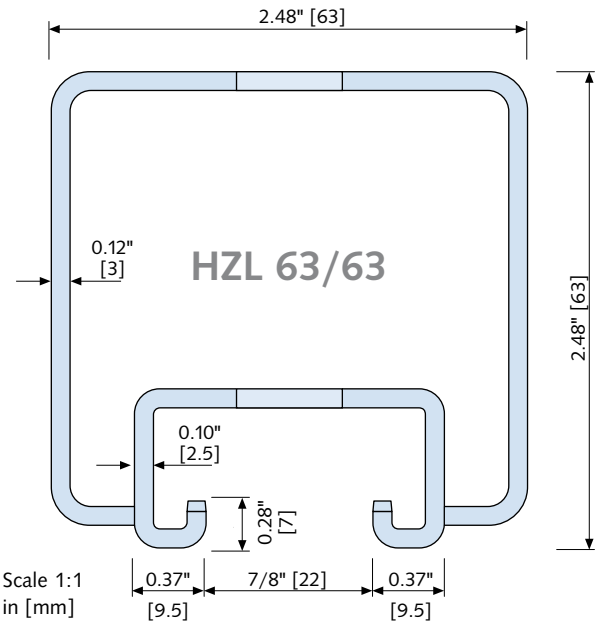


SDM - 41/8
Rubber vibration absorber
→ see catalog MT-FFC

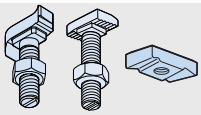


Framing channel HZL 63/63

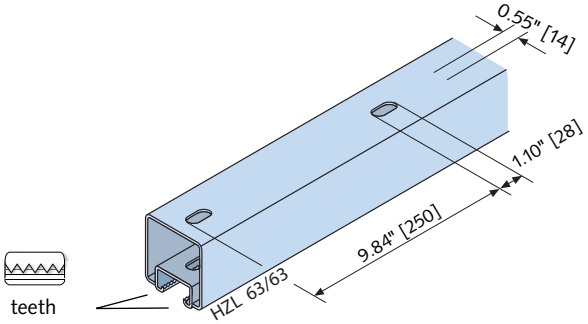
HZL 63/63 cold-rolled, toothed



Standard profile for HALFEN Powerclick System 63. More information on the HALFEN Framing System "Powerclick" can be found in Technical Product Information "HALFEN Powerclick PC63".



Suitable HALFEN T-bolts HS 41/41, HZS 41/41, HZS 41/22 and locking plates → see pages 43 - 44



Cross sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus	
HZL 63/63	0283.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]
HDG	030-00001	118.1	4.27	1.099	0.795	1.032	0.614	0.832
HDG	030-00003	236.2						

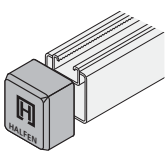
Load capacities

Max. point-load bearing capacity		Bending load capacity at span L		
F_z ① [kips]	≤ e_w [in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
allow. F_z	52.75	allow. F		
1.26		3.71	1.84	1.24

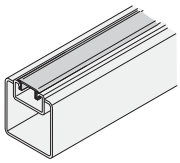
① F_z = max. load bearing capacity of the channel lips

Accessories

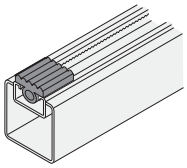
HPE 63/63
Channel end cap
→ see page 58



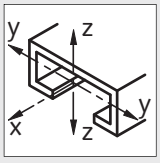
PA - 41
Channel cover
→ see page 58



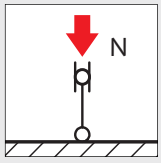
SDM - 41/8
Rubber vibration absorber
→ see catalog MT-FFC



Further design properties



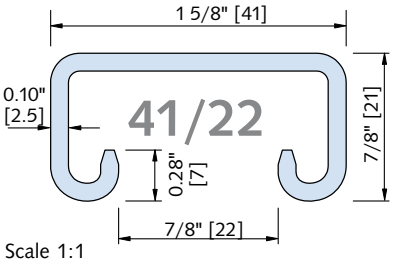
Cross section summary
page 64



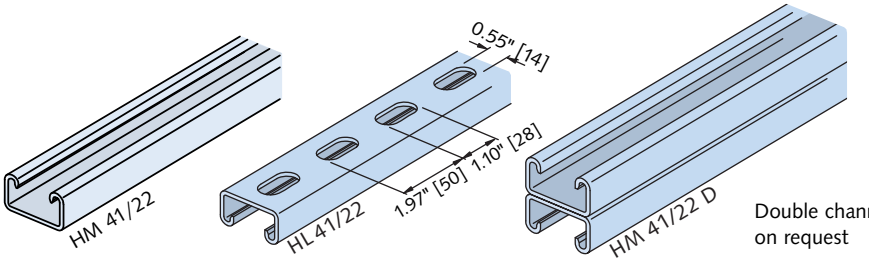
Flexural buckling
page 71

Framing channel HM 41/22 and HL 41/22

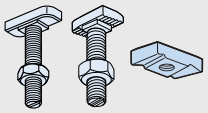
HM 41/22 and HL 41/22 cold-rolled



Scale 1:1
in [mm]



Double channel on request



Suitable HALFEN T-bolts HS 41/41, HZS 41/41, HZS 41/22 and locking plates → see pages 43 - 44

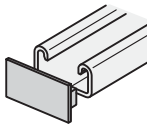
Cross sectional properties | **Load capacities**

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	19.7"	39.4"	59.1"
HM 41/22	0280.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	[0.5 m]	[1.0 m]	[1.5 m]
MF	120-00001	236.2	1.25	0.369	0.031	0.134	0.064	0.164	allow. F_z 1.26	5.91	allow. F 0.43	0.20	0.09
SV	120-00002												
HDG	120-00003												
A4	120-00004												
HL 41/22	0281.										19.7"	39.4"	59.1"
MF	020-00001	236.2	1.05	0.302	0.024	0.127	0.054	0.156	allow. F_z 1.26	4.72	[0.5 m] allow. F 0.36	[1.0 m] 0.16	[1.5 m] 0.07
SV	020-00003												
HDG	020-00002												
A4	020-00004												
HM 41/22 D	0280.										39.4"	59.1"	78.7"
MF	160-00001	236.2	2.51	0.736	0.145	0.267	0.178	0.328	allow. F_z 1.26	5.90	[1.0 m] allow. F 0.56	[1.5 m] 0.38	[2.0 m] 0.22
HDG	160-00002												
A4	160-00003												

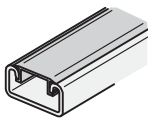
① F_z = max. load bearing capacity of the channel lips

Accessories

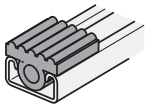
HPE 41/22
Channel end cap
→ see page 58



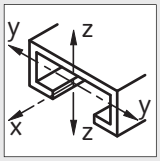
PA - 41
Channel cover
→ see page 58



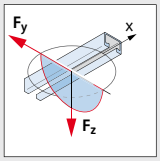
SDM - 41/8
Rubber vibration absorber
→ see catalog MT-FFC



Further design properties



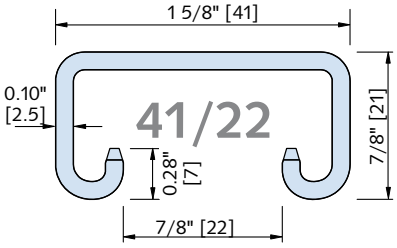
Cross section summary
pages 62, 64



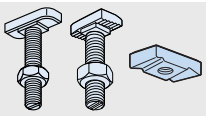
Statics, weld seams
page 68

Framing channel HZM 41/22 and HZL 41/22

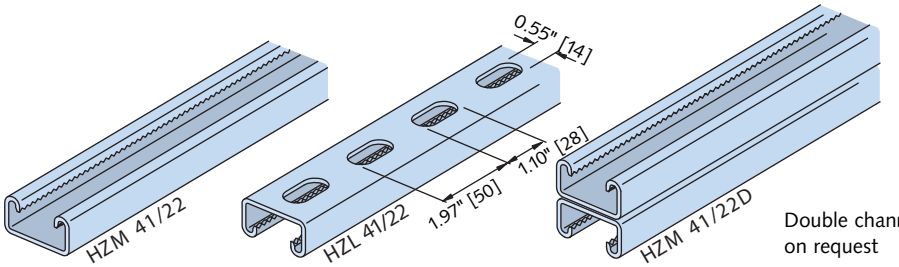
HZM and HZL 41/22 cold-rolled, toothed



Scale 1:1
in [mm]



Suitable HALFEN T-bolts HS 41/41, HZS 41/41, HZS 41/22 and locking plates → see pages 43 - 44



Double channel on request

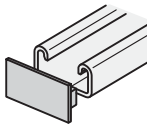
Cross sectional properties / Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	F [kips]		
HZM 41/22	0284.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
MF	020-00001	239	1.23	0.361	0.030	0.132	0.063	0.162	allow. F_z	5.51	allow. F		
HDG	020-00002												
A4	020-00003								1.26		0.43	0.18	0.09
HZL 41/22											19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
MF	020-00001	236.2	1.05	0.290	0.023	0.124	0.052	0.152	allow. F_z	4.72	allow. F		
HDG	020-00002												
A4	020-00003								1.26		0.34	0.13	0.07
HZM 41/22 D											39.4" [1.0 m]	59.1" [1.5 m]	78.7" [2.0 m]
MF	040-00001	239	2.41	0.721	0.140	0.264	0.172	0.324	allow. F_z	5.51	allow. F		
HDG	040-00002												
A4	040-00003								1.26		0.54	0.36	0.22

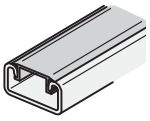
① F_z = max. load bearing capacity of the channel lips

Accessories

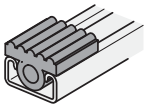
HPE 41/22
Channel end cap
→ see page 58



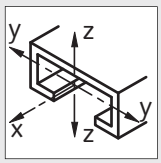
PA - 41
Channel cover
→ see page 58



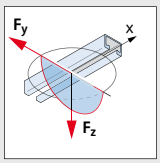
SDM - 41/8
Rubber vibration absorber
→ see catalog MT-FFC



Further design properties



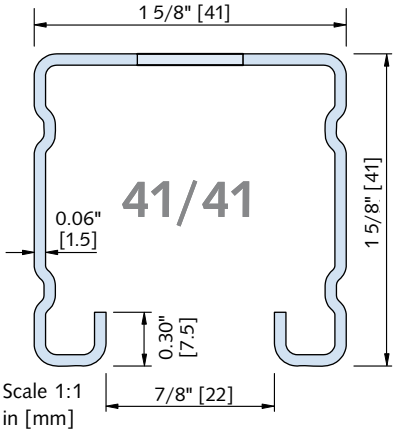
Cross section summary
pages 62, 64



Statics, weld seams
page 68

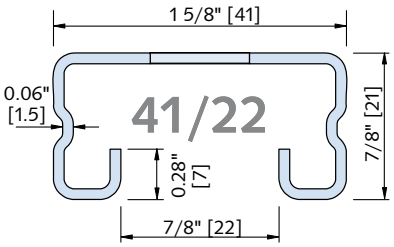
Framing channel HLL 41/41 and HLL 41/22

HLL 41/41 cold-rolled

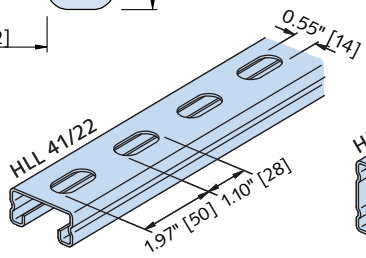


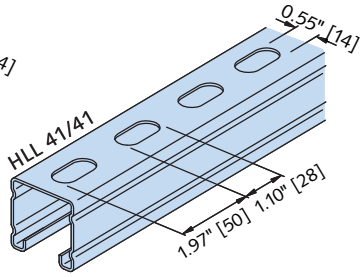
Scale 1:1
in [mm]

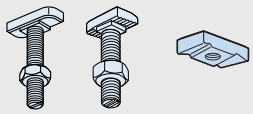
HLL 41/22 cold-rolled



SPECIAL ORDER







Suitable HALFEN T-bolts HS 41/41, HZS 41/41, HZS 41/22 and locking plates → see pages 43 - 44

Cross sectional properties

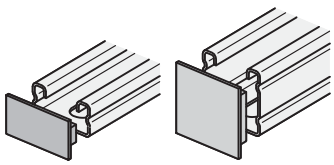
Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	F [kips]		
HLL 41/41	0282.	[in]	G [lb/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	19.7" [0.5 m]	39.4" [1.0 m]	59.1" [1.5 m]
PG	010-00002	236.2	1.08	0.298	0.102	0.147	0.124	0.180	allow. F_z 0.40	35.85"	allow. F 0.72	0.36	0.22
HLL 41/22	0282.												
PG	020-00003	236.2	0.77	0.206	0.018	0.088	0.043	0.109	allow. F_z 0.40	12.20"	19.7" [0.5 m] allow. F 0.25	39.4" [1.0 m] 0.09	59.1" [1.5 m] 0.04

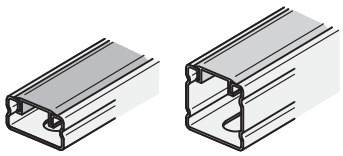
① F_z = max. load bearing capacity of the channel lips

Accessories

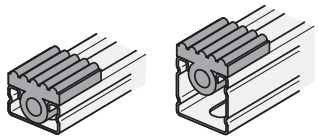
HPE 41/41 resp. **HPE 41/22**
Channel end cap
→ see page 58



PA - 41 Channel cover
→ see page 58

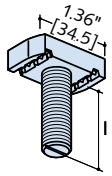


SDM - 41/8
Rubber vibration absorber
→ see catalog MT-FFC

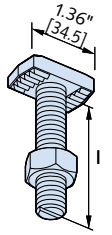


HALFEN T-bolts HZS 41/41, HZS 41/22 and HS 41/41

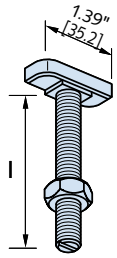
HALFEN T-bolts for all 41/... channels:



HZS 41/41
HALFEN T-bolt
toothed,
order nut separately



HZS 41/22
HALFEN T-bolt toothed,
incl. nut
for toothed channels 41/41, 41/22 and 63/63. Also suitable for HM 41/41, 41/62 & 41/83 in tension only



HS 41/41
HALFEN T-bolt
incl. nut

HZS 41/41 available T-bolts

Length l in [mm]	M6	M8	M10	M12	M16 ①②
1 1/4" [30]	ZL	ZL	ZL	ZL	-
2" [50]	-	ZL	ZL	ZL	-
2 1/2" [63]	-	-	-	-	ZL
3" [75]	-	-	ZL	ZL	-
4" [100]	-	-	-	ZL HDG 4.6	-
4 1/32" [102]	-	-	-	-	ZL

① Diameter M16 is not compatible with profile 41/22
② Diameter M16 can only be inserted into the slot from channel end
ZL = zinc flake coating

HZS 41/22 available T-bolts

Length l in [mm]	M12	M16
1 3/8" [35]	HDG 8.8 A4-50	A4-50 -
2" [50]	HDG 8.8 A4-50	HDG 8.8 A4-50
3 1/4" [80]	A4-50	-
4" [100]	-	HDG 8.8

HS 41/41 available T-bolts

Length l in [mm]	M10	M12
1 3/8" [35]	HDG 4.6 A4-70	HDG 4.6 A4-70
2" [50]	-	HDG 4.6

Torques for HALFEN T-bolts ①

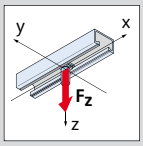
41/...

Recommended torques T_{inst} [Ft-lb]

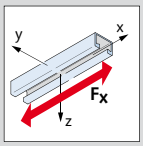
Thread Ø	HZS 41/41 steel	HZS 41/22 8.8	HZS 41/22 A4-50	HS 41/41 4.6	HS 41/41 A4-70
M6	9	-	-	-	-
M8	21	-	-	-	-
M10	41	-	-	11	1
M12	44 (41)	37	37	18	18
M16	92 (70)	59	59	-	-

( ) values for HLL profiles in brackets

Load capacities for 41/... HALFEN T-bolts



Load bearing capacities per T-bolt for centric tension for **all 41/... and 63/... profiles**
F_z [kips]
– Do not exceed the channel load bearing capacity –



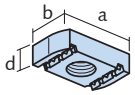
Recommended load capacity per HALFEN T-bolt in channel longitudinal direction
F_x [kips]

Thread Ø		For profiles HZM/HZL 41/22, 41/41, 63/63					For profiles HM/HL 41/22, 41/41, 41/62, 41/83			For profiles HLL 41/22, 41/41		
41/...		HZS 41/41 steel	HZS 41/22 8.8	HZS 41/22 A4-50	HS 41/41 4.6	HS 41/41 A4-70	HZS 41/41③ steel	HZS 41/22 8.8	HZS 41/22 A4-50	HZS 41/41 steel	HZS 41/22 A4-50	HZS 41/41 steel
M6	allow. F	1.12	-	-	-	-	0.49	-	-	0.22	-	0.22
M8	allow. F	1.35	-	-	-	-	0.90	-	-	0.54	-	0.54
M10	allow. F	1.57	-	-	1.44	1.44	1.12	-	-	0.79	-	0.79
M12	allow. F	1.57	1.57	1.57	1.80	2.09	1.12	1.12	1.12	0.90	0.38	0.81
M16	allow. F	2.70 ①②	1.57	2.70	-	-	0.90 ①②	1.12	1.12	0.90 ①②	0.90	0.90 ①②

① Diameter M16 is not compatible with profile 41/22 ② Diameter M16 can only be inserted into the slot from channel end
③ HZS 41/41 M16 × 102 without teeth

Locking plates GWP 41/41 - SN, - SH, GWP 41/22

GWP 41/41
Locking plate for **all 41/... channels** and **profile 63/63**

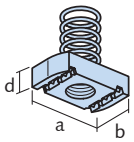


GWP 41/41 available plates

HDG	EP	A4	d in [mm]	b in [mm]	a in [mm]
-	M6	M6	0.24[6]	0.79 [20]	1.36 [34.5]
M8	M8	M8	0.34[8]/ 0.24 [6]		
M10 FM12	M10 FM12	M10 FM12	0.35 [9]		
M12	M12	-	0.47 [12]	1.18[30]	
M16	-	M16			

F = flat shape, fits to all flat 41/.. and 63/.. profiles

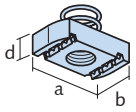
GWP 41/41 SH
Locking plate with long spring for **channel 41/41**



GWP 41/41 SH available plates

EP	d in [mm]	b in [mm]	a in [mm]
M6	0.24 [6]	0.79 [20]	1.36 [34.5]
M8	0.31 [8]		
M10	0.35 [9]		
M12	0.47 [12]		

GWP 41/41 SN
Locking plate with short spring for **channels 41/22** and **63/63**



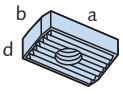
GWP 41/41 SN available plates

EP	d in [mm]	b in [mm]	a in [mm]
M6	0.24 [6]	0.79 [20]	1.36 [34.5]
M8	0.31 [8]		
M10	0.35 [9]		
F M12*			

* - flat shape fits to 41/22 and 63 profiles

NOTE: GWP locking plates are available with UNC thread. Please contact HALFEN USA.

