

# HALFEN FLEXIBLE BOLT CONNECTIONS

## TECHNICAL PRODUCT INFORMATION



*HALFEN FLEXIBLE BOLT CONNECTIONS*

MT-FBC 14.1-E

FRAMING SYSTEMS

**NEW!**

- CE-marking EN 1090-1, EN 1090-2 for all hot-rolled framing channels
- Supplementary load capacities according to Eurocode 3
- Addition of framing channels HM 55/42, HZM 64/44, HZM 41/27



  
**HALFEN**  
YOUR BEST CONNECTIONS

# HALFEN FRAMING SYSTEMS

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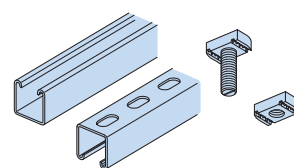
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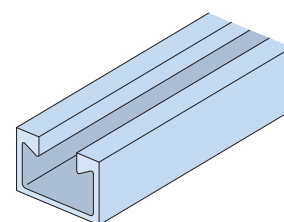
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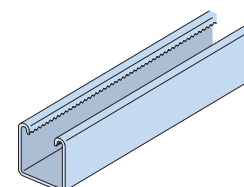
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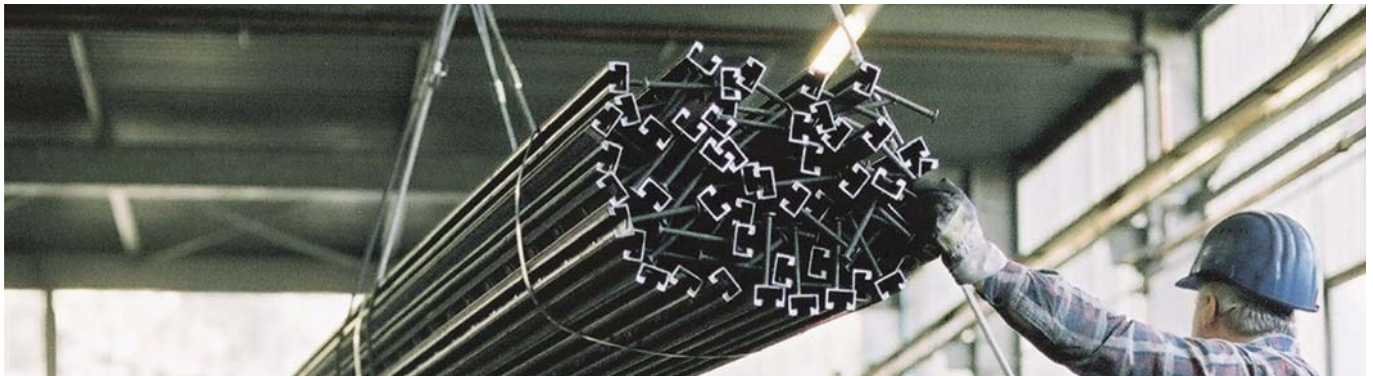
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# HALFEN FRAMING SYSTEMS

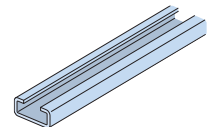
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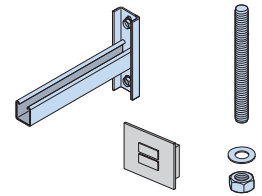
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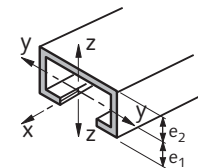
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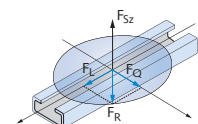
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# HALFEN FRAMING SYSTEMS

## General Information

### European standards EN 1090 / EN 1993

The new EN 1090 series of standards replace the previous DIN 18800-7 standard, regulating execution of steel structures and manufacturing qualifications.

European standard EN 1090-1 specifies requirements for conformity assessment (CE marking) of structural components which will be placed on the European market as construction products. The conformity assessment covers the manufacturing characteristics and where appropriate the structural design characteristics.

The EN 1090-2 standard regulates the requirements applicable to the execution of steel structures. This standard applies to structures that are verified according to the appropriate section of EN 1993 (EC3).

The phase-out period for DIN 18800-7 ended on the 30<sup>th</sup> of June 2014.

Basis for the evaluation of conformity of steel construction products is the system of assessment of conformity 2+ according to Construction Products Regulation (CPR) EU No. 305/2011.



EN 1090-1, EN 1090-2  
2499 – CPR-0113070-00-01



The CE marking confirms conformity with the declared performance of HALFEN Products and with all relevant European harmonized standards in the European Union.

HALFEN Framing channels are also subject to these regulations. To meet CE evaluation obligations the marked products are statically verified in accordance with EN 1993 and the principal performance characteristics are detailed in the respective Declaration of Performance, CONF-DOP\_HM resp. CONF-DOP\_HZM.

CE marking is mandatory from the 1<sup>st</sup> of July 2014 when distributing load bearing metallic construction products in the European market. HALFEN is certified by the notified Body ZDH-ZERT GmbH. Apart from production, the certification includes the method of calculation required by the HALFEN Engineers and their respective qualifications.

### Design method

The European standard EN 1993 was created with the intention to establish uniform, Europe-wide calculation methods for steel structures. However, because these calculation methods have not yet been adopted in all industries we have decided to include two sets of values for load capacities of framing channels and HALFEN Bolts in the following tables.

- working loads will continue to be defined as "allow. F" and
- design values of the resistance will be defined as „F<sub>Rd</sub>“.

The term "design value" is taken from the current applicable standards, for example EN 1993 (EC3), with new safety concept, and must be strictly differentiated from the term "allowable load". The European standard which is based on the so called "partial safety factors" is applied to material resistance as well as to the action (load). The following verification is required:

$$F_{Ed} \leq F_{Rd}$$

**F<sub>Ed</sub>** = calculation value for action  
**F<sub>Rd</sub>** = design value for resistance

The traditional, deterministic safety concept however is based on the method of using a global safety factor for material resistance and is known as the "allowable load method" resp. "allowable tension method". These methods are used in mechanical and plant engineering. For these cases the allowable values for load capacity are calculated. Verification is as follows:

$$F \leq \text{allow. F}$$

**F** = load on the structure  
**allow. F** = allowable load

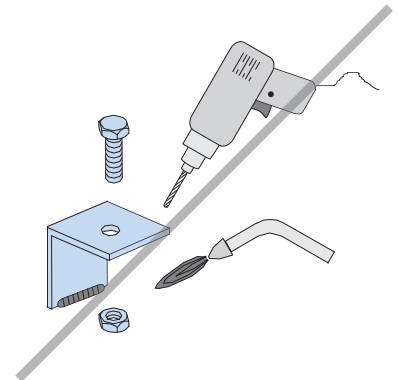
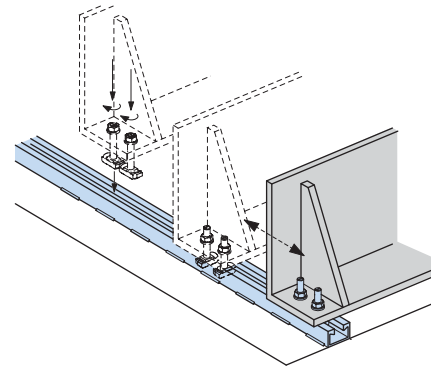


## HALFEN FRAMING SYSTEMS

### General Information

Adjustable HALFEN Channel fixing systems offer a whole range of benefits:

- The adjustable HALFEN Channel-bolt system is a supporting as well as a fixing system
- Full flexibility in positioning and dimensioning the bolt connections
- Choice of corrosion protection:
  - Strip galvanized framing channels for low demands
  - Hot-dip galvanized framing channels for high demands
  - Framing channels in stainless steel for maximum requirements
- Quick assembly and adjustment of equipment and structural components
- Change or up-date entire projects with standard tools
- No specialist required to carry out modifications on site
- Dust free and low noise levels when modification work is done on site
- Corrosion protection is not compromised by bolting
- A large selection of standard channels with good load bearing characteristics



With HALFEN Framing channels you avoid:

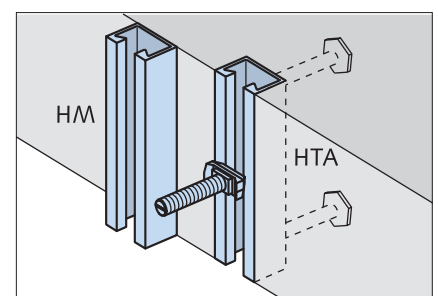
- Time consuming planning of inflexible bolted fixings
- Costly manufacturing of bolt fixings
- Costly corrosion protection work when upgrading already completed structural components i.e. when adjusting components to site

### HALFEN Channels

All hot-rolled HALFEN Profiles and some of the light framing channels are also available as **HALFEN HTA/HZA Cast-in channels**. Both versions use the same bolts and locking plates.

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

[www.halfen.com/  
Products/Fixing systems/  
HTA-Cast-in channels](http://www.halfen.com/Products/Fixing%20systems/HTA-Cast-in%20channels)



### Quality

Quality is an outstanding feature of our products. HALFEN materials and products are subject to stringent quality controls.

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



Certificate-no. QS-281 HH

# HALFEN FRAMING SYSTEMS

## Framing Channels

### Framing channels HM, HL, HZM and HZL

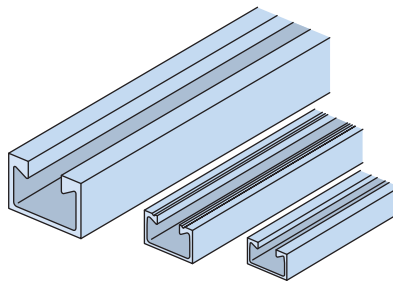
#### Hot-rolled framing channels

The hot-rolling process makes these framing channels ideally suitable for:

- heavy loads
- dynamic loads
- welding

#### Smooth channels HM

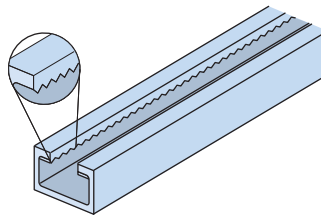
- very high tensile load capacity
- by using nibbed bolts longitudinal loads are possible (applies only to standard steel)



#### Serrated channels HZM



- serration allows high longitudinal loads
- 5 channel sizes for maximum efficiency

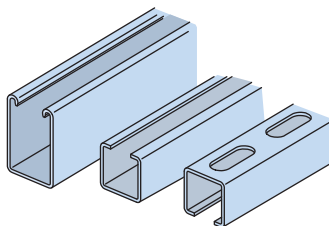


#### Cold-rolled framing channels

Cold-rolled channels are economic for lower loads. Channels are available with holes or without holes.

#### Cold-rolled framing channels HL, HM

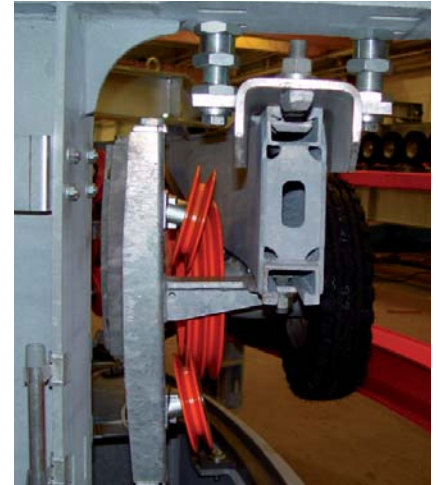
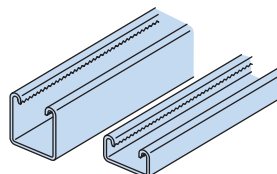
- economic due to large selection of channels



#### Serrated channels HZL, HZM



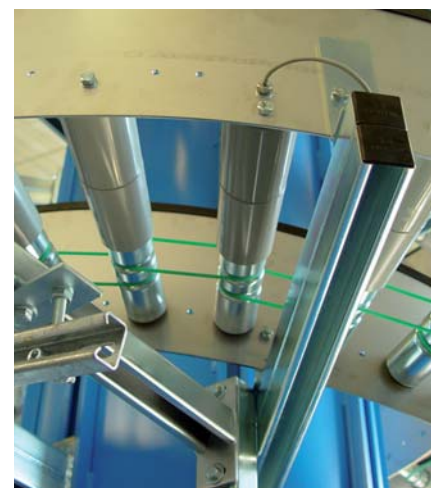
- for loads in longitudinal channel direction
- positive-locking connection for high channel loads



Roller-bearing fixing of a cableway



Welding-jig, locomotive construction



Cantilever fixing on a vertical conveyor system

# HALFEN FRAMING SYSTEMS

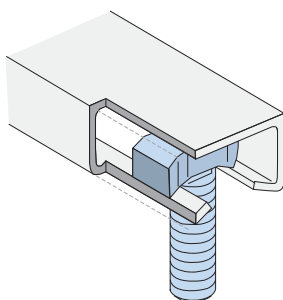
## HALFEN Bolts

### HALFEN Bolts HS, HZS and HSR

#### Type HS

##### HALFEN Bolts

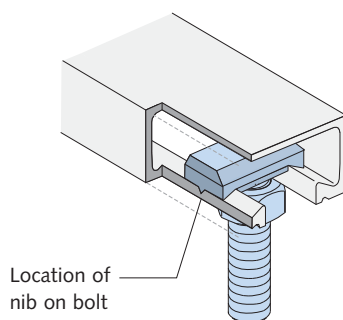
- suitable for all channels
- load bearing capacity in two directions
- marked at shank end with one notch



#### Type HSR

##### HALFEN Bolts with nibs

- suitable for use in hot-rolled, standard steel channels from the heavy duty system
- nibbed; therefore positive-locking, load bearing in all directions
- the T-bolts prevent turning under vibration
- marked at shank end with two notches

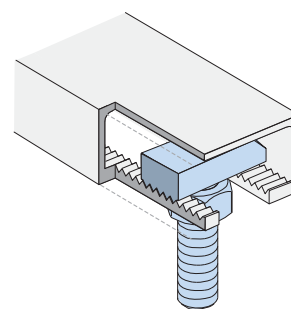


#### Type HZS



##### Serrated HALFEN Bolts

- for serrated framing channels HZM and HZL
- serration also provides positive load bearing transmission in longitudinal channel direction; risk of slippage is eliminated
- marked at shank end with two notches



Bolt identification on the bolt head

Notches on the shank tip:

**1**

**HS All Types**  
**HZS 41/22**  
**HZS 41/41**

**2**

**HSR All Types**  
**HZS 38/23**  
**HZS 29/20**

<p> <b>HALFEN 4.6</b></p> <p> <b>H 4.6</b></p>	<p> <b>HALFEN 8.8</b></p> <p> <b>H 8.8</b></p>	<p> <b>HALFEN A4-50</b></p> <p> <b>HALFEN A4-70</b></p>	<p>Strength class 4.6 galvanized or hot-dip galvanized</p> <p>Strength class 8.8 galvanized or hot-dip galvanized</p> <p>Property class A4 - 50 stainless steel</p> <p>Property class A4 - 70 stainless steel</p>
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Manufacturer (for individual dimensions)

Strength class resp. property class

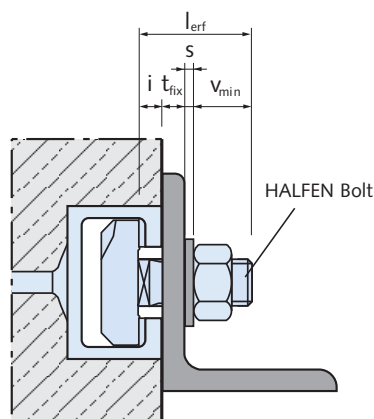
Marking at the shank end of the HALFEN Bolts: After assembly check the correct orientation of the notches on the shank end of the bolts. The slots must be at right angles to the channel length.



# HALFEN FRAMING SYSTEMS

## HALFEN Bolts and Locking Plates

### Calculating the bolt length $l_{req}$ for HALFEN Bolts (steel construction)



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

$l_{req}$  = required 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  
 $u$  = bolt protrusion approx. 5 mm according to DIN 78 (bolts larger M20 require min. 7 mm)

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

### Thickness channel lip $i$

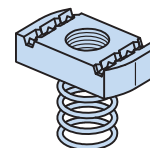
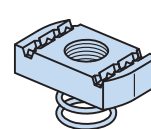
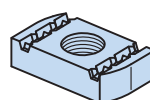
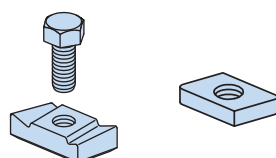
Profile	28/15	29/20	38/17	36/36	38/23	40/22	40/25	41/22	41/27	422	486	49/30	50/30	50/40	52/34	53/34	55/42	64/44	72/48
$i$ [mm]	2.25	5.0	3.0	2.5	5.5	6.0	5.6	7.0	7.0	6.0	6.0	7.39	7.85	7.0	10.5	7.5	12.9	10.0	15.5

### Locking plates GWP

Locking plates (channel nuts) allow any metric 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 – framing channels

Type \_\_\_\_\_ **HM 50/30-FV-6070**  
 Material \_\_\_\_\_  
 Length (mm) \_\_\_\_\_

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

#### Order example – HALFEN Bolts

Type \_\_\_\_\_ **HS 50/30 M20x100 GV s 8.8**  
 Thread diam. \_\_\_\_\_  
 Length (mm) \_\_\_\_\_  
 Material \_\_\_\_\_  
 Property class \_\_\_\_\_

or use the 12-digit order no. e.g. 0350.090-00081  
 Order numbers for HALFEN Bolts can be found in the HALFEN Pricelist.