GWP 41/22
Locking plate for **toothed channel 41/22 and 41/41**



GWP 41/22 available plates

EP	A4	d in [mm]	b in [mm]	a in [mm]
M6	-	0.30 [7.5]	0.79 [20]	1.36 [34.5]
M8	M8			
M10	M10			
M12	M12			
M16	M16			

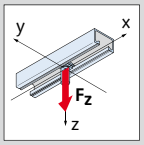
Torques for 41/... locking plates

41/...

Thread Ø	Recommended torques T_{inst} [Ft-lb] GWP 41/41 steel	GWP 41/41 A4	GWP 41/22 steel	GWP 41/22 A4
M6	9	5	9	5
M8	21	12	21	12
M10	41	23	41	23
M12	55 (41)	-	37	37
FM12	32 (41)	41	-	-
M16	92 (70)	92	59	59

( ) values for HLL profiles in brackets

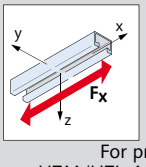
Load capacities for 41/... locking plates



Load bearing capacities for centric tension for **all 41/... and 63/... profiles**

F_z [kips]

– Do not exceed the channel load bearing capacity –



Recommended load capacity for locking plates in channel longitudinal direction

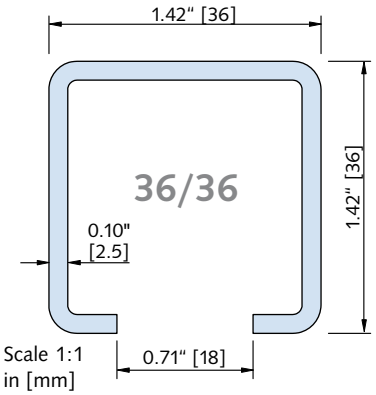
F_x [kips]

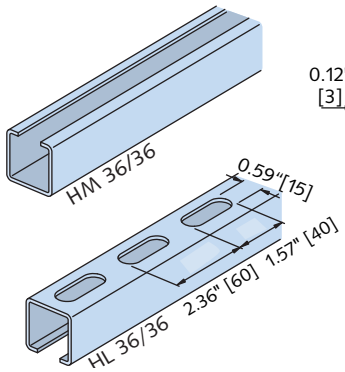
Thread Ø / 41/...		GWP 41/41 carbon steel	GWP 41/41 A4	GWP 41/22 carbon steel	GWP 41/22 A4	For profiles HZM/HZL 41/22, 41/41, HZL 63/63: GWP 41/41 carbon steel	GWP 41/41 A4	GWP 41/22 carbon steel	GWP 41/22 A4	For profiles HM/HL 41/22, 41/41, 41/62, 41/83: GWP 41/41 carbon steel	For profiles HLL 41/22, 41/41: GWP 41/41 carbon steel
M6	allow. F	1.12	1.12	1.12	1.12	0.49	0.49	0.49	-	0.22	0.22
M8	allow. F	1.35	1.35	1.35	1.35	0.90	0.90	0.90	090	0.54	0.54
M10	allow. F	1.57	1.57	1.57	1.57	1.12	1.12	1.12	1.12	0.79	0.79
M12	allow. F	2.02 ①	-	1.57	1.57	1.57 ①	-	1.12	1.12	1.12	0.81
M12 (SN)*	allow. F	1.57	1.57	-	-	1.12	1.12	-	-	0.90	0.81
M16 ①②	allow. F	2.70 ①②	1.57 ①②	1.57	1.57	1.69 ①②	1.12 ①②	1.69	1.12	1.69 ①②	1.01 ①②

*-SN = short spring with flat shape - fits to 41/22 and 63 profiles. ① Not compatible with profiles 41/22 and 63/63
② Diameter M16 can only be inserted into the slot from channel end

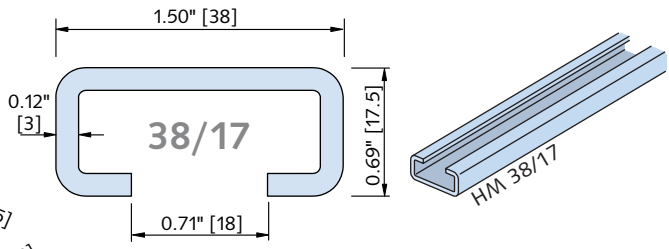
Mounting channel HM 36/36, HL 36/36 and HM 38/17

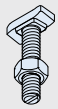
HM 36/36 and HL 36/36 cold-rolled





HM 38/17 cold-rolled





Suitable HALFEN T-bolts HS 38/17, and GWP locking plates → see page 46

Cross-sectional properties / Load capacities

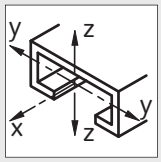
Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Dending load capacity at span L		
									F_z ①	≤ e_w	F [kips]		
HM 36/36	0280.	[in]	G [lf/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	19.7"	39.4"	59.1"
MF	070-00001	236.2	1.48	0.434	0.109	0.142	0.134	0.200		17.32"	[0.5 m]	[1.0 m]	[1.5 m]
HDG	070-00002								allow. F_z		allow. F		
A4	070-00003								0.99		0.88	0.43	0.29
HL 36/36	0281.												
MF	050-00001	236.2	1.34	0.375	0.088	0.139	0.120	0.196		14.17"			
HDG	050-00002								allow. F_z		allow. F		
A4	050-00003								0.99		0.72	0.36	0.25
HM 38/17	0290.												
MF	020-00001	239	1.20	0.352	0.020	0.099	0.039	0.134		4.33"			
HDG	020-00002								allow. F_z		allow. F		
A2 ②	020-00003								1.08		0.34	0.13	0.07
A4	020-00004												

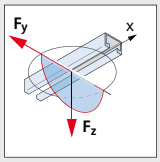
① F_z = max. load bearing capacity of the channel lips
② Stainless steel A2 on request; Note: high corrosion resistant stainless steel HCR for HM 38/17 on request

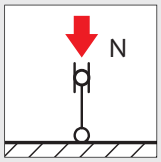
Accessories

PA 18 H Channel cover → see page 58
HPE 36/36 Channel end cap for HM and HL 36/36 → see page 58
SIC 38/17 Locking washer → see page 56
SDM - 36/6 Rubber vibration absorber → see catalog MT-FFC

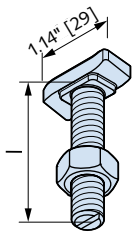
Further design properties


Cross section summary pages 62, 64


Statics, weld seams page 68


Flexural buckling page 71

HALFEN T-bolts HS 38/17



HS 38/17
HALFEN Bolt
incl. nut

Li = left-hand thread

High corrosion resistant stainless steel
HCR on request

HS 38/17 available T-bolts

Length l in [mm]	M10	M12	M16	Length l in [mm]	M10	M12	M16
3/4" [20]	EP 4.6	EP 4.6	EP 4.6 ①	2 3/8" [60]	EP 4.6 A4-70	EP 4.6 EP 8.8 A4-70	EP 4.6 EP 8.8 HDG 8.8 A4-50
1" [25]		A4-70	A4-50 ①				
1 1/4" [30]	EP 4.6 HDG 4.6 A4-70	EP 4.6 HDG 4.6 A2-70 A4-70	EP 4.6 HDG 4.6 A2-50 ① A4-50	2 3/4" [70]		HDG 8.8	
				3 1/4" [80]	EP 4.6	EP 4.6 A4-70	EP 4.6 A4-50 A4-70 ①
1 1/2" [40]	EP 4.6 A4-70	EP 4.6 A2-70 A4-70	EP 4.6 HDG 4.6 A2-50 ① A4-50	3 1/4" [80] Li			A4-50
				4" [100]	EP 4.6	EP 4.6 A4-50	EP 4.6 HDG 4.6 A4-50
2" [50]	EP 4.6 A4-70	EP 4.6 HDG 4.6 A2-70 A4-70	EP 4.6 HDG 4.6 A4-50	5" [125]		EP 4.6	EP 4.6
				6" [150]	EP 4.6	EP 4.6 A4-50 ①	EP 4.6 A4-50
				8" [200]		EP 4.6 A4-50 ①	EP 4.6 A4-50 ①

① on request

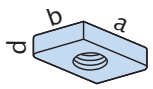
Load bearing capacities for HALFEN T-bolts ①

Thread Ø		Load capacities for HALFEN T-bolts F [kips]				Recommended load bearing capacities per HALFEN Bolt in channel longitudinal direction F_x [kips] ②			Recommended torques T_{inst} [Ft-lb]			
38/17		HS				HS			HS			
		4.6	8.8	A2-50 A4-50	A2-70 A4-70	4.6	8.8	A2-50; A4-50; A2-70; A4-70	4.6	8.8	A2-50; A4-50	A2-70; A4-70
M10	allow. F	1.33	2.99	1.17	2.52	0.07	0.25	0.07	11	30	11	22
M12	allow. F	1.93	4.34	1.71	3.64	0.11	0.36	0.11	18	52	18	37
M16	allow. F	3.62	8.07	3.17	6.79	0.20	0.67	0.20	48	133	44	96

① Note: do not exceed the max. channel load bearing capacity!
② Load capability due to friction

Locking plates

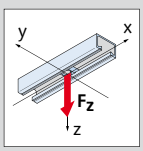
GWP 38/17



GWP 38/17 available T-bolts

EP	A4	a in [mm]	b in [mm]	d in [mm]
M6	M6	1.32" [33.5]	0.69" [17.5]	0.24" [6]
M8	M8			
M10	M10			
M12	M12			

Load capacities GWP 38/17



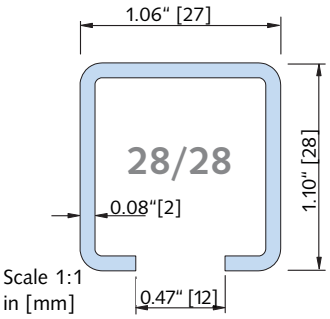
38/17

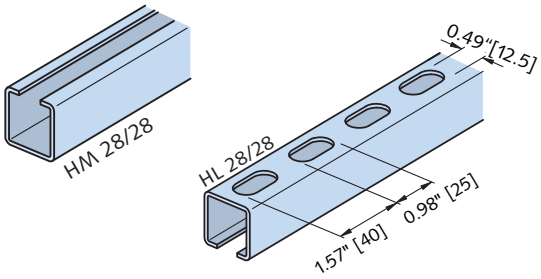
Thread	Load capacity [kips]	
M6	allow. F	0.49
M8	allow. F	0.90
M10	allow. F	1.28
M12	allow. F	1.28

GWP 38/17 locking plates are available in UNC threads. Please contact HALFEN USA.

Mounting channels HM 28/28 and HL 28/28

HM 28/28 and HL 28/28 cold-rolled





Suitable HALFEN T-bolts
HS 28/15 → see page 51

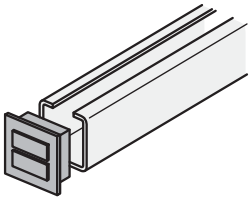
Cross-sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	F [kips]		
HM 28/28	0280.	[in]	G [lf/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	19.7"	39.4"	59.1"
MF	050-00001	236.2	0.91	0.268	0.041	0.048	0.066	0.091		12.20"	[0.5 m]	[1.0 m]	[1.5 m]
PG	050-00003								allow. F_z		allow. F		
HDG	050-00002								0.67		0.43	0.20	0.11
A4	050-00004												
HL 28/28	**0281.**												
MF	060-00001	236.2	0.82	0.229	0.032	0.048	0.058	0.090		10.04			
PG	060-00003								allow. F_z		allow. F		
HDG	060-00002								0.67		0.34	0.18	0.09
A4	060-00004												

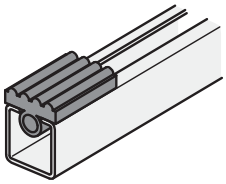
① F_z = max. load bearing capacity of the channel lips

Accessories

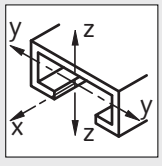
HPE 28/28
Channel end cap
→ see page 58



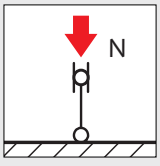
SDM - 28/6
Rubber vibration absorber
→ see catalog MT-FFC



Further design properties



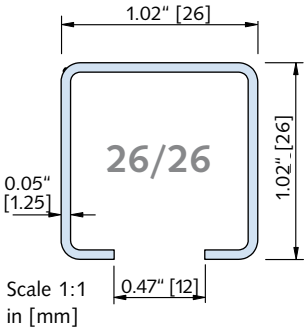
Cross section summary
pages 62, 64

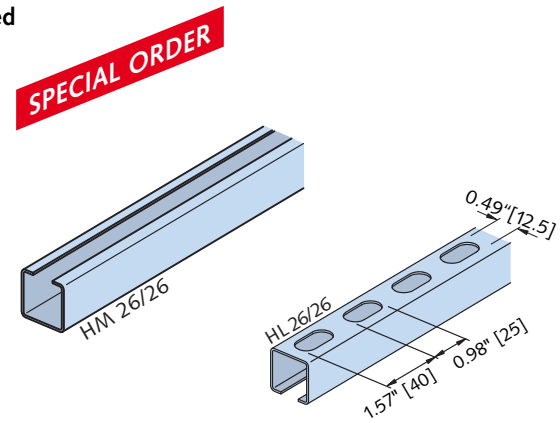


Flexural buckling
page 71

Mounting channel HM 26/26 and HL 26/26

HM 26/26 and HL 26/26 cold-rolled





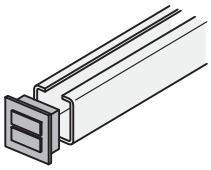
Suitable HALFEN T-bolts
HS 28/15 → see page 51

Cross-sectional properties									Load capacities				
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
Material	Article no.		G	A	I_y	I_z	W_y	W_z	F_z ①	≤ e_w	19.7"	39.4"	59.1"
HM 26/26	0280.	[in]	[lf/ft]	[in²]	[in⁴]	[in⁴]	[in³]	[in³]	[kips]	[in]	[0.5 m]	[1.0 m]	[1.5 m]
PG	040-00001	236.2	0.55	0.163	0.023	0.029	0.039	0.056	allow. F_z 0.25	19.69"	allow. F	0.25	0.11	0.06
HL 26/26	0281.												
PG	070-00001	236.2	0.48	0.138	0.018	0.028	0.034	0.054	allow. F_z 0.25	15.75"	allow. F	0.20	0.09	0.05

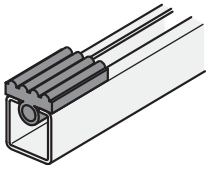
① F_z = max. load bearing capacity of the channel lips

Accessories

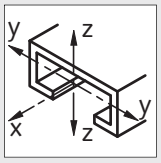
HPE 26/26
Channel end cap
→ see page 58



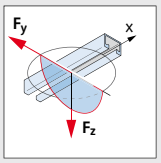
SDM - 28/6
Rubber vibration absorber
→ see catalog MT-FFC



Further design properties



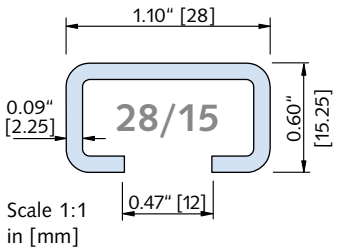
Cross section summary
pages 62, 64

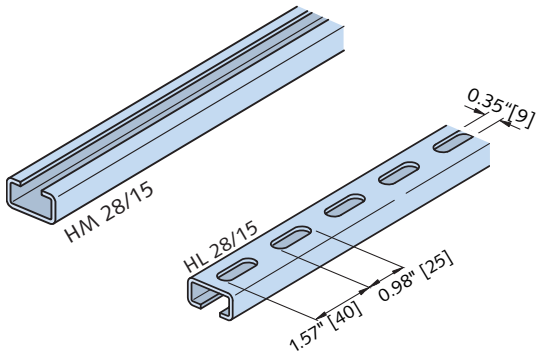


Statics, weld seams
page 68

Mounting channel HM 28/15 and HL 28/15

HM 28/15 and HL 28/15 cold-rolled





Suitable HALFEN T-bolts
HS 28/15 → see page 51

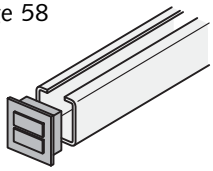
Cross-sectional properties | **Load capacities**

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	19.7"	39.4"	59.1"
HM 28/15	0280.	[in]	G [lf/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	[0.5 m]	[1.0 m]	[1.5 m]
MF	010-00001	239	0.73	0.215	0.010	0.035	0.028	0.063	allow. F_z 0.88	3.23"	allow. F		
HDG	010-00002										0.18	0.07	0.03
A2 ②	010-00004												
A4 ②	070-00003												
HL 28/15	0281.												
MF	080-00001	239	0.58	0.180	0.008	0.032	0.024	0.060	allow. F_z 0.88	2.76"	allow. F		
HDG	080-00004										0.16	0.05	0.02
A2 ②	080-00002												
A4	080-00003												

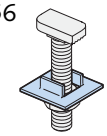
① F_z = max. load bearing capacity of the channel lips
② Stainless steel A2 on request; Note: high corrosion resistant stainless steel HCR for HM 28/15 on request

Accessories

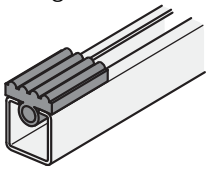
HPE 28/15 Channel end cap
→ see page 58



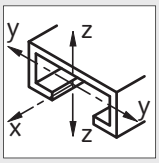
SIC 28/15 Locking washer
→ see page 56



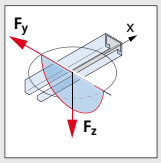
SDM 28/6 Rubber vibration absorber
→ see catalog MT-FFC



Further design properties



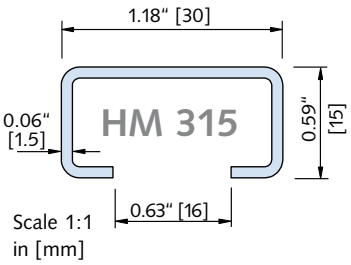
Cross section summary
pages 62, 64



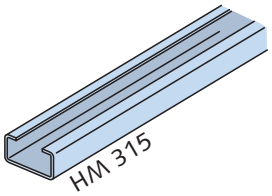
Statics, weld seams
page 68

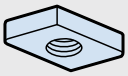
Mounting channel HM 315 (C30)

HM 315 (C30) cold-rolled



SPECIAL ORDER





Suitable locking plates
GWP 28/15 → see page 51

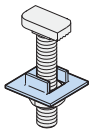
Cross-sectional properties / Load capacities

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
									F_z ①	≤ e_w	19.7"	39.4"	59.1"
HM 315	0280.	[in]	G [lf/ft]	A [in²]	I_y [in⁴]	I_z [in⁴]	W_y [in³]	W_z [in³]	[kips]	[in]	[0.5 m]	[1.0 m]	[1.5 m]
MF	060-00001	236.2	0.52	0.152	0.007	0.030	0.020	0.051	allow. F_z	6.97"	allow. F		
HDG	060-00002								0.37		0.13	0.04	0.02

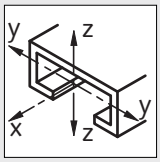
① F_z = max. load bearing capacity of the channel lips

Accessories

SIC 28/15 Locking plate
→ see page 56

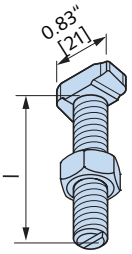


Further design properties



Cross section summary
page 62

HALFEN T-bolts HS 28/15



HS 28/15
HALFEN T-bolts
incl. nut
Li = left-hand thread

Not for HM 315

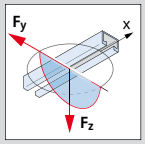
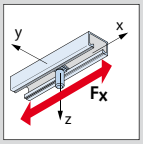
High corrosion resistant stainless steel
HCR on request

HS 28/15 available T-bolts

Length l in [mm]	M6	M8	M10	M12	Length l in [mm]	M6	M8	M10	M12
5/8" [15]	EP 4.6	EP 4.6	EP 4.6		2" [50]		EP 4.6	EP 4.6 HDG 4.6	EP 4.6
3/4" [20]	EP 4.6	EP 4.6 EP 8.8 A2-70	EP 4.6 A2-70 A4-70		2 3/8" [60]		EP 4.6	EP 4.6 EP 8.8 A4-70	
1" [25]	EP 4.6	EP 4.6 A2-70	EP 4.6 A2-70 A4-70		3 1/4" [80]		EP 4.6	EP 4.6 EP 8.8 A4-70	EP 4.6
1 1/4" [30]	EP 4.6	EP 4.6 A2-70 A4-70	EP 4.6 HDG 4.6 A2-70 A4-70	EP 4.6	4" [100]		EP 4.6	EP 4.6 A4-50	
1 3/8" [35]				EP 4.6	5" [125]			EP 4.6 A4-50	
1 1/2" [40]	EP 4.6	EP 4.6	EP 4.6 HDG 8.8 A2-70 A4-70		6" [150]		EP 4.6 ①	EP 4.6 A4-50	
					8" [200]			EP 4.6 A4-50	

① on request

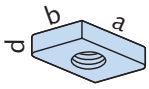
Load bearing capacities for HALFEN T-bolts ①

Thread Ø	Load capacities for HALFEN T-bolts  F [kips]					Recommended load bearing capacity per HALFEN Bolt in channel longitudinal direction  F_x [kips] ②		Recommended torque  T_{inst} [Ft-lb]			
28/15		HS				HS		HS			
		4.6	8.8	A2-50 A4-50	A2-70 A4-70	4.6; 8.8	A2-50; A4-50; A2-70; A4-70	4.6	8.8	A2-50; A4-50	A2-70; A4-70
M6	allow. F	0.47	1.03	0.40	0.85	0.02	0.02	2	-	2	-
M8	allow. F	0.85	1.87	0.74	1.60	0.04	0.04	6	14	6	11
M10	allow. F	1.33	2.99	1.17	2.52	0.07	0.07	11	29	11	22
M12	allow. F	1.93	4.34	1.71	3.64	0.11	0.11	18	52	18	37

① Note: do not exceed the max. channel load bearing capacity ② Load capability due to friction

Locking plates

GWP 28/15
for profiles 28/15
and HM 315 (C30)

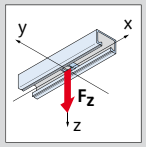


Assembly notes:
M6 and M8: insert the locking plate at an angle through the channel slot!
M10: insert the locking plate first, then fit and turn the threaded rod!

GWP 28/15 available plates

EP	A4	a in [mm]	b in [mm]	d in [mm]
M5	-	0.96" [24.5]	0.51" [13.0]	0.16" [4]
M6	M6			
M8	M8			
M10	M10	1.32" [33.5]	0.69" [17.5]	0.20" [5]

GWP 28/15 Load capacities



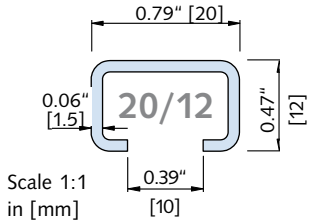
28/15

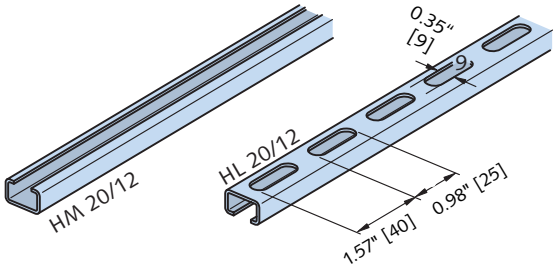
Thread	F_z [kips]	
M5	allow. F	0.34
M6	allow. F	0.43
M8	allow. F	0.63
M10	allow. F	0.67

GWP 28/15 available with UNC threads. Contact HALFEN USA.

Mounting channel HM 20/12 and HL 20/12

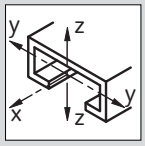
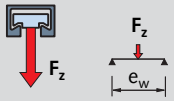
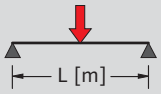
HM 20/12 and HL 20/12 cold-rolled





Suitable HALFEN Bolt
HS 20/12 → see page 53

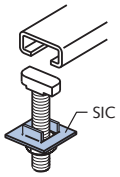
Cross-sectional properties

Material	Article no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Load capacities: Max. point-load bearing capacity		Load capacities: Bending load capacity at span L		
											F [kips] 		
		G	A	I_y	I_z	W_y	W_z	F_z ①	≤ e_w	19.7"	39.4"	59.1"
HM 20/12	0280.	[in]	[lf/ft]	[in²]	[in⁴]	[in⁴]	[in³]	[in³]	[kips]	[in]	[0.5 m]	[1.0 m]	[1.5 m]
MF	030-00001	236.2	0.35	0.102	0.003	0.009	0.010	0.022	allow. F_z	2.28"	allow. F		
HDG	030-00003												
A2	030-00002								0.50		0.07	0.02	0.01
HL 20/12	0281.												
MF	090-00001	236.2	0.30	0.082	0.002	0.008	0.009	0.022	allow. F_z	1.81"	allow. F		
HDG	090-00002												
A2	090-00003								0.50		0.05	0.01	0.01

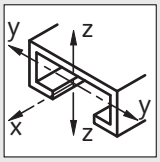
① F_z = max. load bearing capacity of the channel lips

Accessories

SIC 20/12 Locking washer
→ see page 56

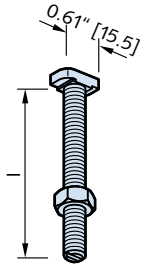


Further design properties



Cross section summary
pages 62, 64

HALFEN T-bolts HS 20/12



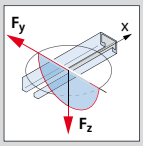
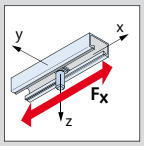
HS 20/12
HALFEN T-bolts
incl. nut

HS 20/12 available T-bolts

Length l in [mm]	M6	M8	Length l in [mm]	M6	M8
5/8" [15]	-	EP 4.6	1 1/2" [40]	EP 4.6 -	EP 4.6 A2-70
3/4" [20]	EP 4.6 -	EP 4.6 A2-70	2" [50]	-	EP 4.6 A2-70 ①
1" [25]	-	EP 4.6	2 3/8" [60]	-	EP 4.6
1 1/4" [30]	EP 4.6 -	EP 4.6 A2-70	3 1/4" [80]	-	EP 4.6
			4" [100]	-	EP 4.6 ①

① on request

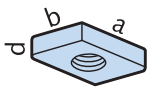
Load bearing capacities for HALFEN T-bolts ①

Thread Ø		Load capacities for HALFEN T-bolts  F [kips]		Recommended load capacity per HALFEN Bolt in channel longitudinal direction  F_x [kips] ②		Recommended torque  T_{inst} [Ft-lb]	
20/12		HS		HS		HS	
		4.6	A2-70	4.6	A2-70	4.6	A2-70
M6						2	2
	allow. F	0.47	0.85	0.02	0.02		
M8						6	6
	allow. F	0.85	1.60	0.04	0.04		

① Note: do not exceed the max. channel load bearing capacity
② Load capability due to friction

Locking plates

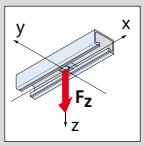
Locking plate **GWP 20/12**



GWP 20/12 available plates

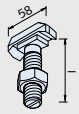
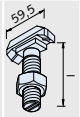
EP Thread	A4 Thread	a in [mm]	b in [mm]	d in [mm]
M5	M5	0.63" [16]	0.35" [9]	0.16" [4]
M6	M6			

Load capacities for GWP 20/12



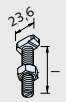
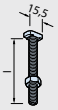
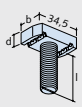
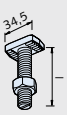
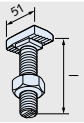
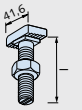
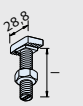
20/12

Thread	F_z [kips]	
M5	allow. F	0.34
M6	allow. F	0.43

Profile	HM 72/48					HM/HL 55/42, 52/34, 50/30, 49/30, 50/40, 50/40, 486				HM 55/42	HM 52/34 HM 50/30		HM 40/22, HM 40/25, HM 422			HM 40/22	HM 36/36, HL 36/36, HM 38/17		
T-bolt	HS 72/48				HSR 72/48	HS 50/30 ①				HS 50/30	HSR 50/30		HS 40/22			HSR 40/22	HS 38/17 ①		
Ø / l																				
in [mm]	M20	M24	M27	M30	M20	M10	M12	M16	M20	M24	M16	M20	M10	M12	M16	M16	M10	M12	M16
5/8"[15]																			
3/4"[20]													EP 4.6	EP 4.6			EP 4.6	EP 4.6	EP 4.6
1"[25]																		A4-70	A4-50
1 1/4" [30]						EP 4.6 HDG4.6	EP 4.6 A4-70	EP 4.6 A4-50					EP 4.6 A4-70	EP 4.6 ZPs 8.8 HDG4.6 A4-50	EP 4.6 A4-50		EP 4.6 HDG4.6 A4-70	EP 4.6 HDG4.6 A2-70 A4-70	EP 4.6 HDG4.6 A2-50 A4-50
1 3/8" [35]									EP 4.6										
1 1/2" [40]						EP 4.6	EP 4.6 HDG4.6 A4-70	EP 4.6 EP 8.8 HDG4.6 A4-50			HDG8.8		EP 4.6 A4-70	EP 4.6 EP 8.8 A4-50 A4-70	EP 4.6 A4-50 A4-70	EP 8.8	EP 4.6 A4-70	EP 4.6 A2-70 A4-70	EP 4.6 HDG4.6 A2-50 A4-50
1 3/4" [45]							EP 8.8		EP 4.6 EP 8.8 A4-50			EP 8.8		EP 8.8					
2" [50]	HDG4.6	HDG 4.6 A4-50				EP 4.6	EP 4.6 A4-70	EP 4.6 HDG4.6 A4-50					EP 4.6 A4-70	EP 4.6 HDG4.6 A4-50	EP 4.6 HDG4.6 A4-50 A4-70		EP 4.6 A4-70	EP 4.6 HDG4.6 A2-70 A4-70	EP 4.6 HDG4.6 A4-50
2 1/8" [55]									EP 4.6 HDG4.6 A4-50										
2 3/8" [60]	HDG8.8						EP 4.6 EP 8.8	EP 4.6 EP 8.8 HDG8.8 A4-50	EP 8.8		EP 8.8	EP 8.8	EP 4.6	EP 4.6 EP 8.8	EP 4.6 EP 8.8 HDG4.6 A4-50	EP 8.8	EP 4.6 A4-70	EP 4.6 EP 8.8 A4-70	EP 4.6 EP 8.8 HDG8.8 A4-50
2 1/2" [63]																			
2 9/16" [65]									EP 4.6										
2 3/4"[70]																		HDG8.8	
3"[75]	HDG4.6 EP 8.8	HDG 4.6 HDG 8.8	HDG4.6	HDG4.6	HDG8.8				EP 4.6 A4-50 FA-70	HDG4.6		EP 8.8							
3 1/4" [80]							EP 4.6 EP 8.8	EP 4.6 EP 8.8 A4-50 A4-70	EP 8.8				EP 4.6	EP 4.6 EP 8.8 A4-50	EP 4.6 EP 8.8 A4-50		EP 4.6	EP 4.6 A4-70	EP 4.6 A4-50 A4-70
3 1/4"[80] Li								A4-50						A4-50	A4-50				A4-50
4" [100]	HDG4.6 EP 8.8	HDG 4.6 EP 8.8 A4-50	HDG4.6 HDG8.8	HDG4.6			EP 4.6 A4-50	EP 4.6 EP 8.8 HDG4.6	EP 4.6 EP 8.8 HDG4.6 A4-50 FA-70				EP 4.6	EP 4.6 ZPs 8.8 A4-50	EP 4.6 HDG4.6 A4-50		EP 4.6	EP 4.6 A4-50 A4-50	EP 4.6 HDG4.6 A4-50
5" [125]							EP 4.6	EP 4.6	EP 4.6 A4-50					EP 4.6	EP 4.6			EP 4.6	EP 4.6
6" [150]	HDG4.6	HDG 4.6 EP 8.8		HDG4.6			EP 4.6	EP 4.6 HDG4.6 A4-50	EP 4.6 EP 8.8 A4-50					EP 4.6 A4-50	EP 4.6 A4-50		EP 4.6	EP 4.6 A4-50	EP 4.6 A4-50
8" [200]	HDG4.6	HDG 4.6		HDG4.6			EP 4.6	EP 4.6	EP 4.6					EP 4.6	EP 4.6			EP 4.6 A4-50	EP 4.6 A4-50
10" [250]															EP 4.6				
12" [300]								EP 4.6	EP 4.6						EP 4.6				

Li = left-hand thread; ZL = zinc flake coated

* lengths in inches are nominal only

	HM/HL 28/28, HM/HL 26/26, HM/HL 28/15				HM 20/12, HL 20/12		HM/HL/HLL/HZM/HZL 41/41, 41/22, HM/HL 41/62, HM/HL 41/83							HZL 63/63 all 41/...		HZM 64/44		HZM 53/34		HZM 41/27, HZM 38/23		HZM 29/20
	HS 28/15 ①				**HS 20/12**		**HS 41/41**		**HZS 41/41**					**HZS 41/22**		**HZS 64/44**		**HZS 53/34**		**HZS 38/23**		**HZS 29/20**
																						
M6	**M8**	**M10**	**M12**	**M6**	**M8**	**M10**	**M12**	**M6**	**M8**	**M10**	**M12**	**M16**	**M12**	**M16**	**M20**	**M24**	**M16**	**M20**	**M12**	**M16**	**M12**
EP 4.6	EP 4.6	EP 4.6			EP 4.6																
EP 4.6	EP 4.6 EP 8.8 A2-70	EP 4.6 A2-70 A4-70		EP 4.6	EP 4.6 A2-70																
EP 4.6	EP 4.6 A2-70	EP 4.6 A2-70 A4-70			EP 4.6																
EP 4.6	EP 4.6 A2-70 A4-70	EP 4.6 HDG4.6 A2-70 A4-70	EP 4.6	EP 4.6	EP 4.6 A2-70			ZL	ZL	ZL	ZL								EP 8.8	EP 8.8	EP 8.8
			EP 4.6			HDG4.6 A4-70	HDG4.6 A4-70						HDG8.8 A4-50	A4-50							
EP 4.6	EP 4.6	EP 4.6 HDG8.8 A2-70 A4-70		EP 4.6	EP 4.6 A2-70														EP 8.8	EP 8.8	EP 8.8
	EP 4.6	EP 4.6 HDG4.6 A2-70 A4-70	EP 4.6		EP 4.6 A2-70		HDG4.6		ZL	ZL	ZL		HDG8.8 A4-50	HDG8.8 A4-50					EP 8.8	EP 8.8	EP 8.8
	EP 4.6	EP 4.6 EP 8.8 A4-70			EP 4.6												EP 8.8 A4-70		EP 8.8	EP 8.8 HDG8.8 A4-70	EP 8.8
												ZL									
																		EP 8.8 A4-70			
										ZL	ZL										
	EP 4.6	EP 4.6 A4-70	EP 4.6		EP 4.6								A4-50		EP 8.8 A4-70	EP 8.8 A4-70			EP 8.8	EP 8.8 A4-70	EP 8.8
	EP 4.6	EP 4.6 A4-50			EP 4.6						ZL HDG 4.6			HDG 8.8			EP 8.8 A4-70	EP 8.8 A4-70	EP 8.8	EP 8.8	EP 8.8
		EP 4.6 A4-50													EP 8.8 A4-70				EP 8.8	EP 8.8	EP 8.8
	EP 4.6	EP 4.6 A4-50														EP 8.8 A4-70			EP 8.8	EP 8.8	EP 8.8
		EP 4.6 A4-50																		EP 8.8	EP 8.8
																				EP 8.8	EP 8.8
																				EP 8.8	EP 8.8

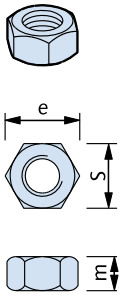
① High corrosion resistant stainless steel HCR on request

Mounting Channels
Heavy Duty Mounting Systems
Medium Duty Framing Systems
Light Duty Mounting Systems
Accessories
Statics
Mechanical engineering

See HALFEN USA Price List for part numbers

MU

Hexagonal nuts EN ISO 4032/ DIN 934

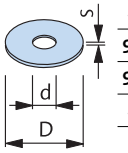


EP Electroplated Grade 8 Thread	A4 Stainless steel A4 Thread	S/m DIN [in]	S/m ISO [in]	e [in]
M6	M6	0.394/0.197	0.394/0.236	0.453
M8	M8	0.512/0.256	0.512/0.295	0.591
M10	M10	0.669/0.315	0.630/0.374	0.772
M12	M12	0.748/0.394	0.709/0.472	0.862
M16	M16	0.945/0.512	0.945/0.610	1.091
M20	M20	1.181/0.630	1.181/0.748	1.362
M24	-	1.417/0.748	1.417/0.866	1.634

HDG Hot-dip galvanized Thread	A2 Stainless steel A4 Thread	S/m DIN [in]	S/m EN [in]	e [in]
M6, M8	M8	0.512/0.256	0.512/0.295	0.591
M10	M10	0.669/0.315	0.630/0.374	0.772
M12	M12	0.748/0.394	0.709/0.472	0.862
M16	M16	0.945/0.512	0.945/0.610	1.091

US

Washers DIN 9021/ EN ISO 7094/ DIN 440

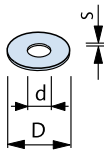


DIN	EP Electroplated For T-bolt	A4 Stainless steel For T-bolt	D [in]	d [in]	s [in]
440	M6	-	0.866	0.260	0.079
9021	M8	M8	0.945	0.331	0.079
9021	M10	M10	1.181	0.413	0.098
440	M12	-	1.772	0.531	0.157
9021	M12	M12	1.457	0.512	0.118
9021	M16	M16	1.969	0.669	0.118
440	M20	-	2.835	0.866	0.236