# Framing Channels

The advantages at a glance

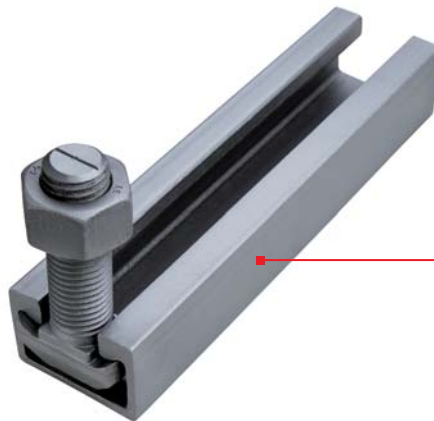
**W**hether for low or very high loads: you will always find a cost effective solution for your requirements in the HALFEN product range of framing channels and bolts.

## Versatile and adaptable

- adjustable assembly
- all connections stay adjustable; they are easily replaced or extended
- almost unlimited in its range of application; e.g. building construction, industrial construction, steel construction, engineering construction, vehicle manufacturing and many other sectors

## Secure and reliable

- corrosion protection is not compromised by bolting
- large selection of standard channels with optimal load bearing capacities
- serrated channels for positive-lock connections



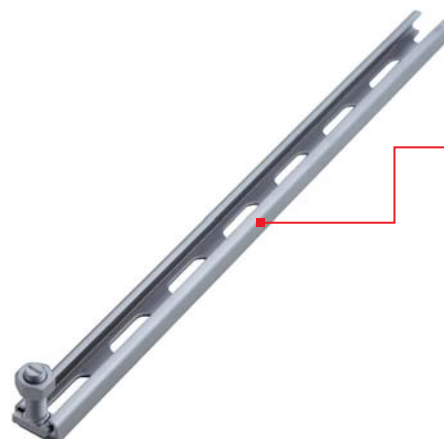
### Heavy duty framing system

The heavy duty framing channel is predominantly hot-rolled and particularly suitable for heavy loads.



### Medium duty framing system

All medium duty framing channels have the same profile width and are compatible with the innovative HALFEN Powerclick assembly system.

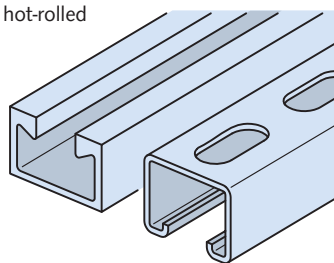
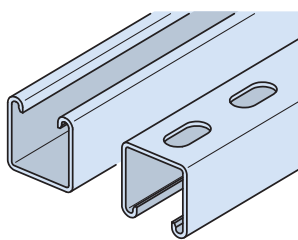
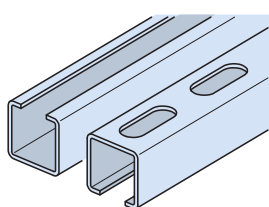
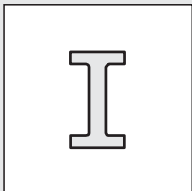
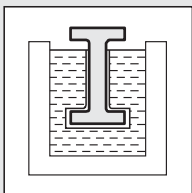
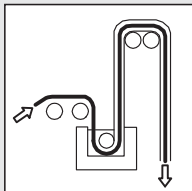



### Low duty framing system

The low duty framing channel is the perfect fixing solution for low loads.

# HALFEN FRAMING SYSTEMS

## Materials, Types

Framing Channels	HALFEN Channels			
		Heavy duty framing systems	Medium duty framing systems	Light duty framing systems
Heavy Duty Framing Systems		 <p>hot-rolled</p> <p>cold-rolled</p> <p>Pages 14 - 34</p>	 <p>Pages 35 - 44</p>	 <p>Pages 45 - 53</p>
Medium Duty Framing Systems	<p><b>Material:</b> Order code</p>  <p>Mill-finished</p>	<p><b>WB</b></p> <p>Hot-rolled material S235JR, acc. to EN 10025, material no. 1.0038</p> <p>Type HZM: S275JR, material no. 1.0044, acc. to EN 10025</p> <p>Cold-rolled: material S235JR, acc. to EN 10025 mill-finished</p>	<p>Material S235JR, acc. to EN 10025, material no. 1.0038</p>	<p>Material S235JR, acc. to EN 10025, material no. 1.0038</p>
Light Duty Framing Systems	 <p>Hot-dip galvanized acc. to EN ISO 1461 suitable for outdoor application</p>	<p><b>FV</b></p> <p>Hot-rolled material S235JR, acc. to EN 10025, material no. 1.0038</p> <p>type HZM: S275JR acc. to EN 10025</p> <p>Cold-rolled: material S235JR, acc. to EN 10025</p> <p>Hot-dip galvanized, acc. to EN ISO 1461, zinc coating min. 50 µm</p>	<p>Material S235JR, acc. to EN 10025, material no. 1.0038</p> <p>Hot-dip galvanized, acc. to EN ISO 1461 zinc coating min. 50 µm</p>	<p>Material S235JR, acc. to EN 10025, material no. 1.0038</p> <p>Hot-dip galvanized, acc. to EN ISO 1461, zinc coating min. 50 µm</p>
Accessories	 <p>Strip-galvanized acc. to EN 10142 suitable for indoor application</p>	<p><b>SV</b></p>	<p>DX51D + Z275NA, material no. 1.0226, acc. to EN 10346</p> <p>Sendzimir galvanized, hot-dip galvanized min. 20 µm</p>	<p>DX51D + Z275NA, material no. 1.0226, acc. to EN 10346</p> <p>Sendzimir galvanized, hot-dip galvanized min. 20 µm</p>
Statics				
Mechanical engineering	 <p>Stainless steel acc. to EN 10088 and DIBt-Certificate Z-30.3-6</p>	<p><b>A2</b></p> <p><b>A4</b></p> <p><b>HCR</b></p> <p>HCR = high corrosion resistant stainless steel, material no. 1.4529 or 1.4547, acc. to EN 10088, for channels 49/30</p>	<p>Material no. 1.4571 / 1.4404, acc. to EN 10088</p> <p>Material no. 1.4571 / 1.4404, acc. to EN 10088</p>	<p>Material no. 1.4301, acc. to EN 10088</p> <p>Material no. 1.4571 / 1.4404, acc. to EN 10088</p> <p>HCR = high corrosion resistant stainless steel, material no. 1.4529 or 1.4547, acc. to EN 10088, for channels 28/15 and 38/17</p>



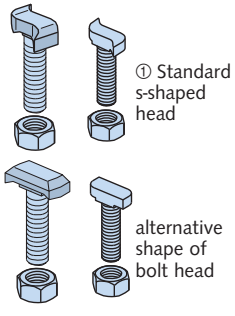
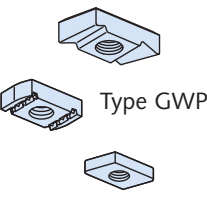
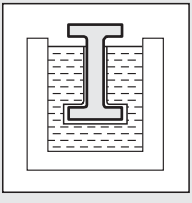
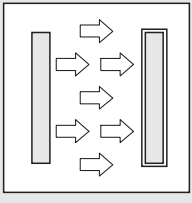

# HALFEN FRAMING SYSTEMS

## Materials, Types

### HALFEN Bolts/Accessories









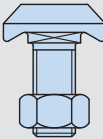

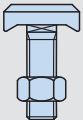
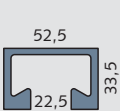
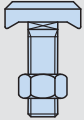
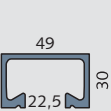

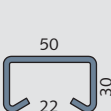
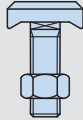
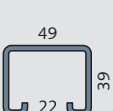
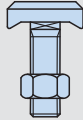

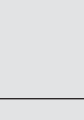
① HALFEN Bolts with s-shape head for safer assembly. The head shape guarantees better hold, preventing the bolt turning in the channel, even coping with manufacturing tolerances in the channel widths. HALFEN supplies both types; subject to change.







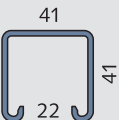









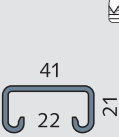

Material: Order code







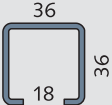
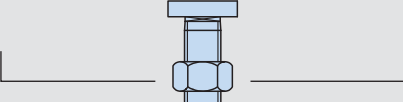
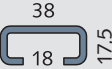
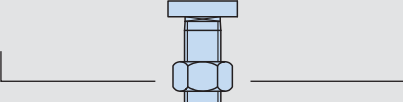

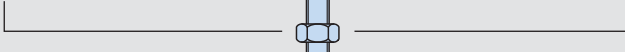




	HALFEN Bolts	Locking plates	Hexagon bolts	Hexagon nuts
	<p>Types <b>HS</b>, <b>HSR</b>, <b>HZS</b></p>  <p>incl. nut</p> <p>Pages 54 - 55</p>	<p>Type <b>GWP</b></p> 	<p>Type <b>HSK</b></p> <p>EN ISO 4017 DIN 933</p> <p>Page 57</p>	<p>Type <b>MU</b></p> <p>DIN EN ISO 4032 DIN 934</p> <p>Page 56</p>
 <p>Hot-dip galvanized acc. to EN ISO 10684, for threaded parts acc. to DIN 267 part 10</p>	<p><b>FV 4.6</b></p> <p>Hot-dip galvanized acc. to EN ISO 10684 property class 4.6 acc. to EN ISO 898-1</p>			
	<p><b>FV 8.8</b></p> <p>Hot-dip galvanized acc. to EN ISO 10684 property class 8.8 acc. to EN ISO 898-1</p>			Hot-dip galvanized acc. to EN ISO 10684 strength 8
 <p>Zinc-electroplated acc. to DIN 50961, DIN EN 1403, DIN EN ISO 4042 zinc flake coating</p>	<p><b>GV 4.6</b></p> <p>Zinc-electroplated with special coating Cr(VI)-free, GVs zinc coating min. 12 µm, property class 4.6 acc. to EN ISO 898-1</p>	Zinc-electroplated Cr(VI)-free, zinc cover min. 5 µm		
	<p><b>GV 8.8</b></p> <p>Zinc-electroplated with special coating Cr(VI)-free, GVs zinc coating min. 12 µm, property class 8.8 acc. to EN ISO 898-1</p>		Zinc-electroplated Cr(VI)-free, zinc cover ca. 5 µm, property class 8.8	Zinc-electroplated Cr(VI)-free, zinc cover min. 5 µm, property class 8
	<p><b>zl</b></p> <p>Zinc flake coating (only Type HZS 41/41)</p>			
 <p>Stainless steel acc. to EN 10088 resp. DIBt-Certificate Z-30.3-6</p>	<p><b>A2</b></p> <p>Property class 50 acc. to EN ISO 3506-1 Property class 70 acc. to EN ISO 3506-1</p>			Stainless steel A2
		Stainless steel A4		
	<p><b>A4</b></p> <p>Property class 50 acc. to EN ISO 3506-1 Property class 70 acc. to EN ISO 3506-1</p>		Stainless steel A4-70	Stainless steel A4-70 or A4-80
	<p><b>HCR</b></p> <p>Material HCR-50, material no. 1.4529, acc. to EN ISO 3506-1 on request</p>			
	<p><b>FA</b></p> <p>Property class 70 material no. 1.4462</p>			

# HALFEN FRAMING SYSTEMS

## Product Range Overview: Framing Channels and HALFEN Bolts

















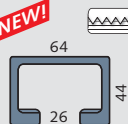
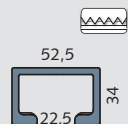

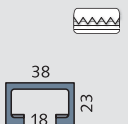

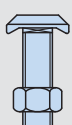

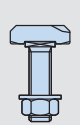



Heavy duty framing system						
Hot-rolled				Cold-rolled		
HM 72/48 	HM 55/42 	HM 52/34 	HM 50/30 	HM 49/30 	HM 50/40, HL 50/40 	HM 486 
 	<b>NEW!</b>  	 	 	 	 	 
HS 72/48, HSR 72/48, GWP 72/48		HS 50/30, HSR 50/30, GWP 50/30		HS 50/30, GWP 50/30 and GWP 50/40		





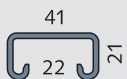
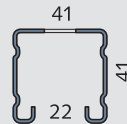
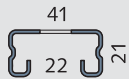
Medium duty framing system					
Cold-rolled	Cold-rolled, serrated	Cold-rolled		Cold-rolled, serrated	
HM 41/41, HL 41/41 	HZM 41/41, HZL 41/41 	HM 41/62, HL 41/62 	HM 41/83, HL 41/83 	HZL 63/63 	HZM 41/22, HZL 41/22 
 	 	 	 	 	 
HZS/HS 41/41, HZS 41/22 GWP 41/41, GWP 41/22					





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	

# HALFEN FRAMING SYSTEMS






## Product Range Overview: Framing Channels and HALFEN Bolts

	Hot-rolled	Cold-rolled		Hot-rolled, serrated				
	HM 40/22  	HM 40/25  	HM 422 	HZM 64/44  	HZM 53/34  	HZM 41/27 	HZM 38/23  	HZM 29/20 
	 39,5 18 23	 40 18 25	 39,5 18 21,5	 <b>NEW!</b> 64 26 44	 52,5 22,5 34	 <b>NEW!</b> 40 18,5 27	 38 18 23	 29 14 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 
	 41 22 21	 41 22 41	 41 22 21

Cold-rolled
HM 20/12, HL 20/12  
 20 10 12

HS 20/12, GWP 20/12

**Material and finishes:**

-  Hot-dip galvanized FV or mill finish WB
-  Sendzimir galvanized SV
-  Stainless steel A4 1.4571/1.4404
-  Stainless steel A2 1.4301/1.4307
-  Stainless steel HCR 1.4547/1.4529

Further information on materials and finishes → see page 10

 HZM/HZL serrated profiles

**Steel structures:**

A4: Corrosion category III acc. to Z-30.3-6, or acc. to EN 1993-1-4: 2006, table A.1, row 3 (group 1.4571, 1.4404).

A2: Corrosion category II acc. to Z-30.3-6, or acc. to EN 1993-1-4: 2006, table A.1, row 2 (group 1.4301).

HCR: Corrosion category IV acc. to Z-30.3-6, or acc. to EN 1993-1-4: 2006, table A.1, row 4 (group 1.4462, 1.4529, 1.4547).