Ordering example: **US - M12 - EP - DIN 9021**

US

Washers EN ISO 7089/ DIN 125



EP Electroplated For T-bolt	A4 Stainless steel A4 For T-bolt	D [in]	d [in]	s [in]
M6	M6	0.472	0.252	0.063
M8	M8	0.630	0.331	0.063
M10	M10	0.827	0.413	0.079
M12	M12	0.945	0.512	0.098
M16	M16	1.181	0.669	0.118
M20	M20	1.457	0.827	0.118
M24	-	1.732	0.984	0.157

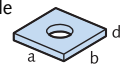
HDG Hot-dip galvanized For T-bolt	A2 Stainless steel A2 For T-bolt	D [in]	d [in]	s [in]
-	M8	0.669	0.331	0.063
M10	M10	0.827	0.413	0.079
M12	M12	0.945	0.512	0.098
M16	M16	1.181	0.669	0.118

Ordering example: **US - M12 - EP - DIN 125**

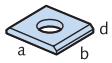
VUS

Square washers

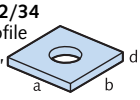
VUS 40/25 for profile 40/25; HZA 41/22



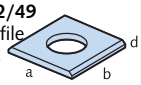
VUS 49/30 for profile 54/33, 49/30



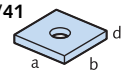
VUS 52/34 for profile 52/34, 50/30



VUS 72/49 for profile 72/48, 72/49



VUS 41/41 for all 41/.. profiles

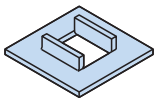


HDG Hot-dip galvanized For T-bolt size:	A4 Stainless steel A4 For T-bolt size:	a x b x d [in]
M10	M10	1.575 x 1.575 x 0.197
M12	M12	1.575 x 1.575 x 0.197
M16	M16	1.575 x 1.575 x 0.197
M10	M10	1.457 x 1.457 x 0.197
M12	M12	1.457 x 1.457 x 0.197
M16	M16	1.457 x 1.457 x 0.197
M20	M20	1.457 x 1.457 x 0.197
M16	M16	1.969 x 1.969 x 0.236
M20	M20	1.969 x 1.969 x 0.236
M20	M20	2.126 x 2.126 x 0.236
M24	M24	2.126 x 2.126 x 0.236
M27	M27	2.126 x 2.126 x 0.236
M30	M30	2.126 x 2.126 x 0.236
M6	M6	1.575 x 1.575 x 0.236
M10	M10	1.575 x 1.575 x 0.236
M12	M12	1.575 x 1.575 x 0.236

Ordering example: **VUS 52/34 - HDG - M20**

SIC

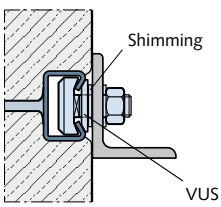
Locking washer



EP Electroplated	A4 Stainless steel	Suitable for HALFEN T-bolts Type	Dimensions
SIC - 50/30 - ZP	SIC - 50/30 - A4	50/30	M16, M20
SIC - 40/22 - ZP	SIC - 40/22 - A4	38/17 40/22	M16
SIC - 38/23 - ZP	-	38/23	M16
SIC - 29/20 - ZP	-	29/20	M12
SIC - 38/17 - ZP	SIC - 38/17 - A4	38/17 40/22	M12, M10
SIC - 28/15 - ZP	SIC - 28/15 - A4	28/15	M8, M10
SIC - 20/12 - ZP	SIC - 20/12 - A4	20/12	M8

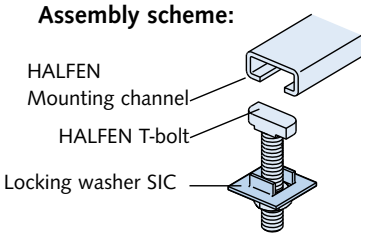
Ordering example: **SIC - 38/17 - EP**

Application VUS:
for shimming non-flush installation of HALFEN Anchor channels or for stand-off installations
→ see page 69



Application SIC:
for securing HALFEN T-bolts; prevents T-bolts turning when tightening nuts

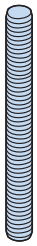
Assembly scheme:



See HALFEN USA Price List for part numbers

GWS

Threaded rods DIN 976-1

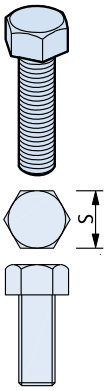


EP Electroplated Grade 4.6 Thread	A4 Stainless steel A4 Thread	Length [in]	Allowable load [kips]
M6	M6	39.4	0.49
M8	M8	39.4	0.90
M10	M10	39.4	1.44
M12	M12	39.4	2.09
M16	M16	39.4	3.89
M20	M20	39.4	6.07
M24	-	39.4	8.72

Ordering example: **GWS - M12 × 1000 - EP**

HSK

Hexagonal head bolts EN ISO 4017/ DIN 933 (without nut)

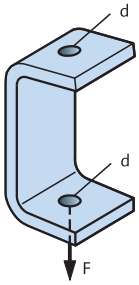


Hex bolts are used in combination with HALFEN Locking plates

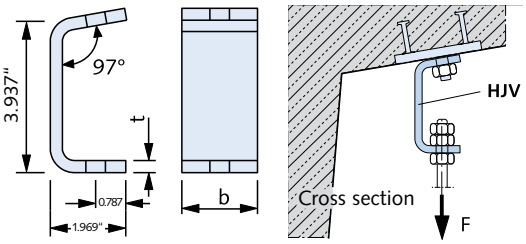
EP 8.8 Electroplated Grade 8.8 Dimensions	A4 Stainless steel Dimensions	S DIN [in]	S EN ISO [in]
M 6 x 12		0.394	0.394
M 6 x 25			
M 8 x 25	M8 x 25	0.512	0.512
M 8 x 40			
M 10 x 20		0.669	0.630
M 10 x 30	M10 x 30		
M 10 x 45	M10 x 45		
M 10 x 60			
M 10 x 70			
M 12 x 22		0.748	0.709
M 12 x 25	M12 x 25		
M 12 x 30	M12 x 30		
M 12 x 40	M12 x 40		
M 12 x 50			
M 12 x 60	M12 x 60		
M 12 x 80	M12 x 80		
M 12 x 90			
M 16 x 40	M16 x 40	0.945	0.945
M 16 x 60	M16 x 60		
M 16 x 90	M16 x 90		

HJV

Adjustment coupler

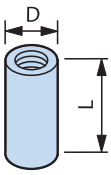


HDG Hot-dip galvanized Type	A4 Stainless steel Type	t [in]	b [in]	d [in]	allow. F [kips]
1	1	0.236	1.575	0.512	0.34
2	2	0.315	1.969	0.669	0.74
3	3	0.394	1.969	0.669	1.12



VBM

Coupler sleeves, round

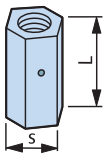


EP Electroplated Thread	A4 Stainless steel Thread	D [in]	L [in]	allow. F ① [kips]
M6	M6	0.394/0.394	0.591	0.49
M8	M8	0.472/0.551	0.787	0.90
M10	M10	0.512/0.630	0.984	1.44
M12	M12	0.630/0.787	1.181	2.09
M16	M16	0.827/0.984	1.575	3.89
M20	M20	1.024/1.260	1.969	6.07

Ordering example: **VBM - A4 - M16**

SKM

Hexagonal coupler sleeves with view holes

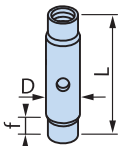


HDG Hot-dip galvanized Thread	A4 Stainless steel Thread	S [in]	L [in]	allow. F ① [kips]
M10	M10	0.512	1.575	1.44
M12	M12	0.669	1.575	2.09
M16	M16	0.866	1.969	3.89

Ordering example: **SKM - HDG - M12**

SPH

Turnbuckles with right- and left-hand thread



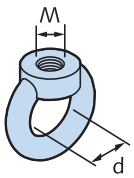
f = min. screw depth
M 10 ≙ 3/8"
M 16 ≙ 1/2"

A4 Stainless steel Thread M12 × Length L [in]	A4 Stainless steel Thread M16 × Length L [in]	D For M12 [in]	D For M16 [in]
M 12 × 60	M 16 × 60	0.630	0.866
M 12 × 75	M 16 × 75	0.630	0.866
M 12 × 95	M 16 × 95	0.630	0.866
M 12 × 115	M 16 × 115	0.630	0.866
M 12 × 135	M 16 × 135	0.630	0.866
allow. F = 5 kips F_{Rd} = 7 kips	allow. F = 10 kips F_{Rd} = 14 kips		

Ordering example: **SPH - A4 - M12 x 75**

RM

Ring nut DIN 582 from 2003-8



EP C 15E, plated Thread	d [in]	allow. F ③ [kips]
M8	0.787	0.31
M10	0.984	0.52
M12	1.181	0.76
M16	1.378	1.57
M20	1.575	2.70

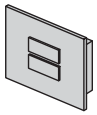
③ Recommended maximum working load with centric-pull according to DIN 582

Ordering example: **RM - EP - M12**

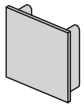
HPE Channel end caps

Channel end caps in plastic

Type HPE 63/63
Color: blue



Type HPE
Color: black

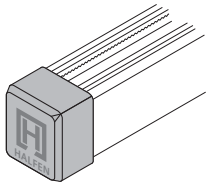


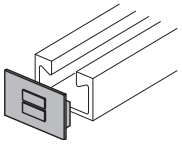
Type HPE 41/41
Type HPE 41/22
Color: black

Product range		
Description	**Article no. 0318.000-**	**Suitable for channel**
HPE 63/63	00010	63/63
HPE 52/34	00001	52/34
HPE 50/40	00002	50/40
HPE 41/41	00003	41/41
HPE 41/22	00004	41/22
HPE 36/36	00005	36/36
HPE 28/28	00006	28/28
HPE 28/15	00011	28/15
HPE 26/26	00007	26/26

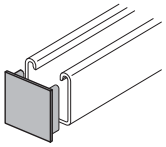
Assembly diagram:

Type HPE 63/63





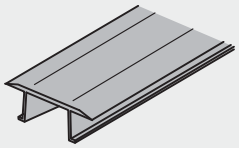
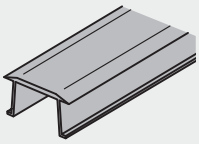
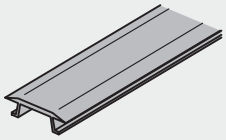
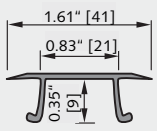
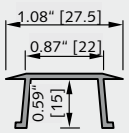
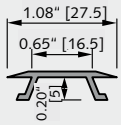
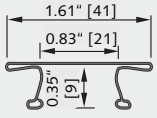
Type HPE



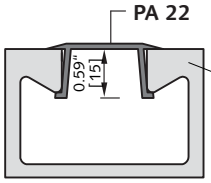
Type HPE 41/41
Type HPE 41/22

PA Channel cover

The channel cover **PA** is used to protect the channel slot against dirt etc.

Type overview			
Type	**PA 41**	**PA 22**	**PA 18 H**
	Suitable for profiles: 50/40, 50/30, 486, all 41/... Profiles	**Suitable for profile 52/34**	**Suitable for profiles 36/36, 38/17**
			
Material: hard PVC (**KS**) in [mm]			
	white	medium grey	medium grey
Material: steel pre-galvanized zinc plated (**PG**) in [mm]			

Assembly diagram:



HALFEN Channel i.e. HM 52/34

Available types				
Type			**Length [mm]**	**Article no. 0321.000-**
PA -	41	- KS	- 3000	00002
PA -	41	- SV	- 3000	00001
PA -	22	- KS	- 3000	00003
PA -	18H	- KS	- 3000	00004

Cantilevers KON

Flexible comprehensive support system

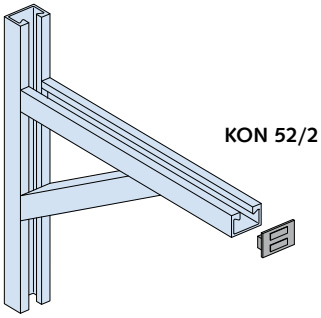
Whether for low or very high performance demands: you will find a most cost-efficient solution for your requirements using the HALFEN product range. With its adjustable T-bolt connections, components can be installed, dismantled, moved and adjusted quickly and simply.

Short assembly times

The flexibility of HALFEN Cantilevers/ T-bolts make them ideal when the positions and sizes of T-bolts cannot be defined during the planning stage of a project. Using the HALFEN product range avoids costly and complex adjustment, drilling or thread cutting in corrosion protected components.

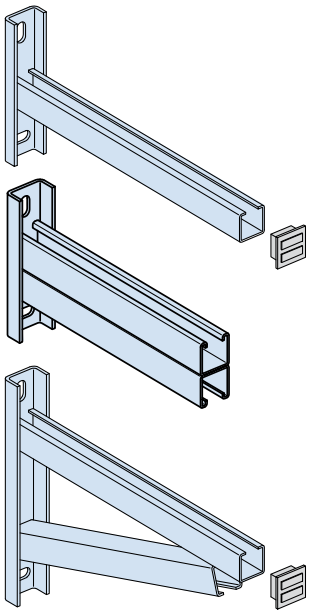
Pipe supports with cantilevers brackets in a sewage treatment plant

Heavy duty framing system:



KON 52/2

Medium duty framing system:

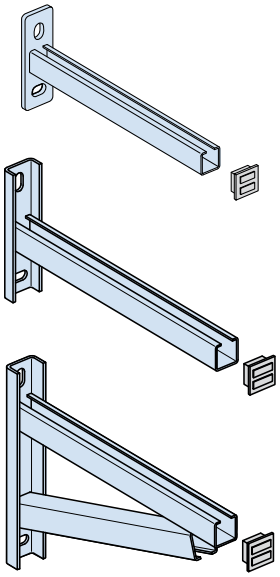


KON 41/1

KON 41/D

KON 41/2

Light duty framing system:



KON 28/1

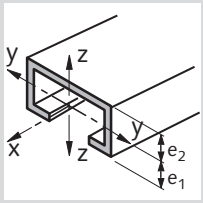
KON 36/1

KON 36/2

Note: Depending on the number of items ordered, custom cantilevers are available

You can find detailed information on HALFEN cantilevers in our catalog; "HALFEN Flexible Framing Connections, Technical Product Information, MT-FFC" at www.HalfenUSA.com.

HALFEN Mounting channels, Hot-Rolled, Non-Slotted – Cross-sectional properties



			Materials/coatings						Channel weight	Cross section area	Centroid	Moment of inertia		Elastic/plastic section modulus				Max. point-load bearing capacity ①	
									G [lb/ft]	A [in²]	e_2 [in]	I_y [in⁴]	I_z [in⁴]	$W_{y,el}$ [in³]	$W_{z,el}$ [in³]	$W_{y,pl}$ [in³]	$W_{z,pl}$ [in³]	allow. F_z [kips]	e_w [in]
	HM 72/48		MF	-	HDG	-	A4		5.95	1.747	0.965	0.840	2.002	0.871	1.413	1.116	1.767	10.57	11.81
	HM 55/42		MF	-	HDG	-	-		4.54	1.335	0.783	0.450	0.872	0.518	0.813	0.716	1.019	8.68	9.84
	HM 52/34								3.35	0.984	0.634	0.224	0.570	0.327	0.552	0.439	1.702	5.82	7.87
	HM 50/30		MF	-	HDG	-	A4		2.19	0.643	0.539	0.126	0.331	0.197	0.343	0.267	0.430	3.24	7.87
	HM 40/22								1.42	0.419	0.413	0.048	0.139	0.097	0.178	0.132	0.225	1.84	5.91
	HM 72/48 D ④								11.89	3.494	1.909	4.929	4.005	2.581	2.825	3.369	3.533	10.57	11.81
	HM 55/42 D ④								9.09	2.669	1.654	2.539	1.744	1.536	1.626	2.091	2.036	8.68	9.84
	HM 52/34 D ④		⑤	-	⑤	-	⑤		6.69	1.969	1.319	1.237	1.141	0.938	1.104	1.246	1.404	5.82	7.87
	HM 50/30 D ④								4.38	1.282	1.181	0.638	0.676	0.540	0.701	0.703	0.871	3.24	7.87
	HM 40/22 D ④								2.85	0.826	0.091	0.242	0.279	0.267	0.359	0.350	0.449	1.84	5.91
	HZM 64/44		MF	-	HDG	-	A4		4.80	1.411	0.827	0.573	1.296	0.632	1.028	0.834	1.273	8.57	9.84
	HZM 53/34		MF	-	HDG	-	A4		3.11	0.911	0.606	0.221	0.557	0.302	0.539	0.415	0.668	6.95	7.87
	HZM 41/27		MF	-	HDG	-	-		2.27	0.668	0.469	0.094	0.228	0.157	0.290	0.228	0.365	4.00	7.87
	HZM 38/23		MF	-	HDG	-	A4		1.63	0.481	0.382	0.051	0.148	0.097	0.198	0.141	0.248	2.88	7.87
	HZM 29/20		MF	-	HDG	-	-		1.04	0.308	0.346	0.025	0.058	0.056	0.102	0.080	0.126	1.75	5.91
	HZM 64/44 D ④								9.61	2.823	1.732	3.074	2.592	1.775	2.057	2.333	2.546	8.57	9.84
	HZM 53/34 D ④								6.22	1.821	1.339	1.114	1.114	0.832	1.078	1.107	1.336	6.95	7.87
	HZM 41/27 D ④		⑤	-	⑤	-	⑤		4.54	1.336	1.063	0.478	0.456	0.450	0.579	0.624	0.730	4.00	7.87
	HZM 38/23 D ④								3.27	0.959	0.901	0.241	0.298	0.266	0.397	0.366	0.496	2.88	7.87
	HZM 29/20 D ④								2.08	0.615	0.787	0.123	0.116	0.156	0.204	0.213	0.251	1.75	5.91

Hot-rolled

① Observe the minimum distance a_e between the channel end and the load point (HALFEN T-bolt, locking plate):
heavy and medium duty framing and mounting systems: ae ≥ 1-1/4" [30 mm], light duty mounting systems: ae ≥ 3/4" [20 mm].

② Do not exceed the T-bolt load capacity or the max. channel load bearing capacity.

③ For maximum point-load capacity:
F_z = max. load bearing capacity of the channel lips.

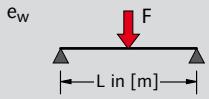
④ Take appropriate measures to prevent failure caused by bulging, tilting and buckling.

⑤ On request.

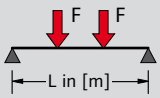
HALFEN Mounting channels, Hot-Rolled, Non-Slotted – Cross-sectional properties

Material: steel, type MF, HDG E = 30.46 x 10^6 psi

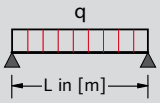
Bending load capacity at span L (single span element) ②



F [kips]



F [kips]



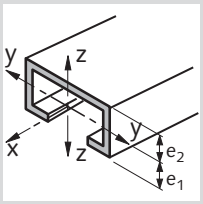
q [kips/m]

allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. q_z	allow. q_z	allow. q_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
5.01	2.52	1.66	3.75	1.89	1.26	5660	1528	678
3.78	1.89	1.26	2.83	1.42	0.74	4591	1151	411
1.98	0.99	0.63	1.48	0.74	0.36	2405	603	206
1.21	0.61	0.36	0.90	0.45	0.20	1466	370	116
0.58	0.29	0.13	0.45	0.18	0.07	726	144	41
allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. q_z	allow. q_z	allow. q_z
39.4" [1.00]	78.7" [2.00]	118.1" [3.00]	39.4" [1.00]	78.7" [2.00]	118.1" [3.00]	39.4" [1.00]	78.7" [2.00]	118.1" [3.00]
7.58	3.78	2.52	5.69	2.83	0.58	4618	1151	514
5.51	2.74	1.78	4.14	2.07	1.03	3358	836	288
2.81	1.39	0.85	2.09	1.06	0.52	1706	425	144
1.57	0.79	0.45	1.19	0.58	0.27	966	240	75
0.79	0.38	0.18	0.58	0.22	0.09	480	96	27
allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. q_z	allow. q_z	allow. q_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
5.58	2.79	1.60	4.18	2.09	0.94	6770	1699	521
2.79	1.39	0.61	2.09	0.81	0.36	3385	678	199
1.53	0.58	0.27	1.15	0.34	0.16	1864	288	82
0.94	0.31	0.13	0.72	0.18	0.09	1151	158	48
0.54	0.16	0.07	0.36	0.09	0.04	603	75	21
allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. q_z	allow. q_z	allow. q_z
39.4" [1.00]	78.7" [2.00]	118.1" [3.00]	39.4" [1.00]	78.7" [2.00]	118.1" [3.00]	39.4" [1.00]	78.7" [2.00]	118.1" [3.00]
7.82	3.91	2.16	5.87	2.83	1.26	4762	1179	349
3.71	1.75	0.79	2.79	1.03	0.45	2261	425	123
2.01	0.74	0.34	1.57	0.45	0.20	1275	185	55
1.24	0.38	0.16	0.90	0.22	0.09	740	89	27
0.72	0.20	0.09	0.45	0.11	0.04	377	48	14

All load capacities are calculated using the elastic-plastic method acc. to EN 1993-1,
partial safety factor γ_F = 1,4; deflection ≤ l /150.

Note: For stainless steel mounting channels the bending deflection value must be verified separately using the valid E-modulus of elasticity.

HALFEN Mounting channels, Cold-Rolled, Non-Slotted – Cross-sectional properties



			Materials/coatings					Channel weight	Cross section area	Centroid	Moment of inertia		Elastic/plastic section modulus				Max. point-load bearing capacity ①	
								G [lb/ft]	A [in²]	e_2 [in]	I_y [in⁴]	I_z [in⁴]	$W_{y,el}$ [in³]	$W_{z,el}$ [in³]	$W_{y,pl}$ [in³]	$W_{z,pl}$ [in³]	allow. F_z [kips]	e_w [in]
	HM 49/30		MF	-	HDG	-	A4	1.94	0.569	0.484	0.100	0.318	0.143	0.323	0.217	0.396	1.10	18.1
	HM 40/25		MF	-	HDG	-	A4	1.40	0.412	0.402	0.049	0.146	0.085	0.186	0.129	0.229	0.85	13.0
	HM 50/40		MF	-	HDG	-	A4	2.25	0.660	0.677	0.208	0.372	0.242	0.386	0.337	0.465	1.21	24.8
	HM 486		MF	-	HDG	-	-	1.55	0.457	0.453	0.071	0.231	0.117	0.245	0.165	0.302	0.79	18.5
	HM 422 (C40)		MF	-	HDG	-	-	1.04	0.307	0.366	0.031	0.103	0.063	0.132	0.089	0.165	0.56	14.2
	HM 41/41		MF	PG	HDG	-	A4	1.79	0.527	0.717	0.179	0.227	0.198	0.279	0.279	0.328	1.26	19.3
	HZM 41/41		MF	-	HDG	-	A4	1.77	0.521	0.709	0.176	0.225	0.192	0.277	0.273	0.324	1.26	18.5
	HM 41/22		MF	PG	HDG	-	A4	1.25	0.369	0.335	0.031	0.134	0.064	0.164	0.097	0.206	1.26	5.9
	HZM 41/22		MF	-	HDG	-	A4	1.23	0.361	0.331	0.030	0.132	0.063	0.162	0.095	0.203	1.26	5.5
	HM 41/83 ④	Cold-rolled	MF	PG	HDG	-	-	2.88	0.848	1.512	1.053	0.414	0.605	0.509	0.838	0.572	1.26	58.3
	HM 41/62 ④		MF	PG	HDG	-	-	2.34	0.688	1.114	0.504	0.320	0.379	0.394	0.527	0.450	1.26	36.2
	HM 41/41 D ④		MF	-	HDG	-	A4	3.59	1.056	1.626	0.903	0.454	0.555	0.558	0.758	0.656	1.26	19.3
	HZM 41/41 D ④		MF	-	HDG	-	A4	3.54	1.040	1.626	0.876	0.450	0.539	0.553	0.738	0.649	1.26	18.5
	HM 41/22 D ④		MF	-	HDG	-	A4	2.51	0.736	0.815	0.145	0.267	0.178	0.328	0.248	0.412	1.26	5.9
	HZM 41/22 D ④		⑤	-	HDG	-	A4	2.41	0.721	0.815	0.140	0.264	0.172	0.324	0.239	0.405	1.26	5.5
	HM 41/62 D ④		MF	-	⑤	-	A4	4.68	1.376	2.441	2.712	0.641	1.111	0.788	1.532	0.901	1.26	36.2
	HM 36/36		MF	-	HDG	-	A4	1.48	0.434	0.602	0.109	0.142	0.134	0.200	0.195	0.235	0.99	17.3
	HM 38/17		MF	-	HDG	A2	A4	1.20	0.352	0.276	0.020	0.099	0.049	0.134	0.074	0.172	1.08	4.3
	HM 315 (C30)		MF	-	HDG	-	-	0.52	0.152	0.228	0.007	0.030	0.020	0.051	0.029	0.063	0.37	7.0
	HM 28/28		MF	PG	HDG	-	A4	0.91	0.268	0.480	0.041	0.048	0.066	0.091	0.094	0.108	0.67	12.2
	HM 26/26		-	PG	-	-	-	0.55	0.163	0.441	0.023	0.029	0.039	0.056	0.055	0.065	0.25	19.7
	HM 28/15		MF	-	HDG	A2	A4	0.73	0.215	0.252	0.010	0.035	0.028	0.063	0.041	0.080	0.88	3.2
	HM 20/12		MF	-	HDG	A2	-	0.35	0.102	0.189	0.003	0.009	0.010	0.022	0.015	0.027	0.50	2.3

① Observe the minimum distance ae between the channel end and the load point (HALFEN T-bolt, locking plate): heavy and medium duty framing and mounting systems: ae ≥ 1 1/4" [30 mm], light duty mounting systems: ae ≥ 3/4" [20 mm].

② Do not exceed the T-bolt load capacity or the max. channel load bearing capacity.

③ For maximum point-load capacity:
Fz = max. load bearing capacity of the channel lips.

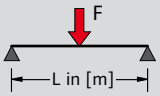
④ Take appropriate measures to prevent failure caused by bulging, tilting and buckling.

⑤ On request.

HALFEN Mounting channels, Cold-Rolled, Non-Slotted – Cross-sectional properties

Material: steel, type MF, HDG, PG E = 30.46 x 10^6 psi

Bending load capacity at span L (single span element) ②



F [kips]

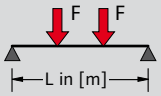
allow. F_z	allow. F_z	allow. F_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
0.97	0.49	0.27
0.58	0.29	0.13
1.53	0.76	0.52
0.74	0.38	0.20
0.40	0.20	0.09

allow. F_z	allow. F_z	allow. F_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
1.26	0.63	0.43
1.24	0.61	0.40
0.43	0.20	0.09
0.43	0.18	0.09

allow. F_z	allow. F_z	allow. F_z
39.4" [1.00]	78.7" [2.00]	118.1" [3.00]
1.89	0.94	0.63
1.19	0.58	0.36

allow. F_z	allow. F_z	allow. F_z
39.4" [1.00]	59.1" [1.50]	78.7" [2.00]
1.71	1.15	0.85
1.66	1.10	0.83
0.56	0.38	0.22
0.54	0.36	0.22
3.44	2.29	1.73

allow. F_z	allow. F_z	allow. F_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
0.88	0.43	0.29
0.34	0.13	0.07
0.13	0.04	0.02
0.43	0.20	0.11
0.25	0.11	0.07
0.18	0.07	0.03
0.07	0.02	0.01



F [kips]

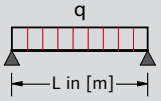
allow. F_z	allow. F_z	allow. F_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
0.74	0.36	0.16
0.43	0.18	0.09
1.15	0.56	0.34
0.56	0.27	0.11
0.29	0.11	0.04

allow. F_z	allow. F_z	allow. F_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
0.94	0.47	0.29
0.92	0.47	0.29
0.34	0.11	0.04
0.31	0.11	0.04

allow. F_z	allow. F_z	allow. F_z
39.4" [1.00]	78.7" [2.00]	118.1" [3.00]
1.42	0.70	0.43
0.88	0.45	0.20

allow. F_z	allow. F_z	allow. F_z
39.4" [1.00]	59.1" [1.50]	78.7" [2.00]
1.28	0.85	0.63
1.24	0.83	0.63
0.43	0.25	0.13
0.40	0.22	0.13
2.59	1.73	1.28

allow. F_z	allow. F_z	allow. F_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
0.65	0.34	0.18
0.25	0.07	0.03
0.09	0.03	0.01
0.31	0.16	0.07
0.18	0.09	0.04
0.13	0.04	0.02
0.04	0.01	0.004



q [kips/m]

allow. q_z	allow. q_z	allow. q_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
1192	295	89
706	151	48
1850	466	192
904	219	62
487	96	27

allow. q_z	allow. q_z	allow. q_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
1528	384	164
1501	377	158
534	96	27
521	96	27

allow. q_z	allow. q_z	allow. q_z
39.4" [1.00]	78.7" [2.00]	118.1" [3.00]
1151	288	116
719	178	55

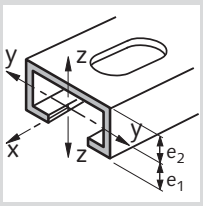
allow. q_z	allow. q_z	allow. q_z
39.4" [1.00]	59.1" [1.50]	78.7" [2.00]
1041	459	260
1014	452	253
343	130	55
329	130	55
2097	932	528

allow. q_z	allow. q_z	allow. q_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
1069	267	96
404	62	21
158	21	7
514	123	34
301	69	21
226	27	9
69	8	3

All load capacities were calculated using the elastic-plastic method acc. to EN 1993-1,
partial safety factor γ_F = 1,4; deflection ≤ l / 150.

Note: For stainless steel Mounting channels the bending deflection value must be verified separately using the valid E-modulus of elasticity.

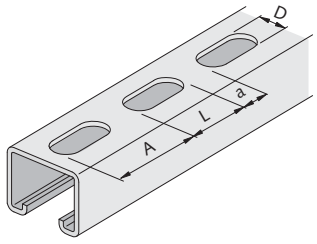
HALFEN Mounting channels, Cold-Rolled, Slotted – Cross-sectional properties



			Materials/coatings					Channel weight	Cross section area	Centroid	Moment of inertia		Elastic/plastic section modulus			Max. point-load bearing capacity ①	
								G [lb/ft]	A [in²]	e_2 [in]	I_y [in4]	I_z [in4]	$W_{y,el}$ [in³]	$W_{z,el}$ [in³]	$W_{y,pl}$ [in³]	zul. F_z [kips]	e_w [in]
	HL 50/40		MF	-	HDG	-	A4	2.12	0.578	0.768	0.172	0.369	0.223	0.366	0.286	1.21	20.9
	HZL 63/63		-	-	HDG	-	-	4.27	1.099	1.295	0.795	1.032	0.614	0.832	0.824	1.26	52.8
	HL 41/41		MF	PG	HDG	-	A4	1.65	0.462	0.783	0.146	0.220	0.173	0.270	0.233	1.26	16.5
	HL 41/22		MF	PG	HDG	-	A4	1.05	0.302	0.378	0.024	0.127	0.054	0.156	0.078	1.26	4.7
	HZL 41/41		MF	-	HDG	-	A4	1.65	0.450	0.768	0.141	0.217	0.164	0.267	0.226	1.26	16.1
	HZL 41/22	Cold-rolled	MF	-	HDG	-	A4	1.05	0.290	0.370	0.023	0.124	0.052	0.152	0.075	1.26	4.7
	HL 41/83 ④		MF	⑤	HDG	-	-	2.64	0.778	1.602	0.891	0.407	0.540	0.500	0.734	1.26	52.4
	HL 41/62 ④		MF	⑤	HDG	-	-	2.11	0.618	1.197	0.415	0.313	0.334	0.385	0.449	1.26	31.9
	HL 36/36		MF	-	HDG	-	A4	1.34	0.375	0.689	0.088	0.139	0.120	0.196	0.161	0.99	14.2
	HL 28/28		MF	PG	HDG	-	A4	0.82	0.229	0.555	0.032	0.048	0.058	0.090	0.076	0.67	10.0
	HL 28/15		MF	-	HDG	A2	A4	0.58	0.180	0.280	0.008	0.032	0.024	0.060	0.034	0.88	2.8
	HL 26/26		-	PG	-	-	-	0.48	0.138	0.516	0.018	0.028	0.034	0.054	0.044	0.25	15.7
	HL 20/12		MF	-	HDG	A2	-	0.30	0.082	0.232	0.002	0.008	0.009	0.022	0.012	0.49	1.8

HL/HZL channel dimensions/holes and spacings

Profile HL/HZL	D in [mm]	L in [mm]	A in [mm]	a in [mm]
50/40	0.71“ [18]	1.58“ [40]	2.36“ [60]	0.79“ [20]
63/63	0.55“ [14]	1.10“ [28]	9.84“ [250]	8.74“ [222]
41/41	0.55“ [14]	1.10“ [28]	1.97“ [50]	0.87“ [22]
41/22	0.55“ [14]	1.10“ [28]	1.97“ [50]	0.87“ [22]
41/83	0.55“ [14]	1.10“ [28]	1.97“ [50]	0.87“ [22]
41/62	0.55“ [14]	1.10“ [28]	1.97“ [50]	0.87“ [22]
36/36	0.59“ [15]	1.58“ [40]	2.36“ [60]	0.79“ [20]
28/28	0.49“ [12.5]	0.98“ [25]	1.58“ [40]	0.59“ [15]
26/26	0.49“ [12.5]	0.98“ [25]	1.58“ [40]	0.59“ [15]
28/15	0.35“ [9]	0.98“ [25]	1.58“ [40]	0.59“ [15]
20/12	0.35“ [9]	0.98“ [25]	1.58“ [40]	0.59“ [15]

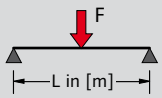


Other hole sizes and spacings on request

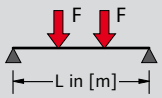
HALFEN Mounting channels, Cold-Rolled, Slotted – Cross-sectional properties

Material: steel, type MF, HDG, PG E = 30.46 x 10^6 psi

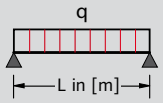
Bending load capacity at span L (single span element) ②



F [kips]



F [kips]



q[kips/m]

allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. q_z	allow. q_z	allow. q_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
1.28	0.65	0.43	0.97	0.47	0.29	1569	391	158
allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. q_z	allow. q_z	allow. q_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
3.71	1.84	1.24	2.79	1.39	0.92	4522	1131	500
1.06	0.52	0.36	0.79	0.38	0.25	1281	322	130
0.36	0.16	0.07	0.27	0.09	0.04	425	75	21
1.01	0.52	0.34	0.76	0.38	0.22	1240	308	130
0.34	0.13	0.07	0.25	0.09	0.04	411	69	21
allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. q_z	allow. q_z	allow. q_z
39.4" [1.00]	78.7" [2.00]	118.1" [3.00]	39.4" [1.00]	78.7" [2.00]	118.1" [3.00]	39.4" [1.00]	78.7" [2.00]	118.1" [3.00]
1.64	0.83	0.54	1.24	0.63	0.36	1007	254	103
1.01	0.49	0.29	0.76	0.38	0.18	617	151	48
allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. F_z	allow. q_z	allow. q_z	allow. q_z
19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]	19.7" [0.50]	39.4" [1.00]	59.1" [1.50]
0.72	0.36	0.25	0.54	0.27	0.13	884	219	82
0.34	0.18	0.09	0.25	0.11	0.05	418	96	27
0.16	0.05	0.02	0.11	0.03	0.01	185	21	7
0.02	0.09	0.05	0.16	0.07	0.03	240	55	16
0.05	0.01	0.01	0.03	0.01	0.004	55	7	2

① Observe minimum distance a_e between channel end and load point (HALFEN T-bolt, locking plate):
heavy and medium duty framing and mounting systems: ae ≥ 1 1/4" [30 mm],
light duty mounting systems: ae ≥ 3/4" [20 mm].

② Do not exceed the T-bolt load capacity or the max. channel load bearing capacity.

③ For maximum point-load capacity:
F_z = max, load bearing capacity of the channel lips.

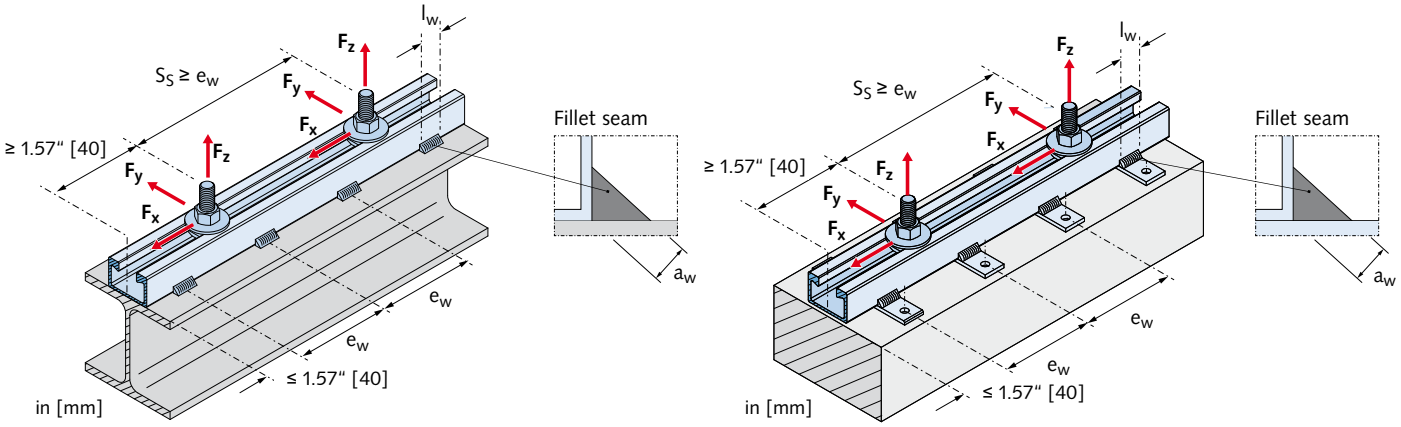
④ Take constructive measures to prevent failure caused by bulging, tilting and buckling.