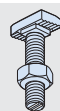
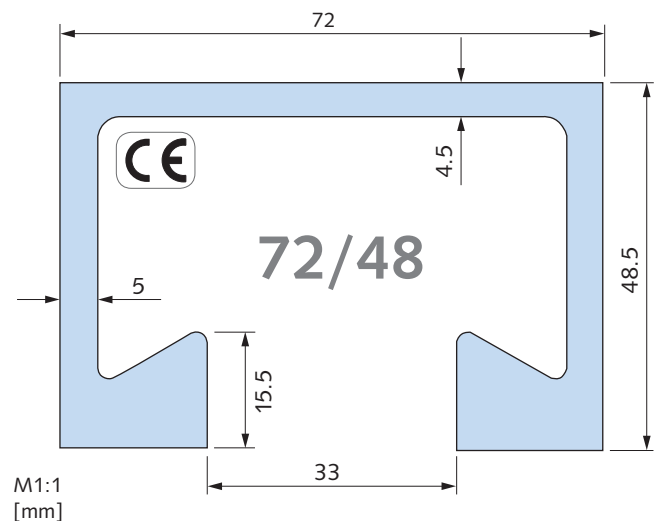


# HALFEN FRAMING SYSTEMS

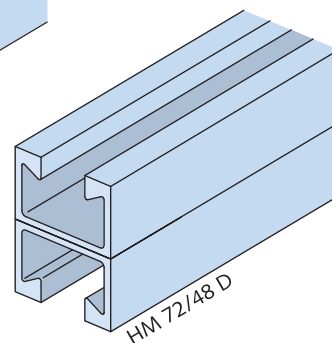
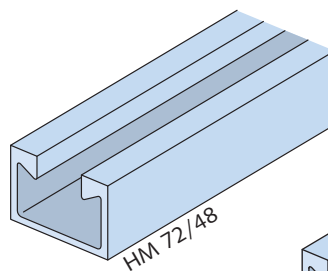
## Framing Channels – Heavy Duty Framing System

### Framing channel HM 72/48

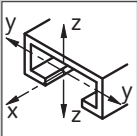
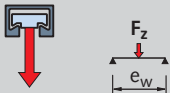
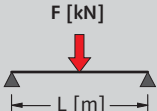
#### HM 72/48 hot-rolled



Suitable HALFEN Bolt HS 72/48 and HSR 72/48 → see page 15



Double channel on request  
- profile data, see page 60

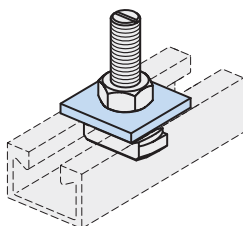
Dimensions and cross-section properties									Load capacities				
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
													
Material	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	e <sub>w</sub>			
HM 72/48	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]	0.5 m	1.0 m	1.5 m
WB	180-00002	6070	8.85	11.27	34.97	83.35	14.28	23.15	F <sub>z,Rd</sub>	30.0	F <sub>Rd</sub>		
FV	180-00003								65.8		31.2	15.6	10.4
A4	180-00001								allow. F <sub>z</sub>		allow. F		
									47.0		22.3	11.2	7.4

① F<sub>z</sub> = max. load bearing capacity of the channel lips - see also page 66

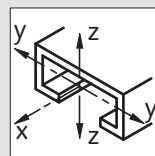
①  $F_z$  = max. load bearing capacity of the channel lips - see also page 66

### Accessories

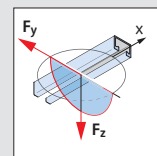
VUS 72/49 Washer  
→ see page 56



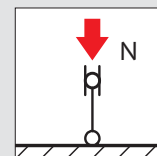
### Further design properties



Cross section data  
page 60



Point-load capacity  
pages 66 - 67

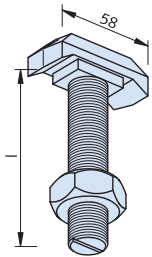


Flexural buckling  
page 70

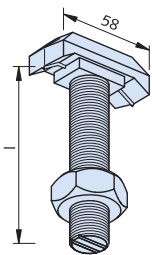
# HALFEN FRAMING SYSTEMS

## HALFEN Bolts and Accessories – Heavy Duty Framing System

### HALFEN Bolts HS 72/48 and HSR 72/48



**HS 72/48**  
HALFEN Bolt  
incl. nut



**HSR 72/48**  
HALFEN Bolt with  
nib incl. nut, for  
hot-rolled channels  
in mild steel WB/FV

#### HS 72/48 available bolts

Length l [mm]	M20	M24	M27	M30	Length l [mm]	M20	M24	M27	M30
50	FV 4.6	FV 4.6 A4-50			150	FV 4.6	FV 4.6 GVs 8.8		FV 4.6
60	FV 8.8								
75	FV 4.6 GVs 8.8	FV 4.6 FV 8.8	FV 4.6	FV 4.6	200	FV 4.6	FV 4.6		FV 4.6
100	FV 4.6 GVs 8.8	FV 4.6 GVs 8.8 A4-50	FV 4.6 FV 8.8	FV 4.6					

#### HSR 72/48 available bolts

Length l [mm]	M20
75	FV 8.8

### Load bearing capacities for HALFEN Bolts ①

Thread Ø	Load capacities for HALFEN Bolts					Recommended load capacity per HALFEN Bolt in channel longitudinal direction				Recommended torque			
		F [kN] ①			HSR	F <sub>x</sub> [kN]			HSR v = 3 ③	T <sub>inst</sub> [Nm]			HSR
		HS	HS	A4-50		HS ②	HSR v = 3 ③	HSR v = 3 ③		HS	HS	A4-50	
72/48		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	F <sub>Rd</sub>	35.2	78.4	-	78.4	1.96	6.58	-	10.5	130	360	-	400
	allow. F	25.1	56.0	-	56.0	1.4	4.7	-	7.5				
M24	F <sub>Rd</sub>	50.7	113.0	44.5	-	2.8	9.52	2.8	-	200	680	200	-
	allow. F	36.2	80.7	31.8	-	2.0	6.8	2.0	-				
M27	F <sub>Rd</sub>	66.0	146.9	-	-	3.64	12.46	-	-	300	1000	-	-
	allow. F	47.1	104.9	-	-	2.6	8.9	-	-				
M30	F <sub>Rd</sub>	80.6	-	-	-	4.48	15.26	-	-	400	1400	-	-
	allow. F	57.6	-	-	-	3.2	10.9	-	-				

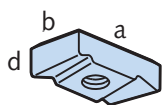
① Note: do not exceed the max. channel load bearing capacity

② Load capacity due to friction

③ Acc. to expert report

### Locking plates

#### Locking plate GWP 72/48



#### GWP 72/48 available plates

GV thread	A4 thread	a [mm]	b [mm]	d [mm]
M12	M12	62	31	22
M16	M16			
M20	M20			

#### Load capacities GWP 72/48

Thread	Load capacity [kN]
M12	F <sub>Rd</sub> 13.0
	allow. F 9.3
M16	F <sub>Rd</sub> 24.2
	allow. F 17.3
M20	F <sub>Rd</sub> 30.8
	allow. F 22.0

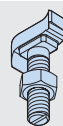
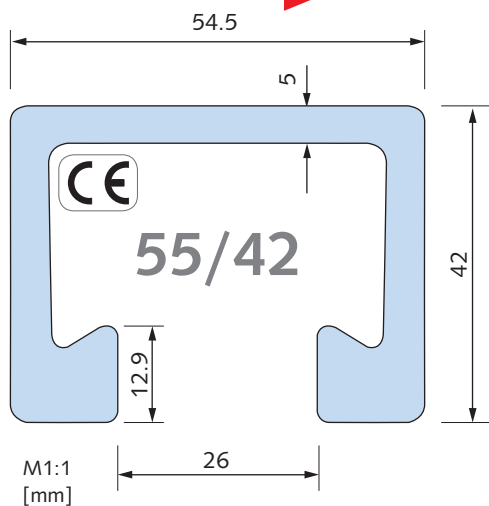
# HALFEN FRAMING SYSTEMS

## Framing Channels – Heavy Duty Framing System

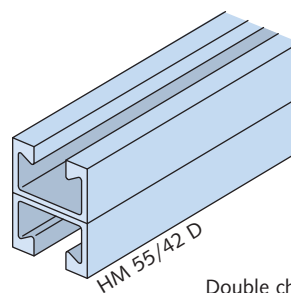
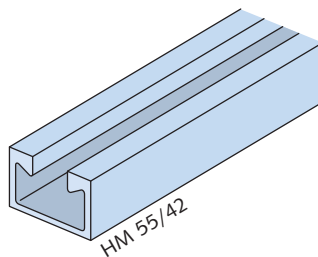
### Framing channel HM 55/42

HM 55/42 hot-rolled

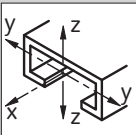
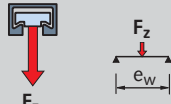
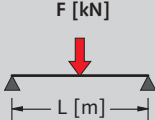
**NEW!**



Suitable HALFEN Bolt HS 50/30,  
see page 21



Double channel on request  
- profile data, see page 60

Dimensions and cross-section 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	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	e <sub>w</sub>			
HM 55/42	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	F <sub>z</sub> ①	e <sub>w</sub>	0.5 m	1.0 m	1.5 m
WB	290-00001	6070	6.76	8.6	18.75	36.29	8.49	13.32	F <sub>z,Rd</sub>	25.0	F <sub>Rd</sub>		
	54.0								23.5		11.7	7.8	
FV	290-00002								allow. F <sub>z</sub>		allow. F		
									38.6		16.8	8.4	5.6

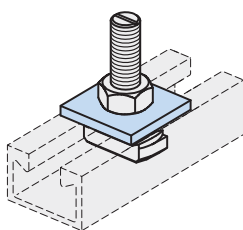
① F<sub>z</sub> = max. load bearing capacity of the channel lips - see also page 66

① F<sub>z</sub> = max. load bearing capacity of the channel lips - see also page 66

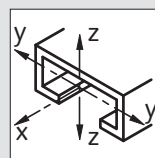
### Accessories

VUS 72/49 Washer

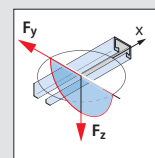
→ see page 56



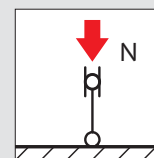
### Further design properties



Cross section data  
page 60



Point-load capacity  
pages 66 - 67



Flexural buckling  
page 70

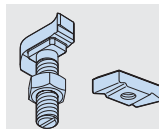
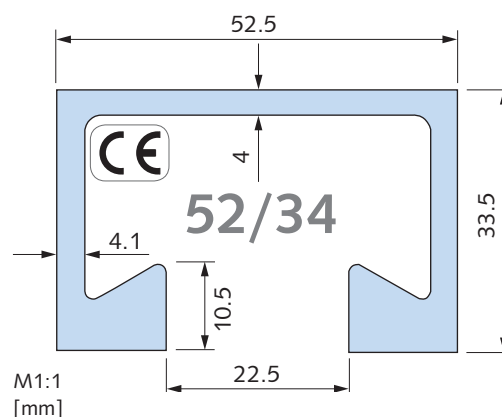


# HALFEN FRAMING SYSTEMS

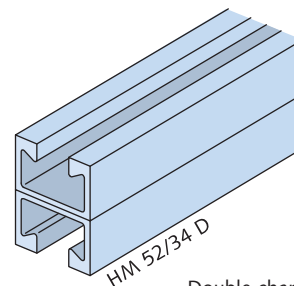
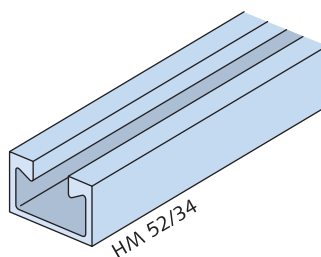
## Framing Channels – Heavy Duty Framing System

### Framing channel HM 52/34

#### HM 52/34 hot-rolled



Suitable HALFEN 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

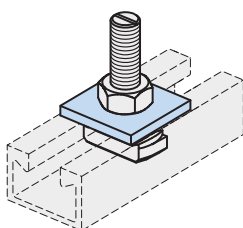
Dimensions and cross-section properties									Load capacities				
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. Point-load bearing capacity		Bending load capacity at span L		
Material	Order no.	[mm]	G [kg/m]	A [cm <sup>2</sup> ]	I <sub>y</sub> [cm <sup>4</sup> ]	I <sub>z</sub> [cm <sup>4</sup> ]	W <sub>y</sub> [cm <sup>3</sup> ]	W <sub>z</sub> [cm <sup>3</sup> ]	F <sub>z</sub> ① [kN]	e <sub>w</sub> [cm]	F [kN]		
HM 52/34	0280.										0.5 m	1.0 m	1.5 m
WB	190-00002	6070	4.98	6.35	9.33	23.74	5.36	9.04	F <sub>z,Rd</sub>	20.0	F <sub>Rd</sub>		
FV	190-00003								36.3		12.3	6.1	3.9
A4	190-00001								allow. F <sub>z</sub>		allow. F		
									25.9		8.8	4.4	2.8

① F<sub>z</sub> = max. load bearing capacity of the channel lips - see also page 66

### Accessories

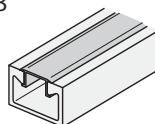
#### VUS 52/34 Washer

→ see page 56



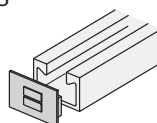
#### PA - 22 Channel cover

→ see page 58

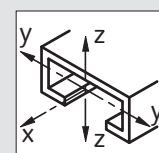


#### HPE 52/34 Channel end cap

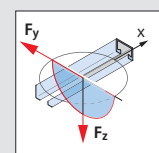
→ see page 58



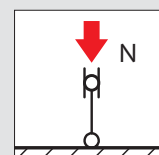
### Further design properties



Cross section data  
page 60



Point-load capacity  
pages 66 - 67



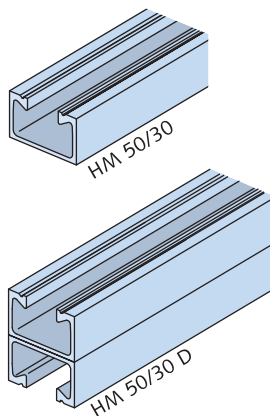
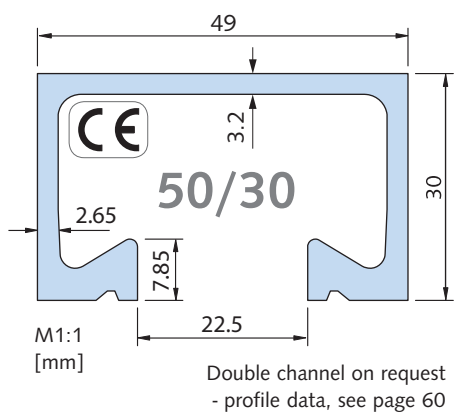
Flexural buckling  
page 70

# HALFEN FRAMING SYSTEMS

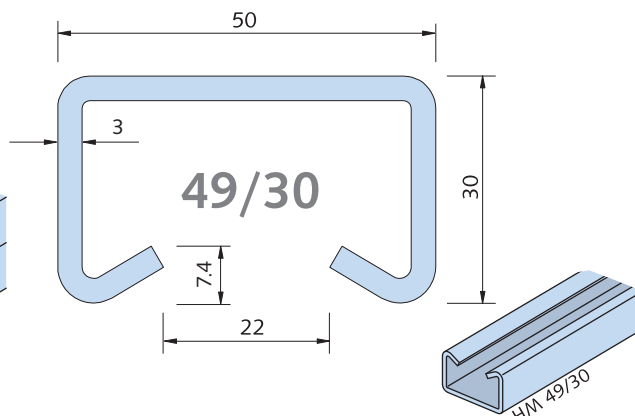
## Framing Channels – Heavy Duty Framing System

### Framing channel HM 50/30 and HM 49/30

#### HM 50/30 hot-rolled



#### HM 49/30 cold-rolled



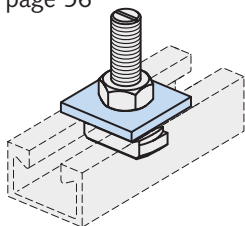
Dimensions and cross-section properties									Load capacities				
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
Material	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	e <sub>w</sub>			
HM 50/30	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]	0.5 m	1.0 m	1.5 m
WB	200-00002	6070	3.26	4.15	5.19	13.99	3.24	5.67	F <sub>z,Rd</sub>	20	F <sub>Rd</sub>		
FV	200-00003								20.2		7.5	3.7	2.2
A4	200-00001								allow. F <sub>z</sub>		allow. F		
									14.4		5.3	2.7	1.6
HM 49/30	0280.												
WB	220-00001	6070	2.88	3.67	4.16	13.23	2.35	5.29	F <sub>z,Rd</sub>	46	F <sub>Rd</sub>		
FV	220-00002								6.9		6.1	3.0	1.7
A2 ②	220-00003								allow. F <sub>z</sub>		allow. F		
A4	220-00004								4.9		4.3	2.2	1.2

① F<sub>z</sub> = max. load bearing capacity of the channel lips; ② [Stainless steel A2 on request](#). Note: HCR for HM 49/30 on request

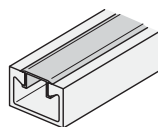
①  $F_z$  = max. load bearing capacity of the channel lips; ② Stainless steel A2 on request. Note: HCR for HM 49/30 on request

### Accessories

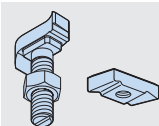
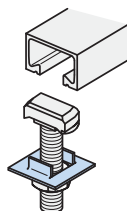
**VUS 52/34 Washer**  
→ see page 56



**PA - 41 Channel cover**  
→ see page 58

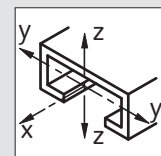


**SIC 50/30 Locking washer**  
→ see page 56

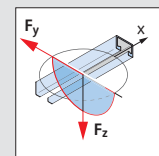


Suitable HALFEN Bolts and locking plates  
HS 50/30, HSR 50/30 and  
GWP 50/30 → see pages 21 - 22

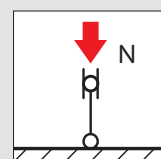
### Further design properties



Cross section data  
pages 60, 62



Point-load capacity  
pages 66 - 67



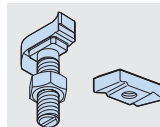
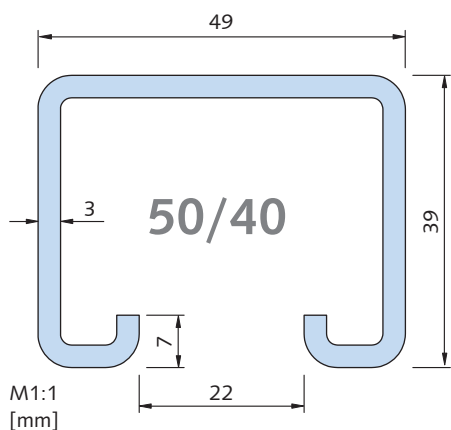
Flexural buckling  
pages 70 - 71

# HALFEN FRAMING SYSTEMS

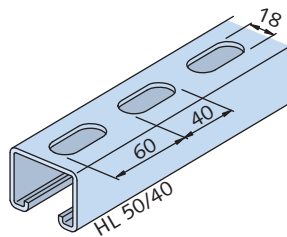
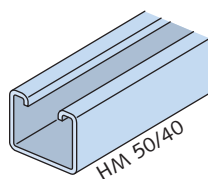
## Framing Channels – Heavy Duty Framing System