⑤ On request.

All load capacities were calculated using the elastic-plastic method acc. to EN 1993-1,
partial safety factor γ_F = 1,4; deflection ≤ l / 150.
Determination of the allowable value
allow. F_z = F_{Rd} / 1.4.

Note: For stainless steel Mounting channels the bending deflection value must be verified separately using the valid E-modulus of elasticity.

Hot-rolled mounting channels welded or bolted to structural elements



Load bearing capacities for welded or bolted hot-rolled mounting channels

	Profile	Weld seams			Point-load bearing capacity ⑤ allowable load F① [kips]			HALFEN T-bolts	
		a_w in [mm]	l_w in [mm]	e_w in [mm]	allow. F_z	allow. F_y	allow. F_x	T-bolt size diam. in [mm]	Spacing S_s
Hot-rolled	HM 72/48	0.20"[5]	2"[50]	12"[300]	10.6	2.4 ④	②	M24	$S_s \geq e_w$
	HM 55/42	0.16"[4]	1.2"[30]	10"[250]	8.7	3.9		M20	
	HM 52/34	0.16"[4]	1.2"[30]	8"[200]	5.8	3.3		M20	
	HM 50/30	0.16"[4]	1.2"[30]	8"[200]	3.2	2.2		M20	
	HM 40/22	0.12"[3]	1.2"[30]	6"[150]	1.8	1.1		M16	
	HZM 64/44	0.20"[5]	1.6"[40]	10"[250]	8.6	2.8	6.1	M24	
	HZM 53/34	0.16"[4]	1.2"[30]	8"[200]	6.9	2.1	4.9/4.3③	M20	
	HZM 41/27	0.16"[4]	1.2"[30]	8"[200]	4.0	1.0	2.7	M16	
	HZM 38/23	0.16"[4]	1.2"[30]	8"[200]	2.9	0.9	2.7	M16	
	HZM 29/20	0.12"[3]	1.2"[30]	6"[150]	1.8	0.3	1.8	M12	

② Recommended load bearing capacities in channel longitudinal direction for standard (non-toothed) channels can be found on the corresponding product page
③ For stainless steel
④ For this determined value, failure of the A4 T-bolt is decisive

① In case of simultaneous loading in all directions the following criterion must be met:

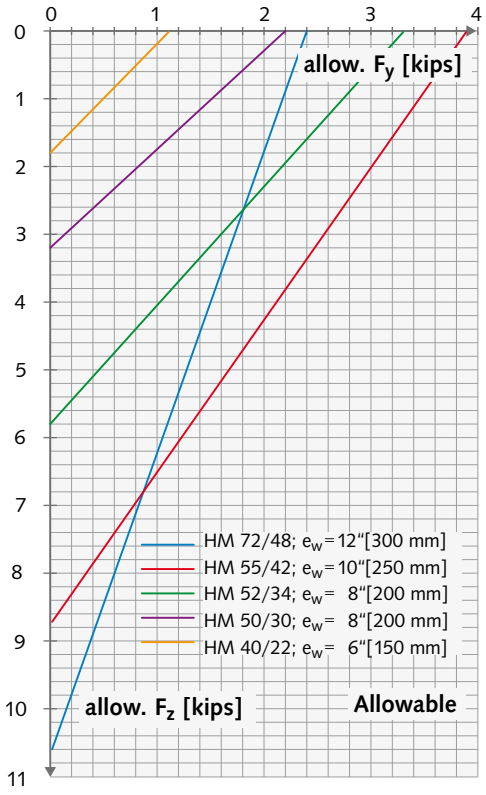
$$\frac{F_z}{\text{allow. } F_z} + \frac{F_y}{\text{allow. } F_y} + \frac{F_x}{\text{allow. } F_x} \leq 1$$

F_x, F_y, F_z = existing load;
allow. F = allowable point-load capacity

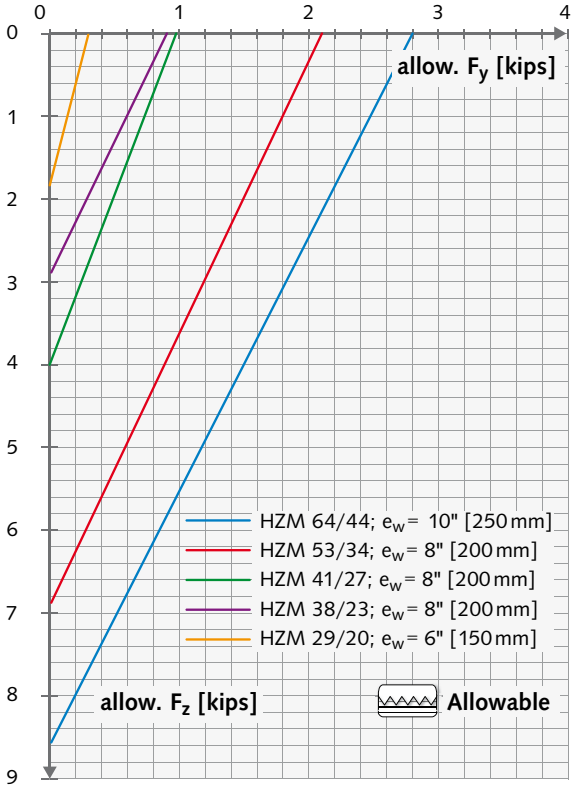
⑤ The bearing capacities are for loads acting on the front edge of the channel. For off-set transverse load (e.g. stand-off installations) the bending moment of the T-bolt must be considered and superimposed with the tensile load, see page 69.

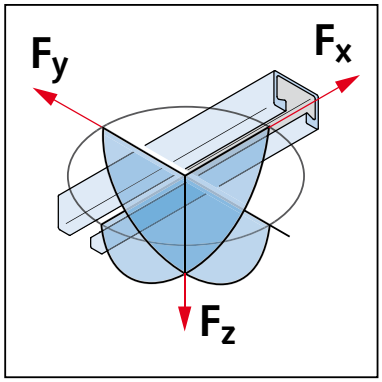
Mounting channels welded or bolted to structural elements

Allowable point-load capacities for HM Channels

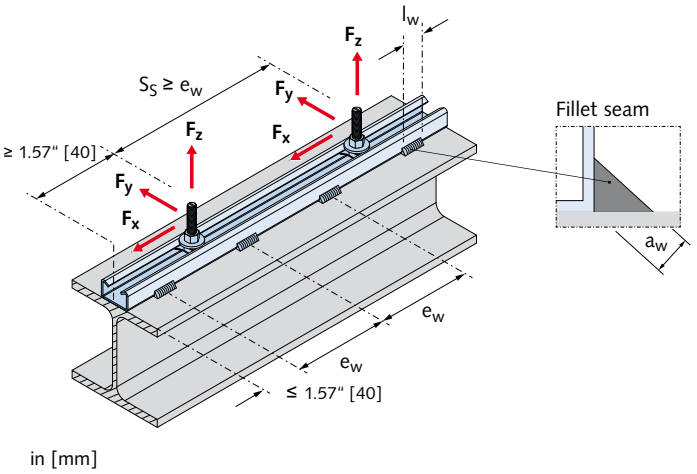


Allowable point-load capacities for HZM Channels

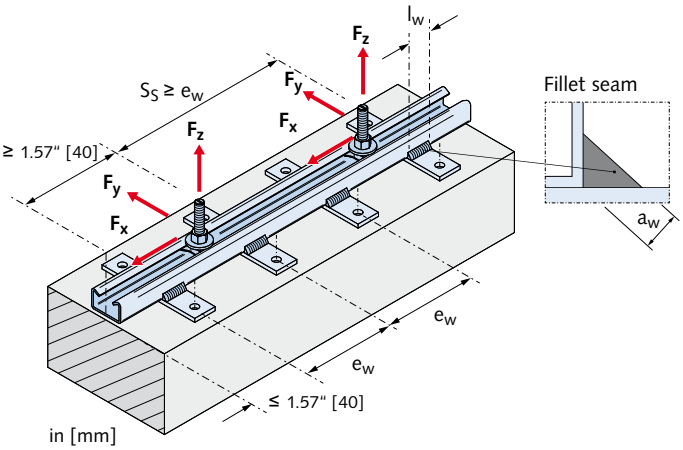




Cold-rolled mounting channels welded or bolted to structural elements

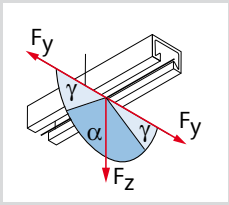


in [mm]



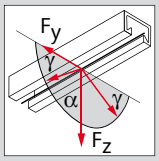
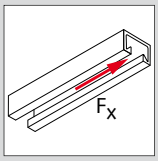
in [mm]

Load bearing capacities for welded or bolted cold-rolled channels



Tension area
α ≤ 60°

Transverse tension area
γ < 60°

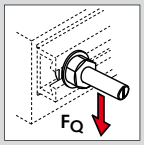
	Profil	Weld seams			Point-load bearing capacities ②					
										
					Tension α ≤ 60° F_z [kips]		Transverse tension γ < 60° F_y [kips]		Longitudinal tension F_x [kips]	
		a_w [mm]	l_w [mm]	e_w [mm]	allow. F_z		allow. F_y		allow. F_x	
Cold-rolled	**HM 50/40**	0.12" [3]	1.2" [30]	16" [400]	1.21		0.43		①	
	HZM 41/41	0.12" [3]	1.2" [30]	12" [300]	1.26		0.27		1.12	
	HZM 41/22	0.12" [3]	1.2" [30]	4.7" [120]	1.26		0.34		1.12	
	HM 41/41	0.12" [3]	1.2" [30]	12" [300]	1.26		0.27		①	
	HM 41/22	0.12" [3]	1.2" [30]	4.7" [120]	1.36		0.34			
	HM 36/36	0.12" [3]	1.2" [30]	12" [300]	0.99		0.27			
	HM 38/17	0.12" [3]	1.2" [30]	4" [100]	1.08		0.56			
	HM 28/15	0.12" [3]	1.2" [30]	4" [100]	0.56		0.27			

① Recommended load bearing capacities in channel longitudinal direction for standard (non-serrated) channels can be found on the corresponding product page

② The bearing capacities are for loads acting on the front edge of the channel. For off-set transverse load (e.g. stand-off installations) the bending moment of the T-bolt must be considered and superimposed with the tensile stress, see page 69.

Bending moments of HALFEN T-bolts

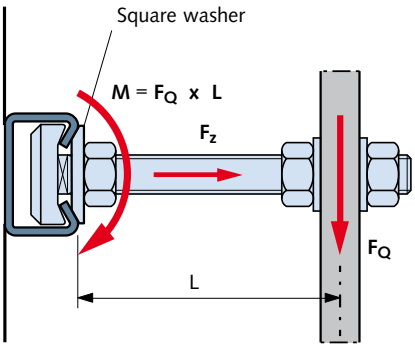
Bending moments of HALFEN T-bolts



Recommended T-bolt bending moments from the front edge of the HALFEN Channel

Thread Ø	Strength grade 4.6 allow. M		8.8 allow. M		A2-50; A4-50 allow. M		A2-70; A4-70 allow. M	
M6	1.5		-		1.3		2.8	
M8	3.7		-		3.2		6.9	
M10	7.4		18.4		6.4		13.8	
M12	12.9		32.2②		11.3		24.2 ①	
M16	32.7		81.9③		28.6		61.4 ②	
M20	63.8		160		55.8		120	
M24	110		276		96.7		115	
M27	164		409		-		-	
M30	221		-		-	-	-	

① For profile **HM/HL 28/15** bending moment must be reduced to allow. M = 22 ft-lb.
② For profile **HM/HL 38/17** bending moment must be reduced to allow. M = 48 ft-lb.



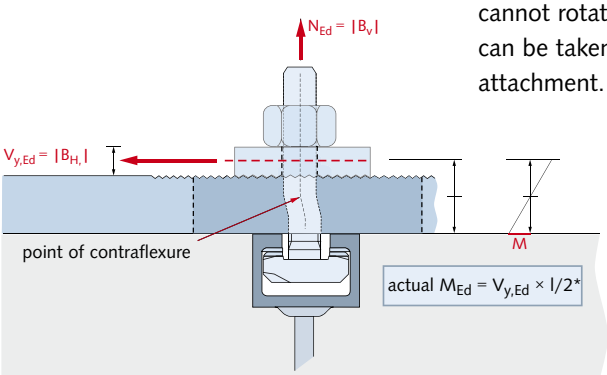
A square washer must always be used with stand-off installations.

In cases of bending with additional centric tension the action loads must be superimposed with the tensile load.

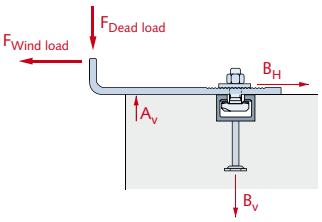
$$F_z \leq \text{allow. } F \cdot \left(1 - \frac{M}{\text{allow. } M}\right)$$

F_z = existing tension load
allow. F_z = allowable load bearing capacity of the T-bolt
M = existing bending moment of the T-bolt
allow. M = allowable bending moment of the T-bolt

For HZS and HS T-bolts in contraflexure bending:



* The assumption is that the attachment cannot rotate and the moment ME can be taken up and transfered by the attachment.



Required verification

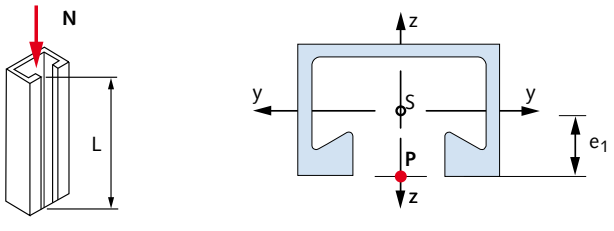
$$F_z \leq F_{allow.} \times \left(1 - \frac{M_E}{\text{allow. } M}\right)$$

F_{allow} = F_{allow} for HZS/HS T-bolts
M_{allow} = allowable bending moment
F_Z = value of the present tensile load component
M_E = value of the present bending moment

HALFEN Mounting channels as compression element – hot-rolled

Flexural buckling acc. to EN 1993-1-1
(Point-load applied at P)

Table footnotes → see page 71

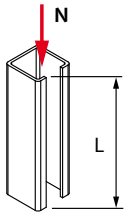


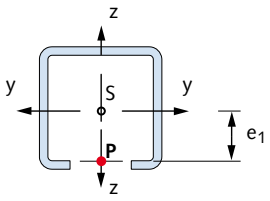
Load bearing capacities – flexural buckling

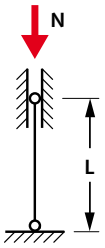
	Type	Cross-section properties						N [kips] ① for element length L in [M]									
		A	e_1	I_y	W_y	W_{pl}		19.7 [0.5]	39.4 [1.0]	59.1 [1.5]	78.7 [2.0]	98.4 [2.5]	118.1 [3.0]	137.8 [3.5]	157.5 [4.0]	177.2 [4.5]	196.9 [5.0]
		[in²]	[in]	[in⁴]	[in³]	[in³]		[kips]									
Hot-rolled mounting channels	HM 72/48	1.747	0.945	0.840	0.871	1.116	allow. N	74.7	58.3	44.3	35.7	28.6	23.0	18.9	15.6	13.1	11.1
	HM 55/42	1.335	0.870	0.450	0.518	0.716	allow. N	56.4	41.1	30.7	23.4	17.9	14.1	11.3	9.2	7.6	6.4
	HM 52/34	0.984	0.685	0.224	0.327	0.439	allow. N	36.0	24.7	18.1	13.2	9.9	7.6	6.1	4.9	4.0	3.4
	HM 50/30	0.643	0.642	0.126	0.197	0.267	allow. N	22.7	15.3	10.9	7.9	5.8	4.5	3.5	2.8	2.3	1.9
	HM 40/22	0.419	0.492	0.048	0.097	0.132	allow. N	13.0	8.0	5.2	3.5	2.5	1.9	-	-	-	-
	HM 72/48 D	3.494	1.909	4.929	2.581	3.369	allow. N	31.3	27.2	23.8	20.5	17.7	15.7	14.0	12.4	11.0	9.80
	HM 55/42 D	2.669	1.654	2.539	1.536	2.091	allow. N	24.9	20.9	17.5	14.5	12.5	10.8	9.24	7.44	6.90	6.02
	HM 52/34 D	1.969	1.319	1.237	0.938	1.246	allow. N	15.6	12.8	10.4	8.59	7.22	6.02	5.10	4.32	3.71	3.21
	HM 50/30 D	1.282	1.181	0.638	0.540	0.703	allow. N	9.87	7.87	6.18	5.08	4.18	3.46	2.88	2.41	2.05	1.78
	HM 40/22 D	0.826	0.906	0.242	0.267	0.350	allow. N	5.93	4.41	3.35	2.59	2.02	1.60	1.30	1.08	0.90	0.76
	HZM 64/44	1.411	0.906	0.573	0.632	0.834	allow. N	14.6	10.9	8.23	6.34	4.90	3.91	3.12	2.56	2.14	1.80
	HZM 53/34	0.911	0.732	0.221	0.302	0.415	allow. N	8.32	5.62	4.09	2.97	2.23	1.71	1.35	1.08	0.09	0.74
	HZM 41/27	0.668	0.594	0.094	0.157	0.228	allow. N	5.06	3.21	2.11	1.48	1.08	0.81	0.63	0.49	0.40	-
	HZM 38/23	0.481	0.524	0.051	0.097	0.141	allow. N	3.33	2.00	1.26	0.85	0.61	0.45	0.36	-	-	-
	HZM 29/20	0.308	0.441	0.025	0.056	0.080	allow. N	2.00	1.15	0.70	0.45	-	-	-	-	-	-
	HZM 64/44 D	2.823	1.732	3.074	1.775	2.333	allow. N	27.4	23.2	19.6	16.4	14.2	12.3	10.6	9.24	8.03	7.06
	HZM 53/34 D	1.821	1.339	1.114	0.832	1.107	allow. N	16.1	13.0	10.2	8.52	6.99	5.82	4.86	4.09	3.48	3.01
	HZM 41/27 D	1.336	1.063	0.478	0.450	0.624	allow. N	10.5	7.96	6.09	4.79	3.78	3.03	2.45	2.05	1.71	1.44
	HZM 38/23 D	0.959	0.906	0.241	0.266	0.366	allow. N	6.99	4.97	3.75	2.81	2.16	1.71	1.37	1.10	0.92	0.79
	HZM 29/20 D	0.615	0.787	0.123	0.156	0.213	allow. N	4.47	3.06	2.23	1.60	1.21	0.94	0.74	0.61	0.49	0.40

HALFEN Mounting channels as compression elements — cold-rolled

Flexural buckling acc to. EN 1993-1-1
(Point-load applied at P)







Load bearing capacities — Flexural buckling

	Type	Cross-section properties						N [kips] ① ② for element length L in [M]									
		A	e_1	I_y	W_y	W_{pl}		19.7 [0.5]	39.4 [1.0]	59.1 [1.5]	78.7 [2.0]	98.4 [2.5]	118.1 [3.0]	137.8 [3.5]	157.5 [4.0]	177.2 [4.5]	196.9 [5.0]
		[in²]	[in]	[in⁴]	[in³]	[in³]		[kips]									
Cold-rolled mounting channels	HM 50/40	0.660	0.858	0.208	0.242	0.337	allow. N	5.33	3.96	2.97	2.27	1.78	1.42	1.12	0.92	0.79	0.65
	HM 41/41	0.527	0.909	0.179	0.198	0.198	allow. N	4.23	3.17	2.41	1.89	1.48	1.17	0.97	0.79	0.65	0.56
	HM 36/36	0.434	0.815	0.109	0.134	0.195	allow. N	3.17	2.27	1.69	1.28	0.99	0.76	0.63	0.52	0.43	0.36
	HM 28/28	0.268	0.622	0.041	0.066	0.094	allow. N	1.82	1.21	0.83	0.58	0.45	-	-	-	-	-
	HM 26/26	0.163	0.583	0.023	0.039	0.055	allow. N	1.12	0.72	0.49	-	-	-	-	-	-	-
	HZM 41/41	0.527	0.917	0.176	0.192	0.273	allow. N	4.09	3.10	2.34	1.82	1.44	1.15	4.1	3.4	2.9	2.4
	HZM 41/41 D	1.040	1.626	0.876	0.539	0.738	allow. N	7.87	6.65	5.62	4.68	4.07	3.51	3.01	2.61	2.27	2.00
	HL 50/40	0.578	0.768	0.172	0.228	0.286	allow. N	5.06	3.66	2.72	2.05	1.57	1.24	0.99	0.81	0.65	0.56
	HL 41/41	0.462	0.843	0.146	0.173	0.233	allow. N	3.82	2.81	2.11	1.62	1.26	0.99	0.81	0.65	0.54	0.45
	HL 36/36	0.375	0.728	0.088	0.120	0.161	allow. N	2.94	2.05	1.51	1.12	0.85	0.65	0.52	0.43	-	-
	HL 28/28	0.229	0.547	0.032	0.058	0.076	allow. N	1.66	1.08	0.72	0.49	0.36	-	-	-	-	-
	HL 26/26	0.138	0.508	0.018	0.034	0.044	allow. N	1.01	0.63	0.43	-	-	-	-	-	-	-
	HZL 63/63 ③	1.099	1.185	0.795	0.614	0.824	allow. N	10.43	8.54	6.95	5.69	4.77	3.98	3.35	2.83	2.45	2.11
	HZL 41/41	0.450	0.858	0.141	0.164	0.226	allow. N	3.62	2.68	2.02	1.55	1.21	0.97	0.76	0.63	0.52	0.45

① allow. N = allowable load
② $N = N_{Rd}/1.4$; $E = 24.7 \times 10^6$ psi
③ $N = N_{Rd}/1.4$; $E = 30.5 \times 10^6$ psi

Note:
For higher excentricity "e > e_1" a flexural buckling analysis acc. to Eurocode 3 is necessary.

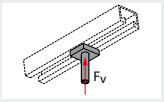
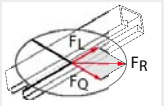
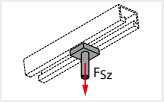
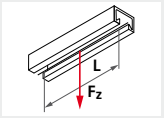
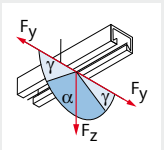
Information on dimensioning

When designing an adjustable assembly system the external load F_i must be less or equal to the minimum permissible load of the T-bolt F_s and to the maximum point-load capacity and respectively to the bending load capacity of the HALFEN Mounting channel F_z.
$F_i \leq MIN\ (F_S; F_z)$ (→ see page 50)
$F_i \leq MIN\ (F_{T\text{-}bolt}; F_{Channel})$; $F_{Channel}$ → see page 60

Design value of the resistance:	**$F_{R,d} = 1.4 \times F$ (Forces)**
Design value of the moment resistance:	**$M_{R,d} = 1.4 \times M$ (Moments)**

All following load specifications are allowable loads.

Symbols and definitions used for mechanical engineering — steel construction industry

HALFEN T-bolts	**F_v**		**Preloading force, T-bolt** The preloading force of the T-bolt occurs by applying a torque on the T-bolt and is calculated according to VDI 2230 guidelines.
	F_R		**Resulting force** The resulting force **F_R** is the vector addition of the external loads F_L in the longitudinal channel direction and the external load FQ transverse to the longitudinal channel direction; the resulting force is frictionally connected to the channel. $F_R = \sqrt{(F_L^2 + F_Q^2)}$
	F_{Sz}		**Force in the longitudinal T-bolt direction** The force **F_{SZ}** is an external load through the screws longitudinal axis, perpendicular to the channel surface and is transferred positive-locked to the channel.
HALFEN Mounting channels	**F_z**		**Maximum point-load-carrying capacity — centric load** The load carrying capacity of the channel lips is decisive. Load figures are only valid for continuous welded channels or intermittent welds according to the table on page 66 ff. In all other cases the suitability of the welding seam must be checked.
	F_y		**Load capacity of the channels under transverse load angle y < 60°** Permissible load for a defined angle to the welded or T-bolted channels.
	F_z		**Load capacity of the channels under transverse load angle α ≤ 60°** Permissible load for a defined load angle to the welded or T-bolted channels.

The force F_{sz} along the screw longitudinal axis must be less than or equal to the maximum point-load capacity of the mounting channel **F_Z**.

$F_{Sz} \leq F_Z$

The force **F_Q** transverse to the longitudinal channel direction must be less than or equal to the load capacity transverse to the longitudinal channel direction of the Mounting channel **F_y**.

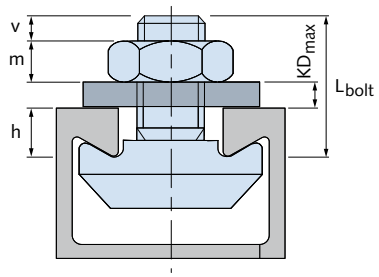
$F_Q \leq F_y$

Required T-bolt length $L_{T\text{-}bolt}$

The required T-bolt length $L_{T\text{-}bolt}$ is the sum of the clamping thickness KD and the minimum required supplement L_{sup}.

The thread protrusion v has to extend past the nut at least 0.5 x the nut height m (DIN EN 24032 regulation for nuts).

$$L_{T\text{-}bolt} = KD + L_{sup}$$
$$L_{sup} = h + m + v$$



Minimum required supplement L_{sup} according to the table below

Minimum required supplement for HALFEN T-bolts (heavy duty mounting systems) in [mm]

Thread	HM 72/48	HM 55/42	HM 52/34	HM 50/30	HM 49/30	HM 40/22	HM 40/25	HM 422	HZM 64/44	HZM 53/34	HZM 41/27	HZM 38/23	HZM 29/20	HM 50/40	HM 486
M6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M8	-	-	-	-	-	-	-	-	-	-	-	-	0.47"[12]	-	-
M10	-	1"[25]	0.94"[24]	0.79"[20]	0.79"[20]	0.71"[18]	0.71"[18]	0.71"[18]	-	-	0.71"[18]	0.67"[17]	0.59"[15]	-	-
M12	-	1.14"[29]	1.06"[27]	0.94"[24]	0.91"[23]	0.87"[22]	0.87"[22]	0.87"[22]	-	-	0.83"[21]	0.83"[21]	0.63"[16]	0.75"[19]	0.71"[18]
M16	-	1.38"[35]	1.30"[33]	1.18"[30]	1.14"[29]	1.10"[28]	1.10"[28]	1.10"[28]	-	1.10"[28]	1.06"[27]	1.06"[27]	0.79"[20]	0.91"[23]	0.87"[22]
M20	1.65"[42]	1.54"[39]	1.50"[38]	1.34"[34]	1.34"[34]	-	-	-	1.34"[34]	1.26"[32]	-	-	-	1.14"[29]	1.10"[28]
M24	1.85"[47]	-	-	-	-	-	-	-	1.57"[40]	-	-	-	-	1.30"[33]	1.26"[32]
M27	1.97"[50]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M30	2.09"[53]	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Minimum required supplement for HALFEN T-bolts (medium duty mounting systems) in [mm]

Thread	HZL 63/63	HM 41/41	HM 41/22	HM 41/62	HM 41/83	HLL 41/41	HLL 41/22
M6	-	-	-	-	-	-	-
M8	-	0.71"[18]	0.71"[18]	0.71"[18]	0.71"[18]	0.71"[18]	0.71"[18]
M10	-	0.75"[19]	0.75"[19]	0.75"[19]	0.75"[19]	0.75"[19]	0.75"[19]
M12	0.75"[19]	0.91"[23]	0.91"[23]	0.91"[23]	0.91"[23]	0.91"[23]	0.91"[23]
M16	0.91"[23]	1.14"[29]	1.14"[29]	1.14"[29]	1.14"[29]	1.14"[29]	1.14"[29]
M20	1.14"[29]	-	-	-	-	-	-
M24	1.30"[33]	-	-	-	-	-	-

Minimum required supplement for HALFEN T-bolts (light duty mounting systems) in [mm]

Thread	HM 36/36	HM 38/17	HM 28/28	HM 26/26	HM 28/15	HM 315	HM 20/12
M6	-	-	-	-	-	-	-
M8	-	-	0.39"[10]	0.35"[9]	0.39"[10]	0.35"[9]	0.35"[9]
M10	0.59"[15]	0.59"[15]	0.51"[13]	0.47"[12]	0.51"[13]	0.47"[12]	0.47"[12]
M12	0.71"[18]	0.75"[19]	0.55"[14]	0.51"[13]	0.55"[14]	0.55"[14]	-
M16	0.94"[24]	1"[25]	0.71"[18]	0.67"[17]	0.71"[18]	0.67"[17]	-

Static and dynamic tension tests

A detailed study of the transferability of static and dynamic loads for adjustable assembly systems was undertaken in cooperation with the State Material Testing Institute at the TU Darmstadt (**T**echnical **U**niversity Darmstadt).

Following VDI guideline 2230, the data acquired from T-bolt tightening tests, static and dynamic traction tests form the basis of algorithms used for calculating adjustable assembly systems.

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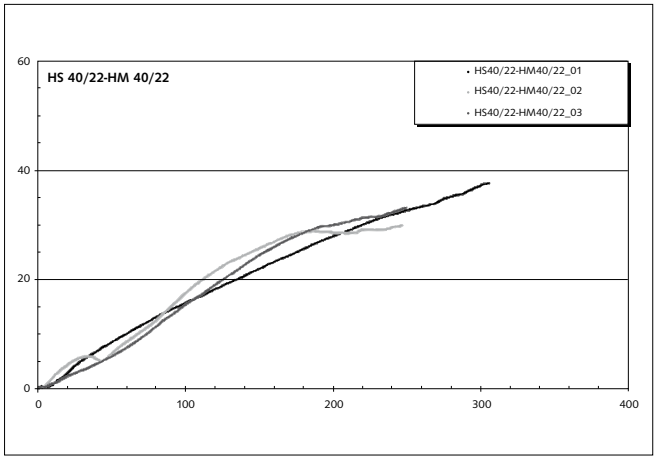
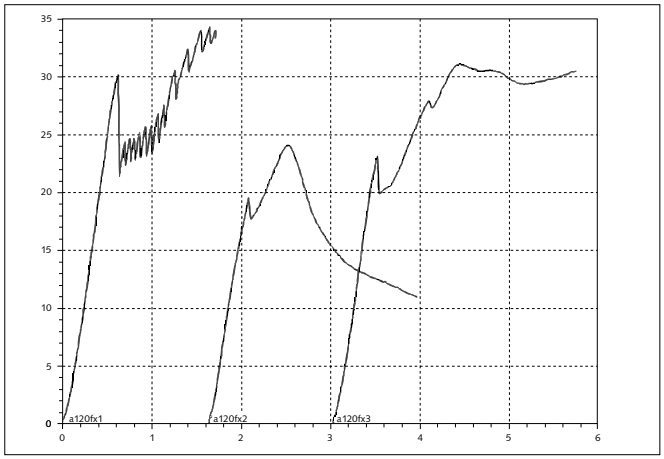
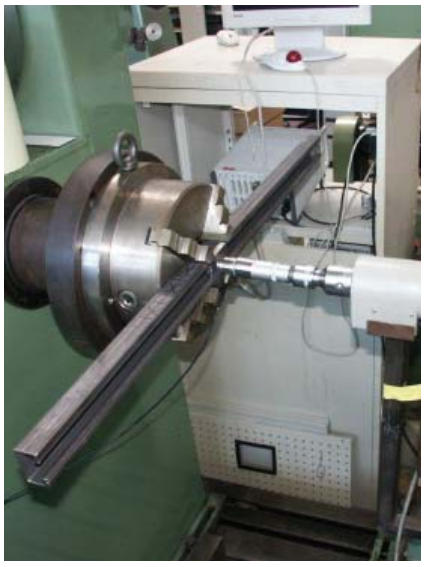


Graph; tightening test results



Graph, tension test results



Tightening test

Tension test

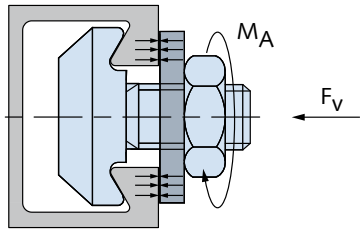
Fatigue test

Calculating the pretension force F_V

In assembling a bolted connection, the torque M_A induces a pretension force F_V in the bolt, which clamps the component being fixed to the mounting channel. The pretension force F_V is a function of the torque M_A, and the friction coefficients uG of the bolt thread, and uK on the nut contact surface.

The pretension forces for HALFEN T-bolts in carbon steel 4.6 and 8.8 grades, and stainless steel 50 and 70 are shown in the following tables (ref. Rohloff-Matek).
The values shown for M_A are recommended torques. HALFEN T-bolts are delivered non-lubricated, installation ready, as standard.

The friction coefficients μ_G and μ_K are 0.24.



Pretension force F_V, strength grade 4.6 [kips]

	M_A [Ft-lb]	Friction coefficient $\mu_G = \mu_K$												
		0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30	0.32	0.34	0.36
M6	2.2	0.67	0.58	0.52	0.47	0.43	0.40	**0.36**	0.34	0.31	0.29	0.27	0.27	0.25
M8	5.9	1.37	1.19	1.06	0.97	0.88	0.79	**0.74**	0.67	0.63	0.61	0.56	0.54	0.49
M10	11	2.07	1.80	1.60	1.44	1.30	1.19	**1.10**	1.03	0.97	0.90	0.85	0.81	0.76
M12	18	2.90	2.54	2.25	2.02	1.84	1.69	**1.55**	1.44	1.35	1.26	1.19	1.12	1.06
M16	48	5.76	5.01	4.45	4.00	3.62	3.33	**3.06**	2.83	2.65	2.47	2.34	2.20	2.07
M20	96	9.17	8.00	7.10	6.38	5.78	5.31	**4.88**	4.52	4.23	3.96	3.71	3.51	3.33
M24	170	13.6	11.9	10.5	9.44	8.59	7.85	**7.24**	6.72	6.25	5.87	5.51	5.19	4.92
M27	251	17.9	15.6	13.8	12.4	11.2	10.3	**9.46**	8.79	8.18	7.67	7.19	6.79	6.43
M30	339	21.7	18.9	16.8	15.1	13.6	12.5	**11.5**	10.7	9.94	9.31	8.75	8.25	7.82

Pretension force F_V, strength grade 8.8 [kips]

	M_A [Ft-lb]	Friction coefficient $\mu_G = \mu_K$												
		0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30	0.32	0.34	0.36
M8	15	3.42	2.99	2.65	2.38	2.18	2.00	**1.84**	1.71	1.60	1.48	1.39	1.33	1.26
M10	30	5.49	4.81	4.27	3.84	3.48	3.19	**2.94**	2.74	2.56	2.41	2.25	2.14	2.02
M12	52	8.12	7.10	6.32	5.67	5.15	4.72	**4.36**	4.05	3.78	3.53	3.33	3.15	2.97
M16	133	15.9	13.9	12.3	11.1	10.0	9.19	**8.48**	7.85	7.33	6.86	6.45	6.09	5.76
M20	266	25.4	22.2	19.7	17.6	16.0	14.7	**13.5**	12.5	11.7	10.9	10.3	9.71	9.19
M24	457	36.7	32.0	28.4	25.5	23.1	21.2	**19.5**	18.1	16.9	15.8	14.9	14.0	13.3
M27	664	47.5	41.3	36.6	32.8	29.8	27.2	**25.1**	23.3	21.7	20.3	19.1	18.0	17.0
M30	885	56.7	49.4	43.8	39.3	35.6	32.6	**30.0**	27.8	25.9	24.3	22.8	21.5	20.4

Pretension force F_V, strength grade 50

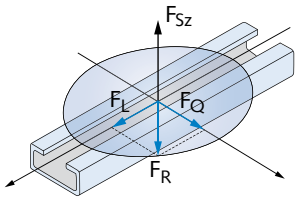
	M_A [Ft-lb]	Friction coefficient $\mu_G = \mu_K$												
		0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30	0.32	0.34	0.36
M6	2.2	0.67	0.58	0.52	0.47	0.43	0.40	**0.36**	0.34	0.31	0.29	0.27	0.27	0.25
M8	5.2	1.19	1.03	0.92	0.83	0.76	0.70	**0.65**	0.61	0.56	0.52	0.49	0.47	0.45
M10	10	1.93	1.69	1.51	1.35	1.21	1.12	**1.03**	0.97	0.90	0.83	0.79	0.74	0.70
M12	18	2.90	2.54	2.25	2.02	1.84	1.69	**1.55**	1.44	1.35	1.26	1.19	1.12	1.06
M16	44	5.31	4.63	4.11	3.69	3.35	3.06	**2.83**	2.61	2.45	2.29	2.16	2.02	1.91
M20	89	8.48	7.40	6.56	5.89	5.35	4.88	**4.50**	4.18	3.89	3.64	3.44	3.24	3.06
M24	148	11.8	10.3	9.15	8.23	7.46	6.83	**6.29**	5.85	5.44	5.10	4.79	4.52	19.0

Pretension force F_V, strength grade 70

	M_A [Ft-lb]	Friction coefficient $\mu_G = \mu_K$												
		0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30	0.32	0.34	0.36
M6	5.2	1.57	1.39	1.24	1.10	1.01	0.92	**0.85**	0.79	0.74	0.70	0.65	0.61	0.58
M8	11	2.56	2.25	2.00	1.80	1.62	1.48	**1.37**	1.28	1.19	1.12	1.06	0.99	0.94
M10	22	4.11	3.60	3.21	2.88	2.63	2.41	**2.23**	2.07	1.91	1.80	1.69	1.60	1.51
M12	37	5.80	5.08	4.50	4.05	3.69	3.37	**3.10**	2.90	2.70	2.52	2.38	2.25	2.11
M16	92	11.1	9.64	8.54	7.69	6.97	6.38	**5.89**	5.46	5.08	4.77	4.47	4.23	4.00
M20	181	17.3	15.1	13.4	12.0	10.9	9.98	**9.19**	8.54	7.96	7.44	7.01	6.61	6.25
M24	310	24.8	21.7	19.2	17.3	15.7	14.3	**13.2**	12.3	11.4	10.7	10.1	9.49	8.99

Transfer of static loads

External loads F_L, F_Q and F_{Sz} acting on the building component are transferred to the T-bolt connection by clamping.