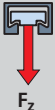

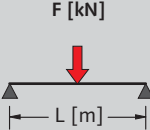
### Framing channel HM and HL 50/40

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



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



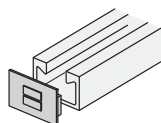
Dimensions and cross-section properties									Load capacities					
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L			
Material	Order no.				$I_y$	$I_z$	$W_y$	$W_z$	$F_z$ ①	$\leq e_w$	0.5 m	1.0 m	1.5 m	
HM 50/40	0280.	[mm]	[kg/m]	A [cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]						
WB	090-00002	6000	3.35	4.26	8.64	15.49	3.96	6.32	$F_{z,Rd}$	63.0	$F_{Rd}$			
FV	090-00003								7.6		9.5	4.7	3.2	
A4	090-00001								allow. $F_z$		allow. F			
											5.4	6.8	3.4	2.3
HL 50/40	0281.													
WB	100-00001	6000	3.15	3.73	7.14	15.36	3.65	6	$F_{z,Rd}$	53.0	$F_{Rd}$			
FV	100-00002								7.6		8.0	4.1	2.7	
A4	100-00003								allow. $F_z$		allow. F			
											5.7	2.9	1.9	

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

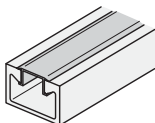
①  $F_z$  = max. load bearing capacity of the channel lips

### Accessories

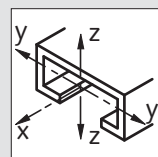
HPE 50/40 Channel end cap  
→ see page 58



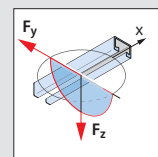
PA - 41 Channel cover  
→ see page 58



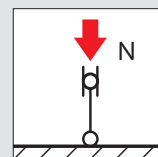
### Further design properties



Cross section data  
pages 62, 64



Point-load capacities  
page 68



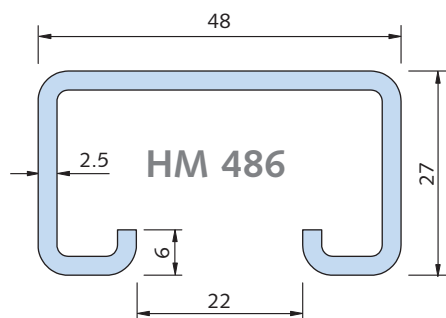
Flexural buckling  
page 71

# HALFEN FRAMING SYSTEMS

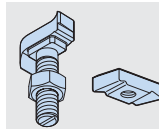
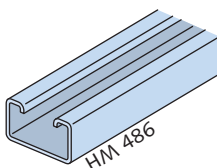
## Framing Channels – Heavy Duty Framing System

### Framing channel HM 486


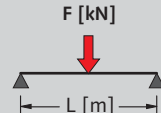
#### HM 486 cold-rolled



M1:1  
[mm]



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

Dimensions and cross-section 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	Order no.				$I_y$	$I_z$	$W_y$	$W_z$		$\leq e_w$				
HM 486	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	$F_z$ ①			0.5 m	1.0 m	1.5 m
WB	100-00001	6000	2.31	2.95	2.97	9.62	1.92	4.01	$F_{Rd,z}$	47.0		$F_{Rd}$		
									4.7			4.6	2.3	1.2
FV	100-00002								allow. $F_z$			allow. F		
									3.5			3.3	1.7	0.9

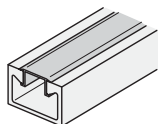
①  $F_z$  = load bearing capacity of the channel lips

①  $F_z$  = load bearing capacity of the channel lips

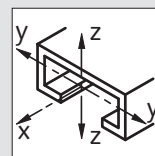
### Accessories

#### PA - 41 Channel cover

→ see page 58



### Further design properties



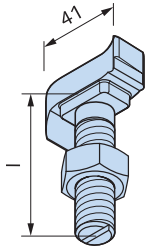
Cross section data  
page 62



# HALFEN FRAMING SYSTEMS

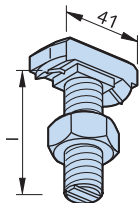
## HALFEN Bolts and Accessories – Heavy Duty Framing System

### HALFEN Bolts HS 50/30 and HSR 50/30



**HS 50/30**  
HALFEN Bolt  
incl. nut

Li = left-hand thread  
T = partial thread



**HSR 50/30**  
HALFEN Bolt with nib,  
incl. nut, for hot-rolled  
profiles in mild steel  
WB/FV

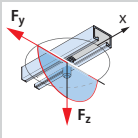
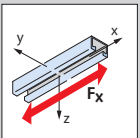
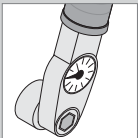
HS 50/30 available bolts											
Length l [mm]	M10	M12	M16	M20	M24 ①	Length l [mm]	M10	M12	M16	M20	M24 ①
30	GVs 4.6 FV 4.6	GVs 4.6 A4-70	GVs 4.6 A4-50	-	-	75	-	-	-	GVs 4.6 A4-50 FA-70	FV 4.6
35				GVs 4.6	-						
40	GVs 4.6	GVs 4.6 FV 4.6 A4-70	GVs 4.6 GVs 8.8 FV 4.6 A4-50	-	-	80	-	GVs 4.6 GVs 8.8	GVs 4.6 GVs 8.8 A4-50 A4-70	GVs 8.8	-
45	-	GVs 8.8	-	GVs 4.6 GVs 8.8 A4-50	-	80 Li	-	-	A4-50		-
						100	-	GVs 4.6 A4-50	GVs 4.6 GVs 8.8 FV 4.6	GVs 4.6 GVs 8.8 FV 4.6 A4-50 FA-70	-
50	GVs 4.6	GVs 4.6 A4-70	GVs 4.6 FV 4.6 A4-50	-	-						
55	-	-	-	GVs 4.6 FV 4.6 A4-50	-	100 T			A4-50		-
						125	-	GVs 4.6	GVs 4.6	GVs 4.6 A4-50	-
60	-	GVs 4.6 GVs 8.8	GVs 4.6 GVs 8.8 FV 8.8 A4-50	GVs 8.8	-	150	-	GVs 4.6	GVs 4.6 FV 4.6 A4-50	GVs 4.6 GVs 8.8 A4-50	-
						200	-	GVs 4.6	GVs 4.6	GVs 4.6	-
65	-	-	-	GVs 4.6	-	300	-	-	GVs 4.6	GVs 4.6	-

① For HM 55/42 only

High corrosion resistant stainless steel HCR for HS 50/30 on request

HSR 50/30 available bolts									
Length l [mm]	M10	M12	M16	M20	Length l [mm]	M10	M12	M16	M20
40			FV 8.8						
45				GVs 8.8	75				GVs 8.8
60			GVs 8.8	GVs 8.8					

### Load bearing capacities for HALFEN Bolts ①

Thread Ø	Load capacities for HALFEN Bolts							Recommended load capacity per HALFEN Bolt in channel longitudinal direction					Recommended torque						
																			
	F [kN]							F <sub>x</sub> [kN]					T <sub>inst</sub> [Nm]						
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	F <sub>Rd</sub>	8.3	18.6	-	-	-	-	0.42	1.54	-	-	-	15	40	-	-	-	-	
	allow. F	5.9	13.3	-	-	-	-	0.3	1.1	-	-	-							
M12	F <sub>Rd</sub>	12.1	27.0	10.6	22.7	-	-	0.7	2.24	0.7	-	-	25	70	25	-	-	-	
	allow. F	8.6	19.3	7.6	16.2	-	-	0.5	1.6	0.5	-	-							
M16	F <sub>Rd</sub>	22.6	50.2	19.8	42.2	-	50.2	1.26	4.2	1.26	-	7.0	65	180	60	130	-	200	
	allow. F	16.1	35.9	14.1	30.2	-	35.9	0.9	3.0	0.9	-	5.0							
M20	F <sub>Rd</sub>	35.2	78.4	30.9	-	66.0	78.4	1.96	6.58	1.96	1.96	10.5	130	360	120	-	250	400	
	allow. F	25.1	56.0	22.1	-	47.1	56.0	1.4	4.7	1.4	1.4	7.5							
M24	F <sub>Rd</sub>	50.7	-	-	-	-	-	2.8	9.5	-	-	-	230	-	-	-	-	-	
	allow. F	36.2	-	-	-	-	-	2.0	6.8	-	-	-							

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

② Load capability due to friction

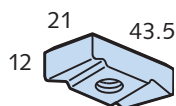
③ acc. to expert report,  $\nu = 3$

# HALFEN FRAMING SYSTEMS

## HALFEN Bolts and Accessories – Heavy Duty Framing System

### Locking plates GWP 50/30

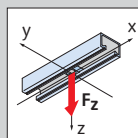
Locking plate  
GWP 50/30



#### GWP 50/30 available bolts

FV	GV	A4
-	M8	M8
M10	M10	M10
M12	M12	M12
M16	M16	M16

#### Load capacities for locking plates 50/30

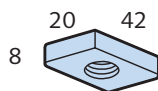


50/30

Thread	Load capacity [kN]	
M8	$F_{Rd}$	5.6
	allow. F	4.0
M10	$F_{Rd}$	9.0
	allow. F	6.4
M12	$F_{Rd}$	13.0
	allow. F	9.3
M16	$F_{Rd}$	13.0
	allow. F	9.3

### Locking plates GWP 50/40

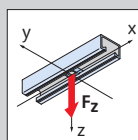
Locking plate  
GWP 50/40



#### GWP 50/40 available bolts

GV	A4
M6	M6
M8	M8
M10	M10
M12	M12
M16	M16

#### Load capacities for locking plates 50/40



50/40

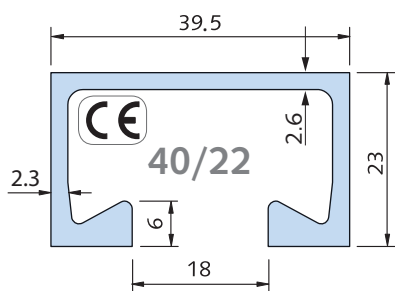
Thread	Load capacity [kN]	
M6	$F_{Rd}$	3.1
	allow. F	2.2
M8	$F_{Rd}$	5.6
	allow. F	4.0
M10	$F_{Rd}$	9.0
	allow. F	6.4
M12	$F_{Rd}$	9.0
	allow. F	6.4
M16	$F_{Rd}$	9.0
	allow. F	6.4

# HALFEN FRAMING SYSTEMS

## Framing Channels – Heavy Duty Framing System

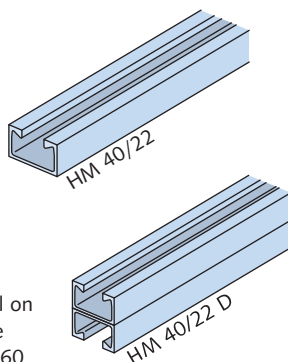
### Framing channel HM 40/22, HM 40/25

#### HM 40/22 hot-rolled

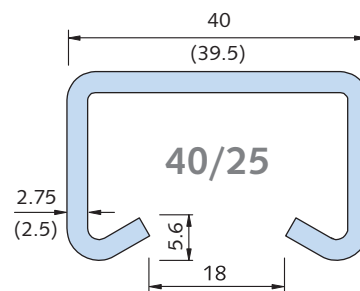


M1:1  
[mm]

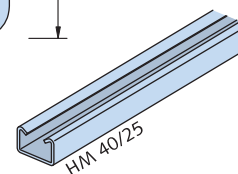
Double channel on request - profile data, see page 60

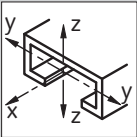
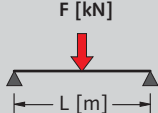


#### HM 40/25 cold-rolled



Values in brackets for stainless steel A2 and A4



Dimensions and cross-section 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	Order no.					$I_y$	$I_z$	$W_y$	$W_z$	$F_z$ ①	$e_w$		
HM 40/22	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]	0.5 m	1.0 m	1.5 m
WB	210-00002	6070	2.12	2.70	1.98	5.77	1.59	2.92	$F_{z,Rd}$	15.0	$F_{Rd}$		
FV	210-00003								11.4		3.7	1.9	0.8
A4	210-00001								allow. $F_z$		allow. F		
									8.2		2.6	1.3	0.6
HM 40/25	0280.												
WB	230-00001	6070	2.09	2.66	2.05	6.09	1.39	3.05	$F_{z,Rd}$	33.0	$F_{Rd}$		
FV	230-00002								5.3		3.6	1.8	0.9
A2	230-00003								allow. $F_z$		allow. F		
A4	230-00004								3.8		2.6	1.3	0.6

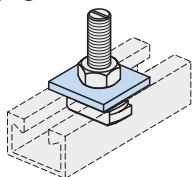
①  $F_z$  = max. load bearing capacity for the channel lips - see also page 66

① F<sub>z</sub> = max. load bearing capacity for the channel lips - see also page 66

### Accessories

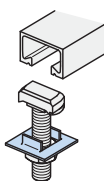
#### VUS 40/25

Washer  
→ see page 56



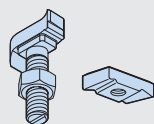
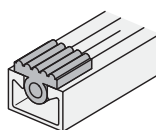
#### SIC 40/22

Locking washer  
→ see page 56



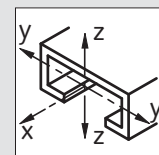
#### SDM - 36/6

Rubber vibration absorber  
→ see catalogue MT-FFC

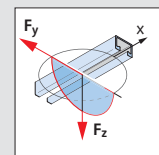


Suitable HALFEN Bolts and locking plates  
HS 40/22, HSR 40/22 and  
GWP 40/22 → see page 25

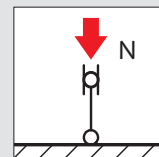
### Further design properties



Cross section data  
pages 60, 62



Point-load capacities  
pages 66 - 67



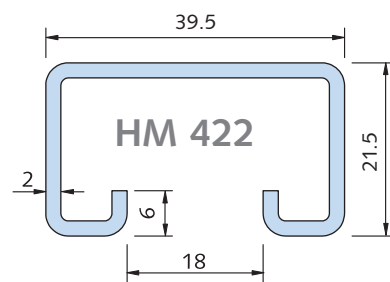
Flexural buckling  
pages 70 - 71

# HALFEN FRAMING SYSTEMS

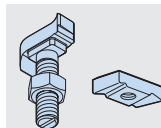
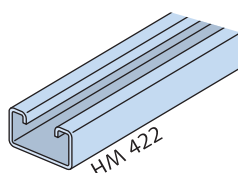
## Framing Channels – Heavy Duty Framing System

### Framing channel HM 422

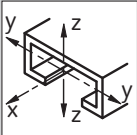
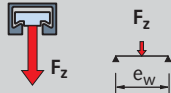
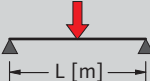
#### HM 422 (C40) cold-rolled



M1:1  
[mm]



Suitable HALFEN Bolts and locking plates  
HS 40/22 and GWP 40/22  
→ see page 25

Dimensions and cross-section 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	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	≤ e <sub>w</sub>			
HM 422	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]	0.5 m	1.0 m	1.5 m
WB	110-00001	6000	1.55	1.98	1.27	4.29	1.04	2.17	F <sub>z,Rd</sub>	36.0	F <sub>Rd</sub>		
	3.5								2.5		1.2	0.5	
allow. F <sub>z</sub>	allow. F												
FV	110-00002								2.5		1.8	0.9	0.4

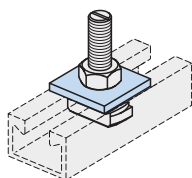
① F<sub>z</sub> = max. load bearing capacity of the channel lips

① F<sub>z</sub> = max. load bearing capacity of the channel lips

### Accessories

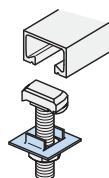
#### VUS 40/25

Washer  
→ see page 56



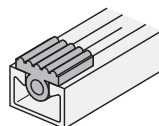
#### SIC 40/22

Locking washer  
→ see page 56

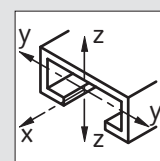


#### SDM - 36/6

Rubber vibration absorber  
→ see catalogue MT-FFC



### Further design properties

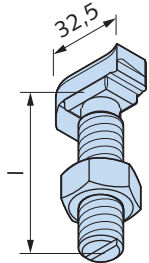


Cross section data  
page 62

# HALFEN FRAMING SYSTEMS

## HALFEN Bolts and Accessories – Heavy Duty Framing System

### HALFEN Bolts HS 40/22 and HSR 40/22

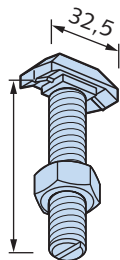


**HS 40/22**  
HALFEN Bolt  
incl. nut

Li = left-hand thread

### HSR 40/22

HALFEN Bolt with nib,  
incl. nut, for hot-rolled  
profiles in mild steel  
WB/FV



#### HS 40/20 available bolts

Length l [mm]	M10	M12	M16	Length l [mm]	M10	M12	M16
20	GVs 4.6	GVs 4.6		60	GVs 4.6	GVs 4.6 GVs 8.8	GVs 4.6 GVs 8.8 FV 4.6 A4-50
30	GVs 4.6 A4-70	GVs 4.6 GVs 8.8 FV 4.6 A4-50	GVs 4.6 A4-50	80	GVs 4.6	GVs 4.6 GVs 8.8 A4-50	GVs 4.6 GVs 8.8 A4-50
40	GVs 4.6 A4-70	GVs 4.6 GVs 8.8 A4-50 A4-70	GVs 4.6 A4-50 A4-70	80 Li	-	A4-50	A4-50
45		GVs 8.8		100	GVs 4.6	GVs 4.6 GVs 8.8 A4-50	GVs 4.6 FV 4.6 A4-50
50	GVs 4.6 A4-70	GVs 4.6 FV 4.6 A4-50	GVs 4.6 FV 4.6 A4-50 A4-70	125	-	GVs 4.6	GVs 4.6
				150	-	GVs 4.6 A4-50	GVs 4.6 A4-50
				200	-	GVs 4.6	GVs 4.6
				250	-	-	GVs 4.6
				300	-	-	GVs 4.6

#### HSR 40/22 available bolts

Length l [mm]	M10	M12	M16
40	-	-	GVs 8.8
60	-	-	GVs 8.8

### Load bearing capacities for HALFEN Bolts ①

Thread Ø	Load capacities for HALFEN Bolts						Recommended load capacity per HALFEN Bolt in channel longitudinal direction ②					Recommended torque				
	F [kN]						F <sub>x</sub> [kN]					T <sub>inst</sub> [Nm]				
40/22	HS						HS					HS				
		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	F <sub>Rd</sub>	8.3	-	-	15.6	-	-	-	-	0.42	-	15	-	-	30	-
	allow. F	5.9	-	-	11.2	-	0.3	-	-	0.3	-					
M12	F <sub>Rd</sub>	12.1	27.0	10.6	-	-			0.7	-	-	25	70	25	-	70
	allow. F	8.6	19.3	7.6	-	-	0.5	1.6	0.5	-	-					
M16	F <sub>Rd</sub>	22.6	50.2	19.8	42.2	50.2			1.26	1.26	7.0	65	180	60	130	200
	allow. F	16.1	35.9	14.1	30.2	39.9	0.9	3.0	0.9	0.9	5.0					

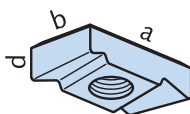
① Note: do not exceed the channel load bearing capacity

② Load capability due to friction

③ acc. to expert report, v = 3

### Locking plates GWP 40/22

Locking plate  
GWP 40/22



#### GWP 40/22 available plates

GV	A4	a [mm]	b [mm]	d [mm]
M5	-			
M6	-			
M8	M8	35	17	10
M10	M10			
M12	M12			11.5

#### Load capacities for GWP 40/22

Thread	Load capacity [kN]	
	F <sub>Rd</sub>	allow. F
M5	3.1	2.2
M6	3.1	2.2
M8	5.6	4.0
M10	9.0	6.4
M12	13.0	9.3



# HALFEN FRAMING SYSTEMS

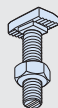
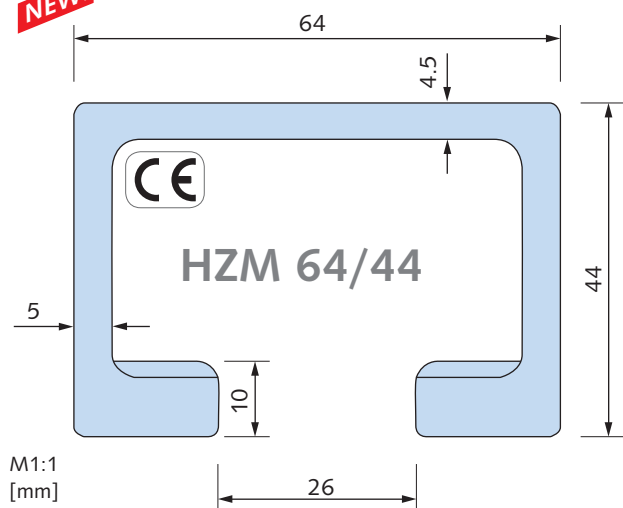
## Framing Channels – Heavy Duty Framing System

### Framing channel HZM 64/44

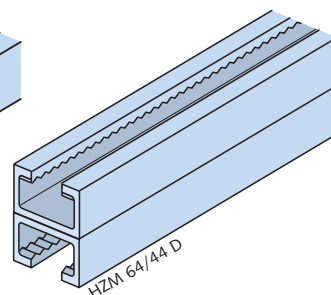
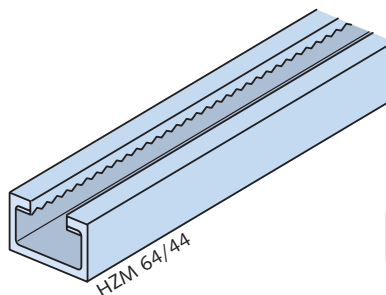
HZM 64/44 hot-rolled, serrated



**NEW!**



Suitable HALFEN Bolts  
HZS 64/44 → see page 27



Double channel on request  
- profile data, see page 60

Dimensions and cross-section properties									Load capacities				
Material	Order no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
		[mm]	G [kg/m]	A [cm <sup>2</sup> ]	I <sub>y</sub> [cm <sup>4</sup> ]	I <sub>z</sub> [cm <sup>4</sup> ]	W <sub>y</sub> [cm <sup>3</sup> ]	W <sub>z</sub> [cm <sup>3</sup> ]	F <sub>z</sub> ① [kN]	≤ e <sub>w</sub> [cm]	F [kN]		
HZM 64/44	0284.										0.5 m	1.0 m	1.5 m
WB	080-00002	6070	7.15	9.1	23.83	53.94	10.36	16.85	F <sub>z,Rd</sub>	25.0	F <sub>Rd</sub>		
FV	080-00003								53.3		34.8	17.4	10.0
A4	080-00001								allow. F <sub>z</sub>		allow. F		
									38.1		24.8	12.4	7.1

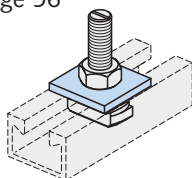
① F<sub>z</sub> = max. load bearing capacity of the channel lips - see also page 66

### Accessories

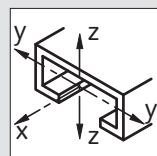
VUS 72/48

Washer

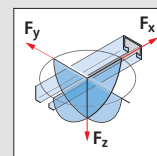
→ see page 56



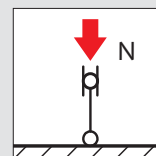
### Further design properties



Cross section data  
page 60



Point-load capacities  
pages 66 - 67

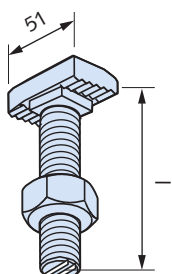


Flexural buckling  
page 70

# HALFEN FRAMING SYSTEMS

## HALFEN Bolts – Heavy Duty Framing System

### HALFEN Bolts HZS 64/44



**HZS 64/44**  
HALFEN Bolt,  
serrated  
incl. nut

HZS 64/44 available bolts		
Length l [mm]	M20	M24
80	GVs 8.8 A4-70	GVs 8.8 A4-70
125	GVs 8.8 A4-70	-
150	-	GVs 8.8 A4-70

### Load bearing capacities for HALFEN Bolts ①

Thread Ø	Load capacities for HALFEN Bolts		Max. load capacity per HALFEN Bolt in channel longitudinal direction		Recommended torque	
	F [kN] ①		F <sub>x</sub> [kN] ①		T <sub>inst</sub> [Nm]	
64/44		HZS		HZS		HZS
		8.8		8.8		8.8
		A4-70		A4-70		A4-70
M20	F <sub>Rd</sub>	79.0		37.8	350	350
	allow. F	56.4		27.0		
M24	F <sub>Rd</sub>	113.7		37.8	450	450
	allow. F	81.2		27.0		

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

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



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

resp.

$$\sqrt{F_{x,Ed}^2 + F_{y,Ed}^2 + F_{z,Ed}^2} \leq F_{Rd}$$

F<sub>x</sub>, F<sub>y</sub>, F<sub>z</sub> = existing loads

allow. F = allowable load bearing capacity of the bolt

resp.

F<sub>x,Ed</sub>, F<sub>y,Ed</sub>, F<sub>z,Ed</sub> = design values of action

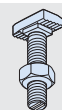
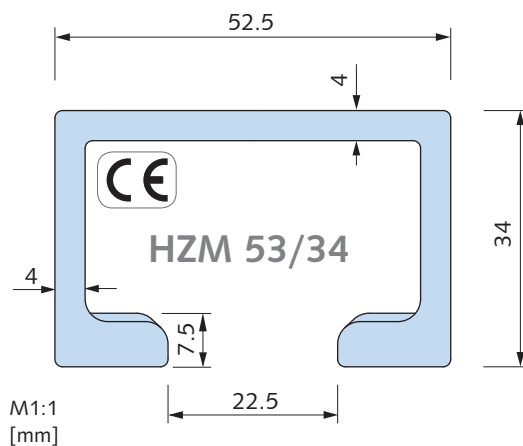
F<sub>Rd</sub> = design value of resistance

# HALFEN FRAMING SYSTEMS

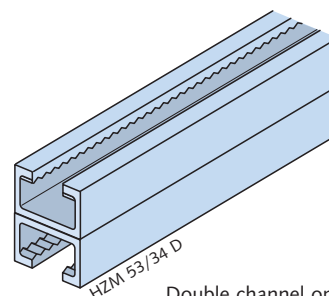
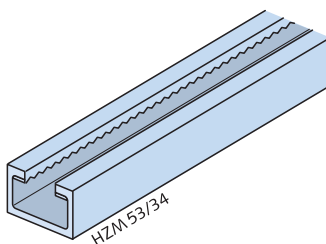
## Framing Channels – Heavy Duty Framing System

### Framing channel HZM 53/34

HZM 53/34 hot-rolled, serrated



Suitable HALFEN Bolts HZS 53/34  
→ see page 29



Double channel on request  
- profile data, see page 60

#### Dimensions and cross-section properties

		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
Material	Order no.		G	A	$I_y$	$I_z$	$W_y$	$W_z$	$F_z$ ①	$\leq e_w$	F [kN]		
HZM 53/34	0284.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]	0.5 m	1.0 m	1.5 m
WB	070-00002	6070	4.63	5.88	9.19	23.18	4.95	8.83	$F_{z,Rd}$	20.0	$F_{Rd}$		
FV	070-00003								43.3		17.3	8.6	3.8
A4	070-00001								allow. $F_z$		allow. F		
									30.9		12.4	6.2	2.7

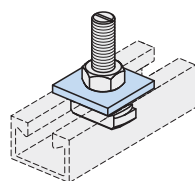
①  $F_z$  = max. load bearing capacity of the channel lips - see also page 66

#### Accessories

VUS 52/34

Washer

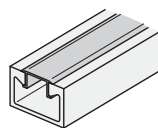
→ see page 56



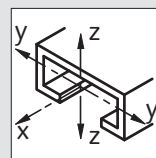
PA - 22

Channel cover

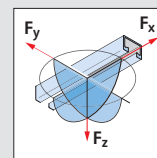
→ see page 58



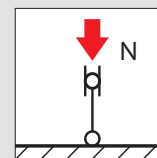
#### Further design properties



Cross section data  
page 60



Point-load capacities  
pages 66 - 67

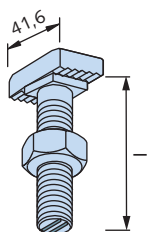


Flexural buckling  
page 70

# HALFEN FRAMING SYSTEMS

## HALFEN Bolts – Heavy Duty Framing System

### HALFEN Bolts HZS 53/34

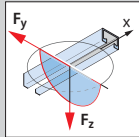
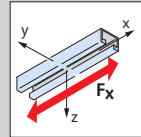
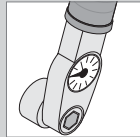


**HZS 53/34**  
HALFEN Bolt,  
serrated  
incl. nut

#### HZS 53/34 available bolts

Length l [mm]	M16	M20
60	GVs 8.8 A4-70	-
65	-	GVs 8.8 A4-70
100	GVs 8.8 A4-70	GVs 8.8 A4-70

#### Load bearing capacities for HALFEN Bolts ①

Thread Ø	Load capacities for HALFEN Bolts		Max. load capacity per bolt in channel longitudinal direction		Recommended torque	
						
	F [kN] ①		F <sub>x</sub> [kN] ①		T <sub>inst</sub> [Nm]	
53/34		HZS		HZS		HZS
		8.8	8.8	A4-70	8.8	A4-70
M16	F <sub>Rd</sub>	50.5	30.8	26.6	200	200
	allow. F	36.1	22.0	19.0		
M20	F <sub>Rd</sub>	79.0	30.8	26.6	350	350
	allow. F	56.4	22.0	19.0		

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

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



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

resp.

$$\sqrt{F_{x,Ed}^2 + F_{y,Ed}^2 + F_{z,Ed}^2} \leq F_{Rd}$$

F<sub>x</sub>, F<sub>y</sub>, F<sub>z</sub> = existing loads

allow. F = allowable load bearing capacity of the bolt

resp.

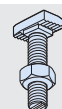
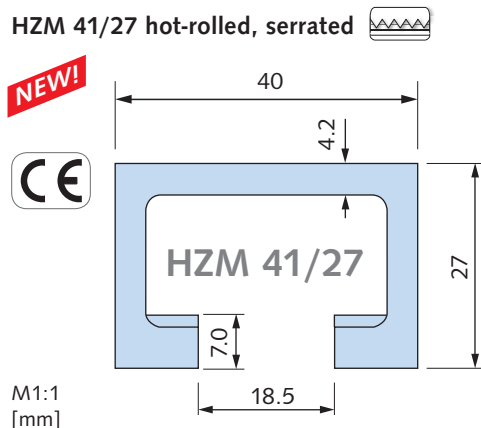
F<sub>x,Ed</sub>, F<sub>y,Ed</sub>, F<sub>z,Ed</sub> = design values of action

F<sub>Rd</sub> = design value of resistance

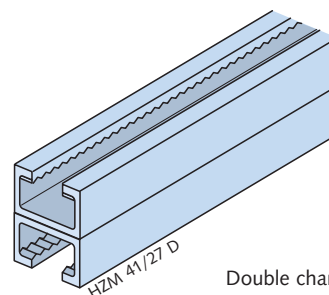
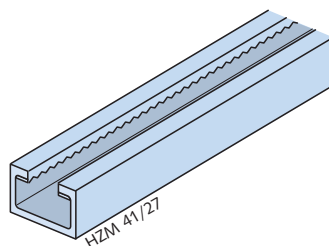
# HALFEN FRAMING SYSTEMS

## Framing Channels – Heavy Duty Framing System

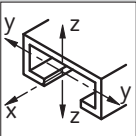

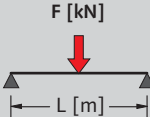
### Framing channel HZM 41/27



Suitable HALFEN Bolts HZS 38/23  
→ see page 32



Double channel on request  
- profile data, see page 60

Dimensions and cross-section 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	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	≤ e <sub>w</sub>			
HZM 41/27	0284.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	F <sub>z</sub> ①	≤ e <sub>w</sub>	0.5 m	1.0 m	1.5 m
WB	090-00002	6070	3.38	4.31	3.90	9.49	2.57	4.75	F <sub>z,Rd</sub>	20.0	F <sub>Rd</sub>		
	25.0								9.5		3.7	1.6	
FV	090-00001								allow. F <sub>z</sub>		allow. F		
									17.8		6.8	2.6	1.2

① F<sub>z</sub> = max. load bearing capacity of the channel lips - see also page 66

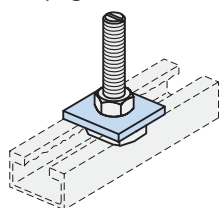
① F<sub>z</sub> = max. load bearing capacity of the channel lips - see also page 66