Force F_{Sz} acts positively in the T-bolt longitudinal axis.

Force F_L acting in and F_Q acting transverse to the longitudinal channel direction are transferred through the component-channel surface through friction and are added to the resulting force F_R:

$$F_R = \sqrt{F_L^2 + F_Q^2}$$

Transfer of the friction force F_R requires a normal force F_N acting in the T-bolt longitudinal axis:

$$F_N = \frac{F_R}{\mu_T}$$

The minimum required clamping force $F_{K,req}$ is a result of the two forces F_N and F_{Sz} acting in the T-bolt longitudinal axis:

$$F_{K\,req} = F_N + F_{Sz} = \frac{F_R}{\mu_T} + F_{Sz}$$

When designing the T-bolt connection the T-bolt tightening procedure and the T-bolt setting behavior must be considered in accordance with VDI guideline 2230. The setting factor S_{set} is intended as a safety factor because the setting force loss for adjustable T-bolt connections is difficult to calculate using VDI 2230. Therefore the minimum necessary assembly pretension strength $F_{M\,min}$ is:

$$F_{M\,min} = S_{set} \times F_{K\,req}$$

Taking the T-bolt tightening procedure into consideration with the tightening factor α_A the maximum necessary assembly pretension force $F_{M\,max}$ calculates at:

$$F_{M\,max} = \alpha_A \times F_{M\,min} = \alpha_A \times S_{set} \times \left(\frac{F_R}{\mu_T} + F_{Sz}\right)$$

The maximum required assembly pretension force $F_{M\,max}$ must be less than the pretension force F_v produced by the T-bolt tightening procedure moment M_A:

$$F_{M\,max} \leq F_v$$

The permissible loads for channel assembly systems are shown as for **delivery condition ($\mu_G = \mu_K = 0.24$)** and for **lubricated T-bolts ($\mu_G = \mu_K = 0.14$)** in the tables on page 77.
The values for F_R apply only to transverse force requirements ($F_{Sz} = 0$), the values for F_{Sz} for pure traction force requirement ($F_R = 0$).

When overlaying the transverse force F_R and longitudinal force F_{Sz} apply the formulas listed right for the maximum assembly pretension force $F_{M\,max}$.

Allowable loads F_R and F_{Sz}– channel T-bolt connection

Strength grade 4.6

		Delivery condition $\mu_G = \mu_K = 0.24$			Lubricated $\mu_G = \mu_K = 0.14$		
Thread	M_A [Ft-lb]	F_v [kips]	F_R [kips]	F_Z [kips]	F_v [kips]	F_R [kips]	F_Z [kips]
M6	2.2	0.36	0.04	0.16	0.58	0.07	0.25
M8	5.9	0.74	0.07	0.31	1.19	0.13	0.49
M10	11	1.10	0.11	0.47	1.80	0.18	0.74
M12	18	1.55	0.16	0.65	2.54	0.27	1.06
M16	48	3.06	0.31	1.28	5.01	0.52	2.09
M20	96	4.88	0.52	2.02	8.00	0.83	3.33
M24	170	7.24	0.76	3.01	11.9	1.24	4.95
M27	251	9.46	0.99	3.96	15.6	1.62	6.50
M30	339	11.5	1.19	4.79	18.9	1.98	7.89

Allowable loads F_R and F_{Sz} – channel T-bolt connection

Strength grade 8.8

		Delivery condition $\mu_G = \mu_K = 0.24$			Lubricated $\mu_G = \mu_K = 0.14$		
Thread	M_A [Ft-lb]	$F_{pre\text{-}tension}$ [kips]	F_R [kips]	F_Z [kips]	F_v [kips]	F_R [kips]	F_Z [kips]
M10	30	2.94	0.31	1.24	4.81	0.49	2.00
M12	52	4.36	0.45	1.82	7.10	0.74	2.97
M16	133	8.48	0.88	3.53	13.9	1.44	5.78
M20	266	13.5	1.42	5.64	22.2	2.32	9.24
M24	457	19.5	2.02	8.14	32.0	3.33	13.3
M27	664	25.1	2.61	10.5	41.3	4.32	17.2

Allowable loads F_R and F_{Sz} – channel T-bolt connection

Strength grade 50

		Delivery condition $\mu_G = \mu_K = 0.24$			Lubricated $\mu_G = \mu_K = 0.14$		
Thread	M_A [Ft-lb]	F_v [kips]	F_R [kips]	F_Z [kips]	F_v [kips]	F_R [kips]	F_Z [kips]
M8	5.2	0.65	0.07	0.31	1.03	0.13	0.49
M10	10	1.03	0.11	0.47	1.69	0.18	0.76
M12	18	1.55	0.16	0.65	2.54	0.27	1.06
M16	44	2.83	0.29	1.19	4.63	0.49	1.93
M20	89	4.50	0.47	1.89	7.40	0.76	3.10
M24	148	6.29	0.65	2.63	10.3	1.08	4.32

Allowable loads F_R and F_{Sz} – channel T-bolt connection

Strength grade 70

		Delivery condition $\mu_G = \mu_K = 0.24$			Lubricated $\mu G = \mu K = 0.14$		
Thread	M_A [Ft-lb]	F_v [kips]	F_R [kips]	F_Z [kips]	F_v [kips]	F_R [kips]	F_Z [kips]
M8	11	1.37	0.13	0.58	2.25	0.22	0.94
M10	22	2.23	0.22	0.92	3.60	0.38	1.51
M12	37	3.10	0.20	1.30	5.08	0.31	2.11
M16	92	5.89	0.61	2.45	9.64	1.01	4.02
M20	181	9.19	0.97	3.84	15.1	1.57	6.29
M24	310	13.2	1.37	5.51	21.7	2.24	9.04

The given data is based on the following failure modes and values:

Failure mode for transverse force load	F_R:	component slippage
Failure mode for longitudinal force load	F_{Sz}:	component separation
Friction coefficient in connection:	μ_T	= 0.25
Tightening factor (electrical-audible torque wrench):	α_A	= 2.0
Safety factor setting of bolt connection:	S_{set}	= 1.2

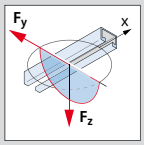
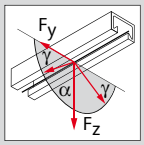
The force F_Q transverse to the longitudinal channel direction must be less than or equal to the load capacity transverse to the longitudinal channel direction of the HALFEN Mounting channel F_y (→ see table on page 78).

$$F_Q \leq F_y$$

The force in the longitudinal T-bolt direction F_{Sz} must be less than or equal to the maximum point-load capacity of the HALFEN Mounting channel F_z (→ see table on page 78).

$$F_{Sz} \leq F_Z$$

Point-load capacity of the HALFEN Mounting channel

	Point-load capacities for hot-rolled, welded or bolted HALFEN Mounting channels				Point-load capacities for cold-rolled, welded or bolted HALFEN Mounting channels		
							
	Profile	allow. F_z [kips]	allow. F_y [kips]		Profile	tension $\alpha \le 60°$ allow. F_z [kips]	transverse tension $\gamma < 60°$ allow. F_y [kips]
Hot-rolled	**HM 72/48**	10.57	2.43	Cold-rolled	**HM 50/40**	1.21	0.43
	HM 55/42	8.68	3.87		**HZM 41/41**	1.26	0.27
	HM 52/34	5.82	3.35		**HZM 41/22**	1.26	0.34
	HM 50/30	3.24	2.25		**HM 41/41**	1.26	0.27
	HM 40/22	1.84	1.06		**HM 41/22**	1.26	0.34
	HZM 64/44	8.57	2.81		**HM 36/36**	0.99	0.27
	HZM 53/34	6.95	2.09		**HM 38/17**	1.08	0.56
	HZM 41/27	4.00	0.99		**HM 28/15**	0.56	0.27
	HZM 38/23	2.88	0.94		-	-	-
	HZM 29/20	1.80	0.34		-	-	-

The table notes on pages 66 and 68 must be observed!

Example:

Specified:	external load in longitudinal channel direction	F_L = 0.34 kips [1.5 kN]
	external load transverse to the longitudinal channel direction	F_Q = 0.11 kips [0.5 kN]
	external load in longitudinal T-bolt direction	F_{Sz} = 0.45 kips [2.0 kN]
	friction between component – channel	μ_T = 0.25
	setting factor	S_{set} = 1.2
	tightening factor	α_A = 2

Selected Mounting channel HM 50/30

Resulting load F_R	0.36 kips [1.58 kN]
Minimum required assembly preloading force $F_{M\ min}$	2.25 kips [10 kN]
Maximum required assembly preloading force $F_{M\ max}$	20 kips

Selected HALFEN T-bolt 50/30, 4.6 in delivery condition	M 20
pretension F_v	4.88 kips [21.7 kN]

Comparison of external loads with permissible load of channel HM 50/30 with values in table above

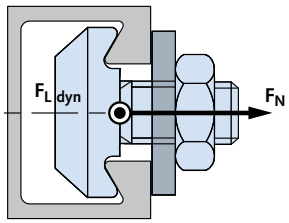
F_z = 14.4 kips > F_{Sz} ✓
F_y = 10.0 kips > F_Q ✓

Result:

Selected Mounting channel: **HM 50/30**
Selected HALFEN T-bolt: **HS 50/30 – M20 - gr. 4.6 in standard delivery condition**

Transfer of dynamic loads

Hot-rolled mounting channels are suitable for the transfer of dynamic loads when used in conjunction with nibbed HALFEN T-bolts (type HSR) or serrated HALFEN T-bolts (type HZS).
The dynamic load $F_{L\ dyn}$ acting on the building component in the longitudinal channel direction, is transferred through friction via the channel/T-bolt contact surface to the channel.



A clamping force $F_{K\ req}$ acting in the T-bolt longitudinal axis is necessary for friction transfer $F_{L\ dyn}$:

$$F_{K\ req} = \frac{F_{L\ dyn}}{\mu_T}$$

According to VDI guideline 2230 when designing the T-bolt connection, the T-bolt tightening procedure and the T-bolt setting behavior must be considered.
The setting factor S_{set} is intended as a safety factor because the setting force loss for adjustable T-bolt connections is difficult to calculate using VDI 2230.

$$F_{M\ min} = S_{Set} \times F_{K\ req}$$

Therefore the minimum necessary assembly preloading strength $F_{M\ min}$ is:

Taking the T-bolt tightening procedure into consideration with the tightening factor α_A the maximum necessary assembly pretension force $F_{M\ max}$ is calculated at:

$$F_{M\ max} = \alpha_A \times S_{Set} \times \frac{F_{L\ dyn}}{\mu_T}$$

The calculated maximum assembly pretension force $F_{M\ max}$ must be smaller or equal to the pretension force F_v of the T-bolt (see table):

$$F_{M\ max} \leq F_v$$

The permissible dynamic loads for channel assembly systems are shown as for **delivery condition ($\mu_G = \mu_K = 0.24$)** and for a lubricated condition **($\mu_G = \mu_K = 0.14$)** in the following table.
The values are valid for **pure alternating stress with a transverse force in the longitudinal channel direction.**
The stress ratio is R = −1 and the maximum load changes value is N = 10^6.

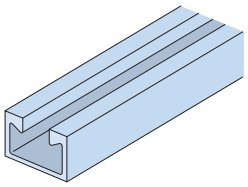
Allowable dynamic loads $F_{L\ dyn}$ – channel-bolt connection

HALFEN T-bolts HSR and HZS, strength class 8.8							
		Delivery condition			Lubricated		
		$\mu_G = \mu_K = 0.24$			$\mu_G = \mu_K = 0.14$		
Thread	M_A [Ft-lb]	F_v [kips]	$F_{L\ dyn}$ [kips]	Typ	F_v [kips]	$F_{L\ dyn}$ [kips]	Type
M12	59	5.01	0.52	HZS	8.14	0.85	HZS
M16	89	5.67	0.58	HZS	9.28	0.97	HZS
M16	148	9.46	0.99	HSR	15.47	1.62	HSR
M20	295	15.11	1.57	HSR	24.71	2.56	HSR

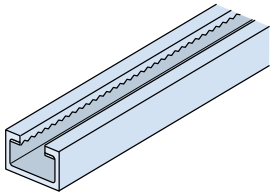
This data is based on the following failure modes and values:
Failure mode for transverse force load $F_{L\ dyn}$: component slippage
Friction coefficient in connection: μ_T = 0.25
Tightening factor (electrical-audible torque wrench): α_A = 2.0
Safety factor setting of T-bolt joint: S_{set} = 1.2
Individual calculation of T-bolted connections is achieved using the formulas and tables listed above.

Product Specifications – Examples for HALFEN Mounting channels

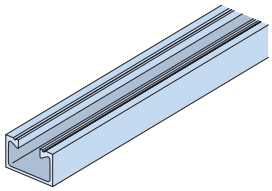
HM 52/34 - MF - 6070
HALFEN Mounting channel HM 52/34 hot-rolled, mill finished (MF).
In-stock lengths of approx. 239“; deliver, cut to length and welded.
Unit: mm or inch



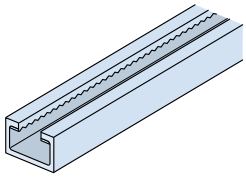
HZM 64/44 - MF - 6070
HALFEN Mounting channel HZM 64/44 hot-rolled, toothed, mill finished (MF).
In-stock lengths of approx. 239“; deliver, cut to length and welded.
Unit: mm or inch



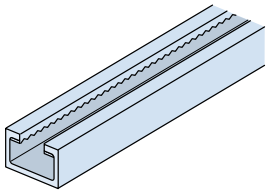
HM 50/30 - HDG - 6070
HALFEN Mounting channel HM 50/30 hot-rolled, hot-dip galvanized (HDG).
In-stock lengths approx. 239“; deliver, cut to length and install.
Unit: mm or inch



HZM 38/23 - HDG - 6070
HALFEN Mounting channel HZM 38/23 hot-rolled, toothed, hot-dip galvanized (HDG).
In-stock lengths approx. 239“; deliver, cut to length and install.
Unit: mm or inch

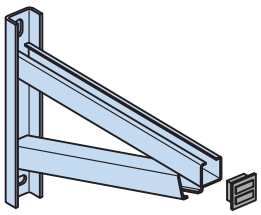


HZM 53/34 - A4 - 6070
HALFEN Mounting channel HZM 53/34 hot-rolled, toothed, stainless steel (A4).
In-stock lengths approx. 239“; deliver, cut to length and install.
Unit: mm or inch

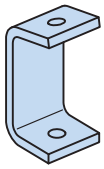


Product Specifications – Examples for HALFEN Cantilevers or accessories

Cantilever type KON
HALFEN Cantilever KON 36/2, length 500 mm, hot-dip galvanized, for installation of pipes or other elements. Delivery and installation.
Unit: pcs



Adjustment coupler Typ HJV
HALFEN Adjustment coupler HJV type 3, hot-dip galvanized, for installation variants, incl. accessories. Delivery and installation.
Unit: pcs

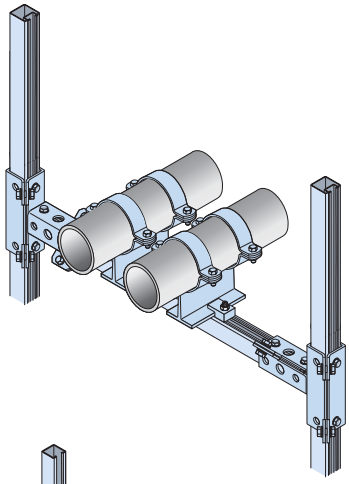


Further product specifications at: www.halfenusa.com ► Specifications ► Specification Forms

The multi-functional system for small bore pipework

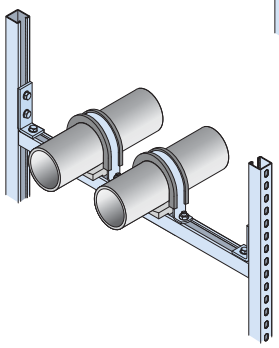
POWERCLICK System 63

Suitable for pipes with nominal diameters up to DN 6“ or with separate verification up to 16“
→ Catalog PC 63



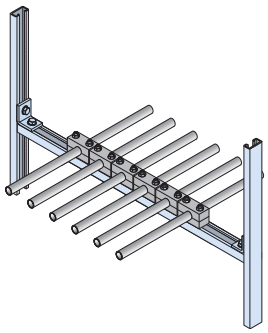
POWERCLICK System 41

Suitable for pipes with nominal diameters up to 3“ or with short spans up to 6“ with separate verifications
→ Catalog PC 41



POWERCLICK System 22

Suitable for pipes with nominal diameters up to 1“
→ Catalog PC 41



POWERCLICK Accessories

Cantilever brackets, pipe clamps, sliding supports
→ Catalog PC Z

Product information on the internet.
Catalogs and tender texts available at:
halfenUSA.com ► Products ► Powerclick.

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CONTACT HALFEN WORLDWIDE

HALFEN has a global network of Subsidiary Companies to assist you. The main contact information for North America and the European Headquarter is provided below. For a full list of offices please visit www.HALFEN.com

USA & Mexico	HALFEN USA Inc. PO Box 18687 San Antonio TX 78218	Phone: E-Mail: Web:	+1 800.423.9140 info@halfenusa.com www.halfenusa.com	Fax:	+1.877.683.4910
Canada	UCC Industries International [Distributor] Units 12 & 13 895 Sandy Beach Road Pickering, Ontario, L1W 3N7	Phone: E-Mail: Web:	+1 905.831.7724 bhughes@ucci.ca www.ucci.ca	Fax:	+1 905.831.5872
	Provinces of British Columbia and Alberta:	Please contact HALFEN USA Inc.			
Germany	HALFEN GmbH Liebigstrasse 14 40764 Langenfeld	Phone: E-Mail: Web:	+49 2173 970-0 info@halfen.de www.halfen.de	Fax:	+49 2173 970-123

HALFEN is also represented by distributors in Argentina, Australia, Azerbaijan, Belarus, Brazil, Bulgaria, Chile, China, Colombia, Croatia/Bosnia-Herzegovina/FYROM/Montenegro, Cyprus, Estonia, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Japan, Jordan, Kingdom of Saudi-Arabia, Latvia, Lebanon, Lithuania, Luxembourg, Malaysia, Malta, Mexico, New Zealand, Peru, Philippines, Republic of Kazakhstan, Romania, Russia, Serbia, Singapore, Slovenia, Spain, South Korea, Taiwan/ROC, Thailand, Turkey, Ukraine, United Arab Emirates, Uruguay, Vietnam

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