### Accessories

#### VUS 40/25

Washer

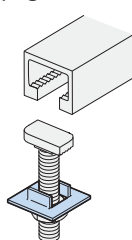
→ see page 56



#### SIC 38/23

Locking washer

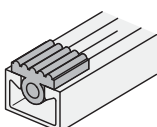
→ see page 56



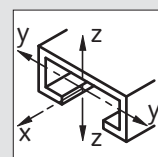
#### SDM - 36/6

Rubber vibration absorber

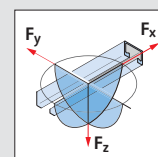
→ see catalogue MT-FFC



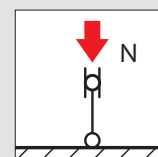
### Further design properties



Cross section data  
page 60



Point-load capacities  
pages 66 - 67



Flexural buckling  
page 70

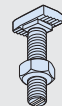


# HALFEN FRAMING SYSTEMS

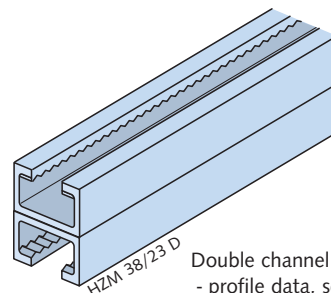
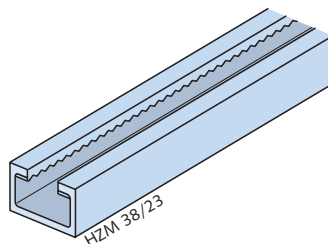
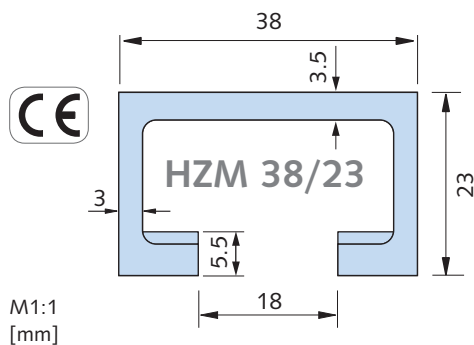
## Framing Channels – Heavy Duty Framing System

### Framing channel HZM 38/23




HZM 38/23 hot-rolled, serrated



Suitable HALFEN Bolts HZS 38/23 and HS 38/17 → see page 32



Double channel on request  
- profile data, see page 60

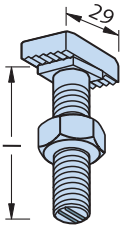
Dimensions and cross-section properties								Load capacities					
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
Material	Order no.				$I_y$	$I_z$	$W_y$	$W_z$	$F_z$ ①	$\leq e_w$	0.5 m	1.0 m	1.5 m
HZM 38/23	0284.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]					
WB	060-00001	6070	2.43	3.09	2.11	6.17	1.59	3.25	$F_{z,Rd}$	20	$F_{Rd}$		
FV	060-00003								18.0		5.9	2.0	0.9
A4	060-00002								allow. $F_z$		allow. $F$		
									12.8		4.2	1.4	0.6

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

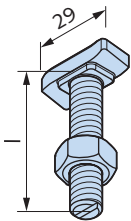
# HALFEN FRAMING SYSTEMS

## HALFEN Bolts – Heavy Duty Framing System

### HALFEN Bolts HZS 38/23 and HS 38/17



**HZS 38/23**  
HALFEN Bolt  
serrated incl. nut



**HS 38/17**  
HALFEN Bolt  
incl. nut  
  
Li = left-hand thread

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

HZS 38/23 available bolts					
Length l [mm]	M12	M16	Length l [mm]	M12	M16
30	GVs 8.8	GVs 8.8	80	GVs 8.8	GVs 8.8
40	GVs 8.8	GVs 8.8	100	GVs 8.8	GVs 8.8
50	GVs 8.8	GVs 8.8	125	GVs 8.8	GVs 8.8
60	GVs 8.8	GVs 8.8	150	GVs 8.8	GVs 8.8
		FV 8.8	200	-	GVs 8.8
		A4-70	300	-	GVs 8.8

HS 38/17 available bolts							
Length l [mm]	M10	M12	M16	Length l [mm]	M10	M12	M16
20	GVs 4.6	GVs 4.6	GVs 4.6 ①	60	GVs 4.6	GVs 4.6	GVs 4.6
25	-	A4-70	A4-50 ①		A4-70	GVs 8.8	GVs 8.8
30	GVs 4.6	GVs 4.6	GVs 4.6	70	-	FV 8.8	FV 8.8
	FV 4.6	FV 4.6	FV 4.6				A4-50
40	A4-70	A2-70	A2-50 ①	80	GVs 4.6	GVs 4.6	GVs 4.6
		A4-70	A4-50			A4-70	A4-50
50	GVs 4.6	GVs 4.6	GVs 4.6	80 Li	-		A4-50
	A4-70		FV 4.6		GVs 4.6	GVs 4.6	GVs 4.6
50	A4-70	A2-70	A4-50	100	-	GVs 4.6	FV 4.6
						A4-50	A4-50
				125		GVs 4.6	GVs 4.6
				150		GVs 4.6	GVs 4.6
				200		GVs 4.6	GVs 4.6

① on request

### Load bearing capacities for HALFEN Bolts ①

		Load capacities for HALFEN Bolts				Max. load capacity per bolt in channel longitudinal direction		Recommended torque			
Thread Ø		F [kN] ①				F <sub>x</sub> [kN] ①		T <sub>inst</sub> [Nm]			
38/23		HZS				HZS		HZS			
		8.8				For all strength classes		8.8			
M12		A4-70						A4-70			
		F <sub>Rd</sub>	27.2	-	-			80	-	-	-
		allow. F	19.4	-	-						
M16		F <sub>Rd</sub>	50.5	33.0	16.8			120	120		
		allow. F	36.1	23.6	12.0						
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		F <sub>Rd</sub>	8.3	18.6	7.3	HALFEN Bolts HS are not suited for longitudinal loads!		15	40	15	30
		allow. F	5.9	13.3	5.2						
M12		F <sub>Rd</sub>	12.1	27.0	10.6			25	70	25	50
		allow. F	8.6	19.3	7.6						
M16		F <sub>Rd</sub>	22.6	50.2	19.8			65	180	60	130
		allow. F	16.1	35.9	14.1						

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

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



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

resp.

$$\sqrt{F_{x,Ed}^2 + F_{y,Ed}^2 + F_{z,Ed}^2} \leq F_{Rd}$$

F<sub>x</sub>, F<sub>y</sub>, F<sub>z</sub> = existing loads  
allow. F = allowable load bearing capacity of the bolt

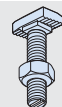
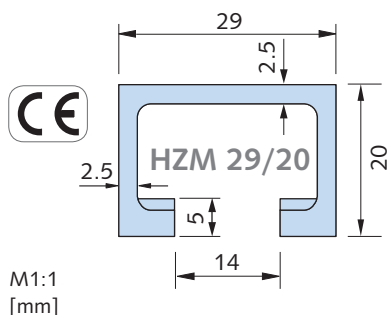
resp.  
F<sub>x,Ed</sub>, F<sub>y,Ed</sub>, F<sub>z,Ed</sub> = design values of action  
F<sub>Rd</sub> = design value of resistance

# HALFEN FRAMING SYSTEMS

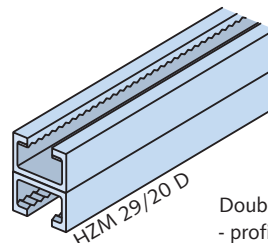
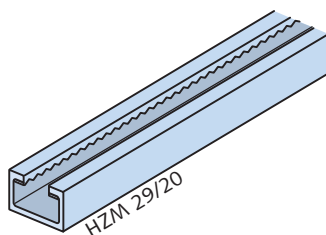
## Framing Channels – Heavy Duty Framing System

### Framing channel HZM 29/20

HZM 29/20 hot-rolled, serrated 



Suitable HALFEN Bolt HZS 29/20 and HS 28/15 → see page 34



Double channel on request  
- profile data, see page 60

Dimensions and cross-section properties									Load capacities				
Material	Order no.	Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
		[mm]	G [kg/m]	A [cm <sup>2</sup> ]	I <sub>y</sub> [cm <sup>4</sup> ]	I <sub>z</sub> [cm <sup>4</sup> ]	W <sub>y</sub> [cm <sup>3</sup> ]	W <sub>z</sub> [cm <sup>3</sup> ]	F <sub>z</sub> ① [kN]	≤ e <sub>w</sub> [cm]	F [kN]		
HZM 29/20	0284.										0.5 m	1.0 m	1.5 m
WB	050-00001	6070	1.55	1.98	1.02	2.42	0.91	1.67	F <sub>z,Rd</sub>	15.0	F <sub>Rd</sub>		
FV	050-00003								10.9		3.3	1.0	0.4
									allow. F <sub>z</sub>		allow. F		
									7.8		2.4	0.7	0.3

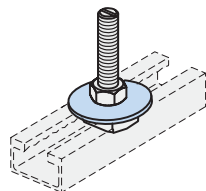
① F<sub>z</sub> = max. load bearing capacity of the channel lips - see also page 66

### Accessories

US DIN 9021

Washer

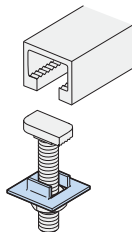
→ see page 56



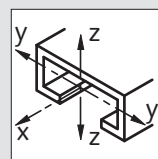
SIC 29/20

Locking washer

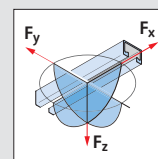
→ see page 56



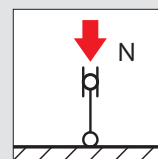
### Further design properties



Cross section data  
page 60



Point-load capacities  
pages 66 - 67

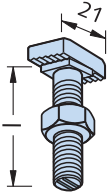


Flexural buckling  
page 70

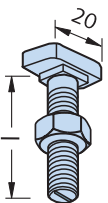
# HALFEN FRAMING SYSTEMS

## HALFEN Bolts – Heavy Duty Framing System

### HALFEN Bolts HZS 29/20 and HS 28/15



**HZS 29/20**  
HALFEN Bolt  
serrated incl. nut



**HS 28/15**  
HALFEN Bolt incl.  
nut

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

#### HZS 29/20 available bolts

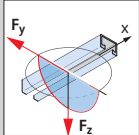
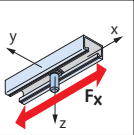
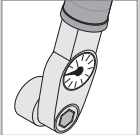
Length l [mm]	M12	Length l [mm]	M12
30	GVs 8.8	125	GVs 8.8
40	GVs 8.8	150	GVs 8.8
50	GVs 8.8	200	GVs 8.8
60	GVs 8.8	250	GVs 8.8
80	GVs 8.8	300	GVs 8.8
100	GVs 8.8		

#### HS 28/15 available bolts

Length l [mm]	M6	M8	M10	M12	Length l [mm]	M6	M8	M10	M12
15	GVs 4.6	GVs 4.6	GVs 4.6		50		GVs 4.6	GVs 4.6	GVs 4.6
20	GVs 4.6	GVs 4.6	GVs 4.6					FV 4.6	
		A2-70	A2-70					A2-70	
		A2-70	A4-70					A4-70	
25	GVs 4.6	GVs 4.6	GVs 4.6		60		GVs 4.6	GVs 4.6	
		A2-70	A2-70					GVs 8.8	
		A4-70	A4-70					A4-70	
30	GVs 4.6	GVs 4.6	GVs 4.6	GVs 4.6	80		GVs 4.6	GVs 4.6	GVs 4.6
		A2-70	FV 4.6					A4-70	
		A4-70	A2-70		100		GVs 4.6	GVs 4.6	
		A4-70	A4-70					A4-50	
35				GVs 4.6	125			GVs 4.6	
								A4-50	
40	GVs 4.6	GVs 4.6	GVs 4.6		150		GVs 4.6	GVs 4.6	
			FV 8.8					A4-50	
			A2-70		200			GVs 4.6	
			A4-70					A4-50	

① on request

#### Load bearing capacities for HALFEN Bolts ①

		Load capacities for HALFEN Bolts				Max. load capacity per bolt in channel longitudinal direction		Recommended torque			
Thread Ø		 F [kN] ①				 Fx [kN] ①		 Tinst [Nm]			
29/20		HZS				HZS		HZS			
		8.8				8.8		8.8			
M12	FRd	27.2				11.2		80			
	allow. F	19.4				8.0					
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	FRd	2.9	-	-	-	HALFEN Bolts HS are not suited for longitudinal loads!		3	-	3	-
	allow. F	2.2	-	-	-			8	20	8	15
M8	FRd	5.3	11.7	-	-			15	40	15	30
	allow. F	4.0	8.3	-	5.5						
M10	FRd	8.3	18.6	7.3	15.6			25	70	25	50
	allow. F	6.4	13.3	5.2	11.2						
M12	FRd	12.1	-	-	-						
	allow. F	9.3	-	-	-						

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

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



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

resp.

$$\sqrt{F_{x,Ed}^2 + F_{y,Ed}^2 + F_{z,Ed}^2} \leq F_{Rd}$$

F<sub>x</sub>, F<sub>y</sub>, F<sub>z</sub> = existing loads

allow. F = allowable load bearing capacity of the bolt

resp.

F<sub>x,Ed</sub>, F<sub>y,Ed</sub>, F<sub>z,Ed</sub> = design values of action

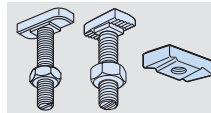
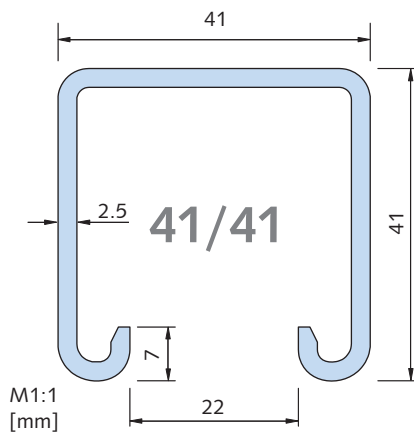
F<sub>Rd</sub> = design value of resistance

# HALFEN FRAMING SYSTEMS

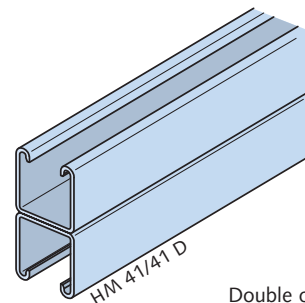
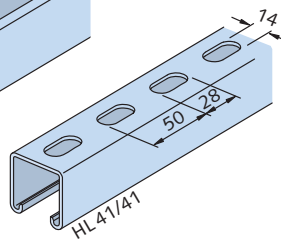
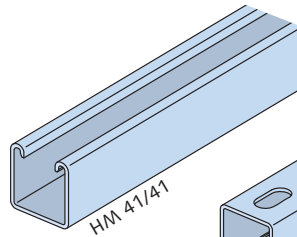
## Framing Channels – Medium Duty Framing System

### Framing channels HM 41/41 and HL 41/41

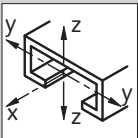
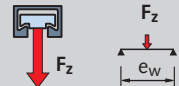
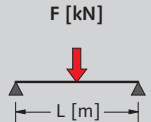
HM 41/41 resp. HL 41/41 cold-rolled



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



Double channel on request

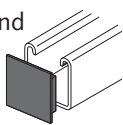
Dimensions and cross-section properties									Load capacities				
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
													
Material	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	≤ e <sub>w</sub>			
HM 41/41	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]	0.5 m	1.0 m	1.5 m
WB	080-00001	6000	2.67	3.4	7.47	9.44	3.24	4.57	F <sub>z,Rd</sub>	49.0	F <sub>Rd</sub>		
SV	080-00002								7.8		3.9	2.6	
FV	080-00003								allow. F				
A4	080-00004								5.6		2.8	1.9	
HL 41/41	0281.										0.5 m	1.0 m	1.5 m
WB	010-00001	6000	2.46	2.98	6.07	9.16	2.84	4.43	F <sub>z,Rd</sub>	42.0	F <sub>Rd</sub>		
SV	010-00003								7.8		3.2	2.2	
FV	010-00002								allow. F				
A4	010-00004								5.6		4.7	2.3	1.6
HM 41/41 D	0280.										1.0 m	1.5 m	2.0 m
WB	150-00001	6000	5.34	6.81	37.60	18.88	9.10	9.14	F <sub>z,Rd</sub>	132.0	F <sub>Rd</sub>		
FV	150-00003								7.8		10.6	7.1	5.3
A4	150-00002								allow. F				
									5.6		7.6	5.1	3.8

① F<sub>z</sub> = max. load bearing capacity of the channel lips

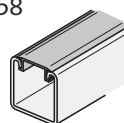
① F<sub>z</sub> = max. load bearing capacity of the channel lips

### Accessories

HPE 41/41 Channel end cap → see page 58

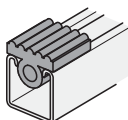


PA - 41 Channel cover → see page 58

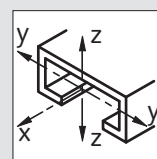


SDM - 41/8

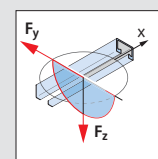
Rubber vibration absorber → see catalogue MT-FFC



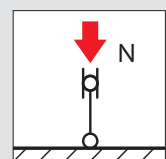
### Further design properties



Cross section data  
pages 62, 64



Point-load capacities  
page 68



Flexural buckling  
page 71

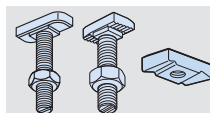
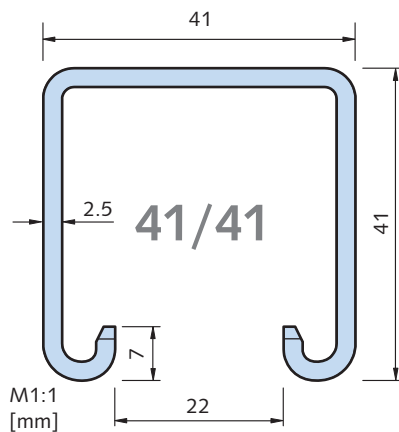


# HALFEN FRAMING SYSTEMS

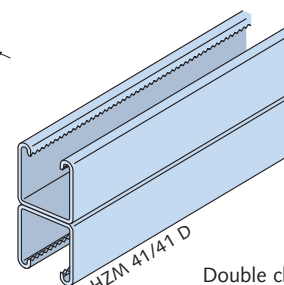
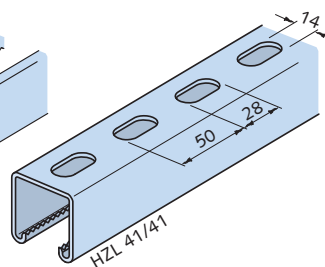
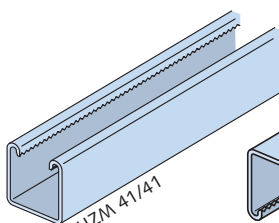
## Framing Channels – Medium Duty Framing System

### Framing channel HZM 41/41 and HZL 41/41

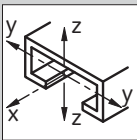
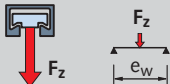
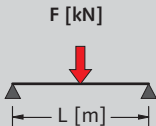
HZM resp. HZL 41/41 cold-rolled, serrated



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



Double channel on request

Dimensions and cross-section properties									Load capacities				
		Length [mm]	Weight G [kg/m]	Cross section area A [cm <sup>2</sup> ]	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
Material	Order no.				I <sub>y</sub> [cm <sup>4</sup> ]	I <sub>z</sub> [cm <sup>4</sup> ]	W <sub>y</sub> [cm <sup>3</sup> ]	W <sub>z</sub> [cm <sup>3</sup> ]					
HZM 41/41	0284.								F <sub>z</sub> ① [kN]	≤ e <sub>w</sub> [cm]	0.5 m	1.0 m	1.5 m
WB	010-00001	6000	2.63	3.35	7.34	9.37	3.15	4.54	F <sub>z,Rd</sub>	47.0	F <sub>Rd</sub>		
FV	010-00002								7.8		7.7	3.8	2.6
A4	010-00003								allow. F <sub>z</sub>		allow. F		
									5.6		5.5	2.7	1.8
HZL 41/41	0283.										0.5 m	1.0 m	1.5 m
WB	010-00001	6000	2.46	2.90	5.87	9.04	2.69	4.38	F <sub>z,Rd</sub>	41.0	F <sub>Rd</sub>		
FV	010-00002								7.8		6.3	3.2	2.1
A4	010-00003								allow. F <sub>z</sub>		allow. F		
									5.6		4.5	2.3	1.5
HZM 41/41 D	0284.										1.0 m	1.5 m	2.0 m
WB	030-00001	6000	5.27	6.7	36.45	18.73	8.83	9.07	F <sub>z,Rd</sub>	126.0	F <sub>Rd</sub>		
FV	030-00002								7.8		10.3	6.9	5.2
A4	030-00003								allow. F <sub>z</sub>		allow. F		
									5.6		7.4	4.9	3.7

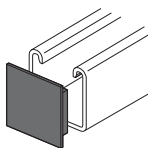
① F<sub>z</sub> = max. load bearing capacity of the channel lips

① F<sub>z</sub> = max. load bearing capacity of the channel lips

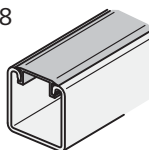
### Accessories

#### HPE 41/41

Channel end cap  
→ see page 58

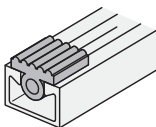


PA - 41 Channel cover  
→ see page 58

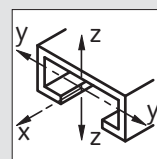


#### SDM - 41/8

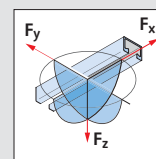
Rubber vibration absorber  
→ see catalogue MT-FFC



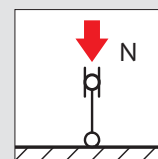
### Further design properties



Cross section data  
pages 62, 64



Point-load capacities  
page 68



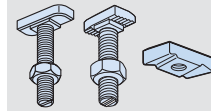
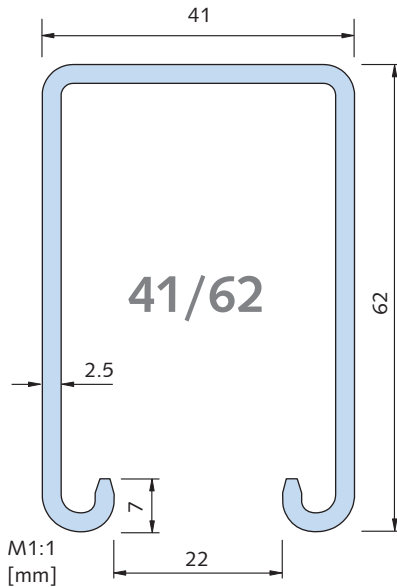
Flexural buckling  
page 71

# HALFEN FRAMING SYSTEMS

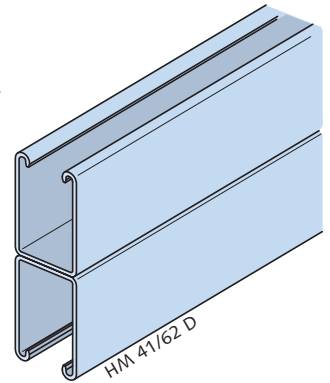
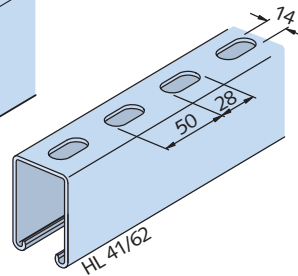
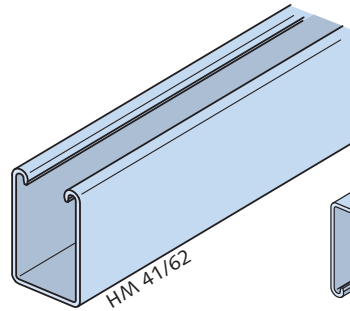
## Framing Channels – Medium Duty Framing System

### Framing channel HM 41/62 and HL 41/62

HM resp. HL 41/62 cold-rolled



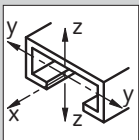
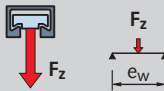
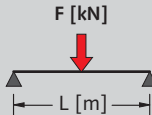
Suitable HALFEN Bolts HS 41/41, HZS 41/41, HZS 41/22 and locking plates → see pages 43 - 44



Double channel on request



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

Dimensions and cross-section 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	Order no.				$I_y$	$I_z$	$W_y$	W					
HM 41/62	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	$F_z$ ①	$\leq e_w$	1.0 m	2.0 m	3.0 m
WB	140-00002	6000	3.48	4.44	20.96	13.34	6.21	6.46	$F_{z,Rd}$	92.0	$F_{Rd}$		
									7.8		7.4	3.7	2.2
FV	140-00003								allow. $F_z$		allow. F		
									5.6		5.3	2.6	1.6
HL 41/62	0281.										1.0 m	2.0 m	3.0 m
WB	040-00001	6000	3.14	3.99	17.27	13.03	5.47	6.31	$F_{z,Rd}$	81.0	$F_{Rd}$		
SV	040-00003								7.8		6.3	3.1	1.8
FV	040-00002								allow. $F_z$		allow. F		
									5.6		4.5	2.2	1.3
HM 41/62 D	0280.										1.0 m	1.5 m	2.0 m
WB	170-00001	6000	6.97	8.88	112.88	26.68	18.21	12.92	$F_{z,Rd}$	269.0	$F_{Rd}$		
									7.8		21.4	14.3	10.7
FV	170-00002								allow. $F_z$		allow. F		
									5.6		15.3	10.2	7.7

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

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.

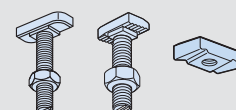
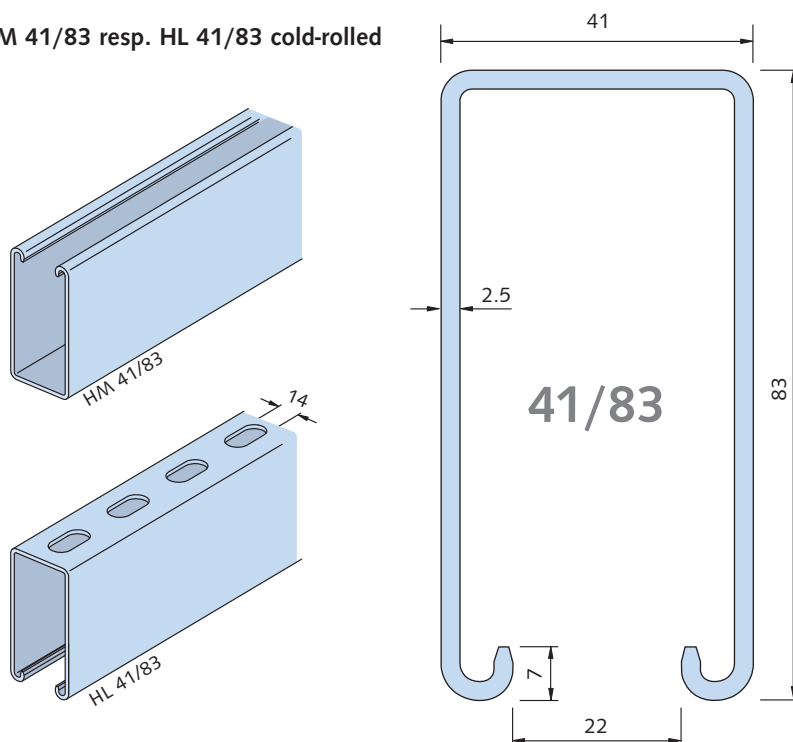
**Further design properties:** Cross section data → pages 62, 64

# HALFEN FRAMING SYSTEMS

## Framing Channels – Medium Duty Framing System

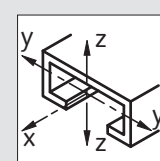
### Framing channel HM 41/83 and HL 41/83

HM 41/83 resp. HL 41/83 cold-rolled



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

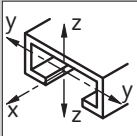


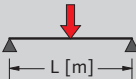
### Further design properties



Cross section data pages 62, 64



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

Dimensions and cross-section 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	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	≤ e <sub>w</sub>	1.0 m	2.0 m	3.0 m	
HM 41/83	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]				
WB	130-00002	6000	4.29	5.47	43.82	17.22	9.91	8.34	F <sub>z,Rd</sub>	148.0	F <sub>Rd</sub>			
SV	130-00001								7.8		11.7	5.9	3.9	
FV	130-00003								allow. F <sub>z</sub>		allow. F			
									5.6		8.4	4.2	2.8	
HL 41/83	0281.										1.0 m	2.0 m	3.0 m	
WB	030-00004	6000	3.93	5.02	37.07	16.93	8.85	8.20	F <sub>z,Rd</sub>	133.0	F <sub>Rd</sub>			
SV	030-00006								7.8		10.2	5.2	3.4	
FV	030-00005								allow. F <sub>z</sub>		allow. F			
									5.6		7.3	3.7	2.4	

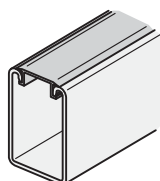
① F<sub>z</sub> = max. load bearing capacity of the channel lips

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

### Accessories

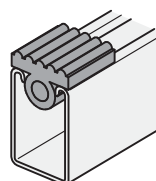
#### PA - 41

Channel cover  
→ see page 58



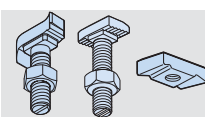
#### SDM - 41/8

Rubber vibration absorber  
→ see catalogue MT-FFC

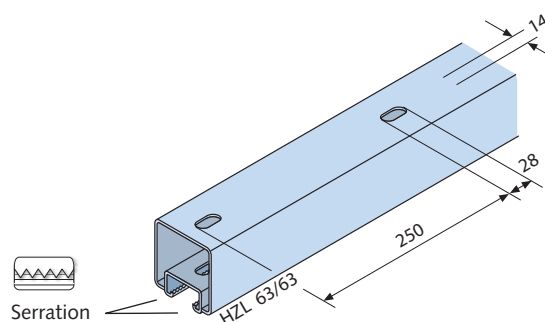


## Framing Channels – Medium Duty Framing System

HZL 63/63 cold-rolled, serrated 

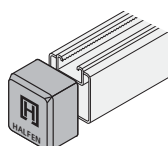


Suitable HALFEN Bolts HS 41/41,  
HZS 41/41, HZS 41/22 and locking  
plates → see pages 43 - 44

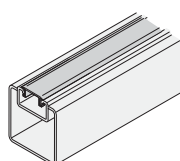


①  $F_z$  = max. load bearing capacity of the channel lips

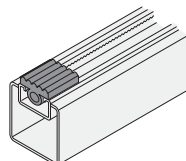
**HPE 63/63**  
Channel end cap  
→ see page 58



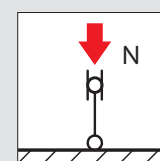
**PA - 41**  
Channel cover  
→ see page 58



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



Cross section data  
page 64



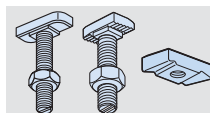
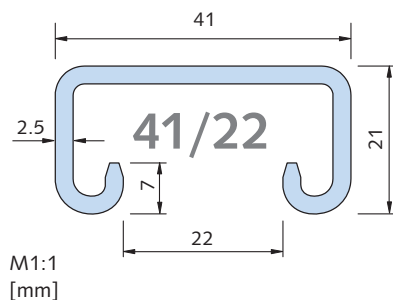
Flexural buckling  
page 71

# HALFEN FRAMING SYSTEMS

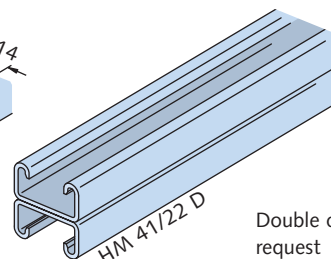
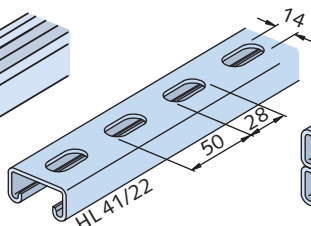
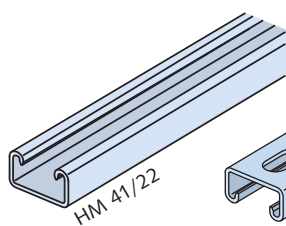
## Framing Channels – Medium Duty Framing System

### Framing channel HM 41/22 and HL 41/22

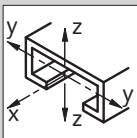
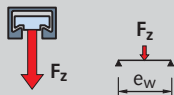
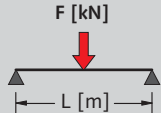
HM 41/22 resp. HL 41/22 cold-rolled



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



Double channel on request

Dimensions and cross-section 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	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	≤ e <sub>w</sub>			
HM 41/22	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]	0.5 m	1.0 m	1.5 m
WB	120-00001	6000	1.86	2.37	1.28	5.56	1.05	2.69	F <sub>z,Rd</sub>	15.0	F <sub>Rd</sub>		
SV	120-00002								7.8		2.7	1.2	0.5
FV	120-00003								allow. F <sub>z</sub>		allow. F		
A4	120-00004								5.6		1.9	0.9	0.4
HL 41/22	0281.										0.5 m	1.0 m	1.5 m
WB	020-00001	6000	1.57	1.95	0.99	5.27	0.89	2.55	F <sub>z,Rd</sub>	12.0	F <sub>Rd</sub>		
SV	020-00003								7.8		2.2	1.0	0.4
FV	020-00002								allow. F <sub>z</sub>		allow. F		
A4	020-00004								5.6		1.6	0.7	0.3
HM 41/22 D	0280.										1.0 m	1.5 m	2.0 m
WB	160-00001	6000	3.73	4.75	6.02	11.11	2.91	5.38	F <sub>z,Rd</sub>	42.0	F <sub>Rd</sub>		
FV	160-00002								7.8		3.5	2.3	1.4
A4	160-00003								allow. F <sub>z</sub>		allow. F		
									5.6		2.5	1.7	1.0

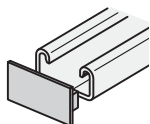
① F<sub>z</sub> = max. load bearing capacity of the channel lips

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

### Accessories

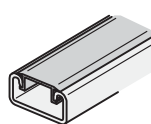
#### HPE 41/22

Channel end cap  
→ see page 58



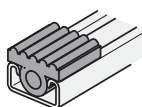
#### PA - 41

Channel cover  
→ see page 58

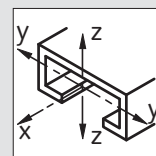


#### SDM - 41/8

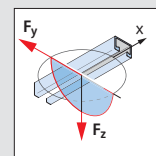
Rubber vibration absorber  
→ see catalogue MT-FFC



### Further design properties



Cross section data  
pages 62, 64

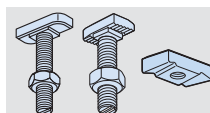


Point-load capacities  
page 68

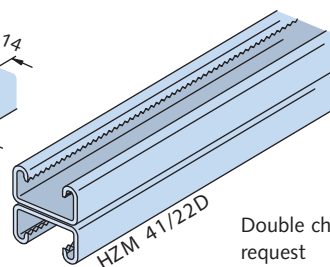
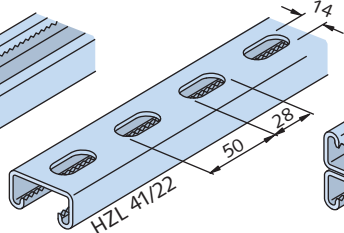
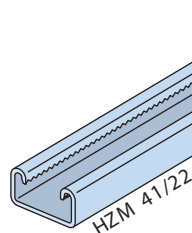
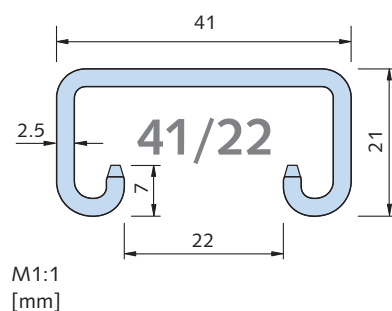


## Framing Channels – Medium Duty Framing System

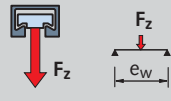
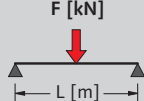
HZM resp. HZL 41/22 cold-rolled, serrated



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



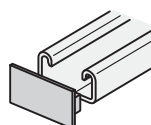
Double channel on request

Dimensions and cross-section properties									Load capacities				
		Length [mm]	Weight G [kg/m]	Cross section area A [cm <sup>2</sup> ]	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
Material	Order no.				$I_y$ [cm <sup>4</sup> ]	$I_z$ [cm <sup>4</sup> ]	$W_y$ [cm <sup>3</sup> ]	$W_z$ [cm <sup>3</sup> ]		$\leq e_w$ [cm]		0.5 m	1.0 m
HZM 41/22	0284.	6070	1.83	2.33	1.26	5.48	1.03	2.66	$F_z$ ① [kN]	14.0			
WB	020-00001								$F_{z,Rd}$				
FV	020-00002								7.8				
A4	020-00003								allow. $F_z$				
									5.6				
HZL 41/22		6000	1.57	1.87	0.97	5.15	0.86	2.49	$F_z$ ① [kN]	12.0			
WB	020-00001								$F_{z,Rd}$				
FV	020-00002								7.8				
A4	020-00003								allow. $F_z$				
									5.6				
HZM 41/22 D		6070	3.58	4.65	5.83	10.97	2.82	5.31	$F_z$ ① [kN]	42.0			
WB	040-00001								$F_{z,Rd}$				
FV	040-00002								7.8				
A4	040-00003								allow. $F_z$				
									5.6				

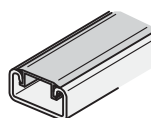
①  $F_z$  = max. load bearing capacity of the channel lips

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

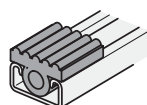
**HPE 41/22**  
Channel end cap  
→ see page 58



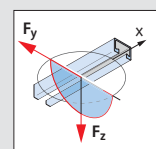
**PA - 41**  
Channel cover  
→ see page 58



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



Cross section data  
pages 62, 64



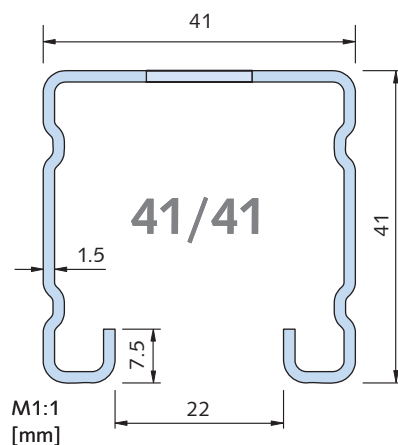
Point-load capacities  
page 68

# HALFEN FRAMING SYSTEMS

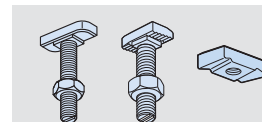
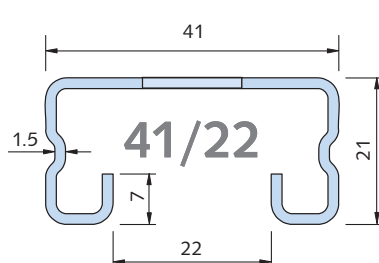
## Framing Channels – Medium Duty Framing System

### Framing channel HLL 41/41 and HLL 41/22

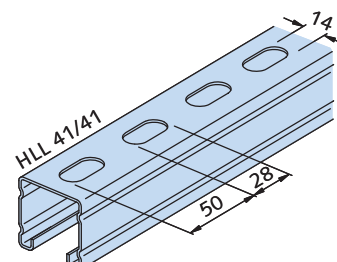
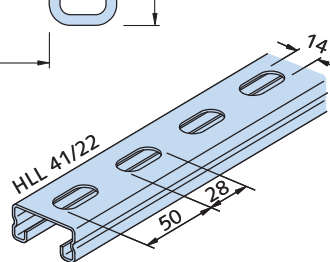
HLL 41/41 cold-rolled

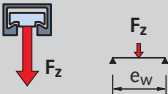



HLL 41/22 cold-rolled



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



Dimensions and cross-section properties									Load capacities					
		Length [mm]	Weight [kg/m]	Cross section area [cm <sup>2</sup> ]	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L			
Material	Order no.				I <sub>y</sub> [cm <sup>4</sup> ]	I <sub>z</sub> [cm <sup>4</sup> ]	W <sub>y</sub> [cm <sup>3</sup> ]	W <sub>z</sub> [cm <sup>3</sup> ]	F <sub>z</sub> ① [kN]	≤ e <sub>w</sub> [cm]	0.5 m	1.0 m	1.5 m	
HLL 41/41	0282.													
SV	010-00002	6000	1.61	1.92	4.24	6.10	2.04	2.95	F <sub>z,Rd</sub>	91.0	F <sub>Rd</sub>			
									2.5		4.5	2.2	1.4	
									allow. F <sub>z</sub>		allow. F			
								1.8			3.2	1.6	1.0	
HLL 41/22	0282.													
SV	020-00003	6000	1.14	1.33	0.75	3.67	0.71	1.78	F <sub>z,Rd</sub>	31.0	F <sub>Rd</sub>			
									2.5		1.54	0.56	0.28	
									allow. F <sub>z</sub>		allow. F			
									1.8		1.1	0.4	0.2	

① F<sub>z</sub> = max. load bearing capacity of the channel lips

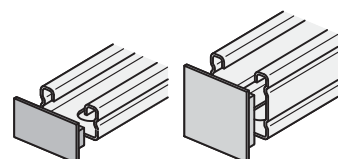
① F<sub>z</sub> = max. load bearing capacity of the channel lips

### Accessories

#### HPE 41/41 resp. HPE 41/22

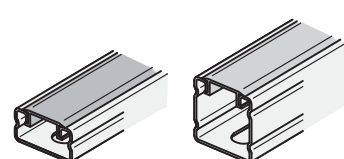
Channel end cap

→ see page 58



#### PA - 41 Channel cover

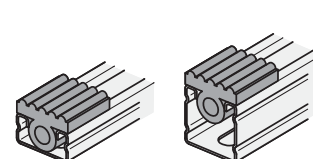
→ see page 58



#### SDM - 41/8

Rubber vibration absorber

→ see catalogue MT-FFC

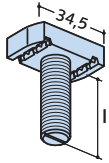


# HALFEN FRAMING SYSTEMS

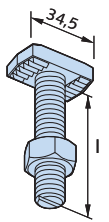
## Framing Channels – Medium Duty Framing System

### HALFEN Bolts HZS 41/41, HZS 41/22 and HS 41/41

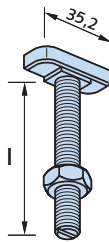
HALFEN Bolts for all 41/... channels:



**HZS 41/41**  
HALFEN Bolt  
serrated,  
order nut separately



**HZS 41/22**  
HALFEN Bolt serrated,  
incl. nut  
for serrated channels  
41/41, 41/22 and  
63/63



**HS 41/41**  
HALFEN Bolt  
incl. nut

HZS 41/41 available bolts					
Length l [mm]	M6	M8	M10	M12	M16 ① ②
30	ZL	ZL	ZL	ZL	-
50	-	ZL	ZL	ZL	-
63	-	-	-	-	ZL
75	-	-	ZL	ZL	-
100	-	-	-	ZL FV4.6	-
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

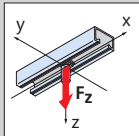
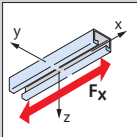
HZS 41/22 available bolts		
Length l [mm]	M12	M16
35	FV 8.8 A4-50	-
50	FV 8.8 A4-50	FV 8.8 A4-50
80	A4-50	-
100	-	FV 8.8

HS 41/41 available bolts		
Length l [mm]	M10	M12
35	FV 4.6 A4-70	FV 4.6 A4-70
50	-	FV 4.6

Torques for HALFEN Bolts ①						
41/...	Recommended torques $T_{inst}$ [Nm]					
	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	12	-	-	-	-
	M8	28	-	-	-	-
	M10	55	-	-	15	15
	M12	60 (55)	50	50	25	25
	M16	125 (95)	80	80	-	-

( ) values for HLL profiles in brackets

### Load capacities for 41/... HALFEN Bolts

Thread Ø	<div></div> <div>Load bearing capacities per bolt for centric tension for all 41/... and 63/... profiles <b>F<sub>z</sub> [kN]</b>  – Do not exceed the channel load bearing capacity –</div>						<div></div> <div>Recommended load capacity per HALFEN Bolt in channel longitudinal direction <b>F<sub>x</sub> [kN]</b></div> <div><div>For profiles HZM/HZL 41/22, 41/41, 63/63</div><div>For profiles HM/HL 41/22, 41/41, 41/62, 41/83</div><div>For profiles HLL 41/22, 41/41</div></div>					
	41/...		HZS 41/41	HZS 41/22	HZS 41/22	HS 41/41	HS 41/41	HZS 41/41③	HZS 41/22	HZS 41/22	HZS 41/41	HZS 41/22
		steel	8.8	A4-50	4.6	A4-70	steel	8.8	A4-50	steel	A4-50	steel
M6	F <sub>Rd</sub>	7.0	-	-	-	-	3.1	-	-	1.4	-	1.4
	allow. F	5.0	-	-	-	-	2.2	-	-	1.0	-	1.0
M8	F <sub>Rd</sub>	8.4	-	-	-	-	5.6	-	-	3.4	-	3.4
	allow. F	6.0	-	-	-	-	4.0	-	-	2.4	-	2.4
M10	F <sub>Rd</sub>	9.8	-	-	9.0	9.0	7.0	-	-	4.9	-	4.9
	allow. F	7.0	-	-	6.4	6.4	5.0	-	-	3.5	-	3.5
M12	F <sub>Rd</sub>	9.8	9.8	9.8	11.2	13.0	7.0	7.0	7.0	5.6	2.4	5.0
	allow. F	7.0	7.0	7.0	8.0	9.3	5.0	5.0	5.0	4.0	1.7	3.6
M16	F <sub>Rd</sub>	16.8 ①②	9.8	16.8	-	-	5.6 ①②	7.0	7.0	5.6 ①②	5.6	5.6 ①②
	allow. F	12.0 ①②	7.0	12.0	-	-	4.0 ①②	5.0	5.0	4.0 ①②	4.0	4.0 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 serration

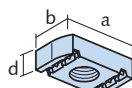
# HALFEN FRAMING SYSTEMS

## Framing Channels – Medium Duty Framing System

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

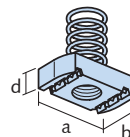
#### GWP 41/41

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



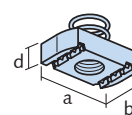
#### GWP 41/41 SH

Locking plate with  
long spring for  
channel 41/41



#### GWP 41/41 SN

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



#### GWP 41/41 available plates

FV	GV	A4	d [mm]	b [mm]	a [mm]
-	M6	M6	6	20	34.5
M8	M8	M8	8/6		
M10	M10	M10	9		
FM12	FM12	FM12	12		
M12	M12	-	12	30	
M16	-	M16			

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

#### GWP 41/41 SH available plates

GV	d [mm]	b [mm]	a [mm]
M6	6	20	34,5
M8	8		
M10	9		
M12	12		

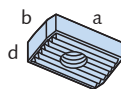
#### GWP 41/41 SN available plates

GV	d [mm]	b [mm]	a [mm]
M6	6	20	34,5
M8	8		
M10	9		
F M12	12		

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

#### GWP 41/22

Locking plate for  
serrated channel  
41/22 and 41/41



#### GWP 41/22 available plates

GV	A4	d [mm]	b [mm]	a [mm]
M6	-	7.5	20	34.5
M8	M8			
M10	M10			
M12	M12			
M16	M16			

#### Torques for 41/... locking plates

Thread Ø	Recommended torques T <sub>inst</sub> [Nm]			
	GWP 41/41 steel	GWP 41/41 A4	GWP 41/22 steel	GWP 41/22 A4
M6	12	6.5	12	6.5
M8	28	16.0	28	16.0
M10	55	31.5	55	31.5
M12	75 (55)	-	50	50
FM12	60 (55)	55	-	-
M16	125 (95)	125	80	80

( ) 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 <sub>z</sub> [kN]						Recommended load capacity for locking plates in channel longitudinal direction F <sub>x</sub> [kN]					
- Do not exceed the channel load bearing capacity -						For profiles H2M/H2L 41/22, 41/41, H2L 63/63					
						For profiles HM/HL 41/22, 41/41, 41/62, 41/83					
						For profiles HLL 41/22, 41/41					
Thread Ø		GWP 41/41 steel	GWP 41/41 A4	GWP 41/22 steel	GWP 41/22 A4	GWP 41/41 steel	GWP 41/41 A4	GWP 41/22 steel	GWP 41/22 A4	GWP 41/41 steel	GWP 41/41 steel
41/...	F <sub>Rd</sub>	7.0	7.0	7.0	7.0	3.1	3.1	3.1	-	1.4	1.4
	allow. F	5.0	5.0	5.0	5.0	2.2	2.2	2.2	-	1.0	1.0
M8	F <sub>Rd</sub>	8.4	8.4	8.4	8.4	5.6	5.6	5.6	5.6	3.4	3.4
	allow. F	6.0	6.0	6.0	6.0	4.0	4.0	4.0	4.0	2.4	2.4
M10	F <sub>Rd</sub>	9.8	9.8	9.8	9.8	7.0	7.0	7.0	7.0	4.9	4.9
	allow. F	7.0	7.0	7.0	7.0	5.0	5.0	5.0	5.0	3.5	3.5
M12	F <sub>Rd</sub>	12.6 ①	-	9.8	9.8	7.0 ①	-	7.0	7.0	7.0	5.0
	allow. F	9.0 ①	-	7.0	7.0	5.0 ①	-	5.0	5.0	5.0	3.6
FM12	F <sub>Rd</sub>	9.8	9.8	-	-	7.0	7.0	-	-	5.6	5.0
	allow. F	7.0	7.0	-	-	5.0	5.0	-	-	4.0	3.6
M16 ①②	F <sub>Rd</sub>	16.8 ①②	9.8 ①②	9.8	9.8	10.5 ①②	7.0 ①②	10.5	7.0	10.5 ①②	6.3 ①②
	allow. F	12.0 ①②	7.0 ①②	7.0	7.0	7.5 ①②	5.0 ①②	7.5	5.0	7.5 ①②	4.5 ①②

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

① Not compatible with profiles 41/22 and 63/63

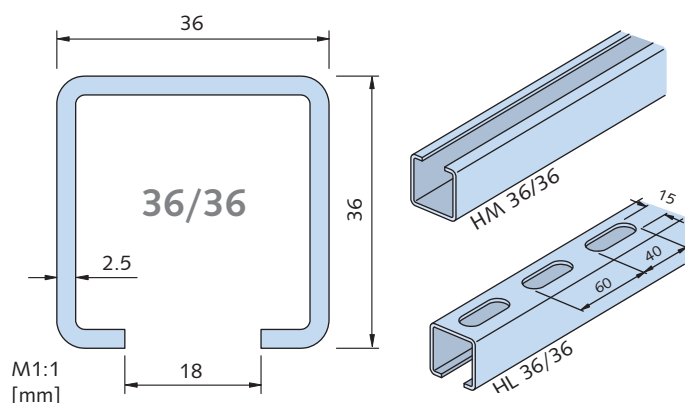
② Diameter M16 can only be inserted into the slot from channel end

# HALFEN FRAMING SYSTEMS

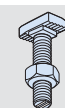
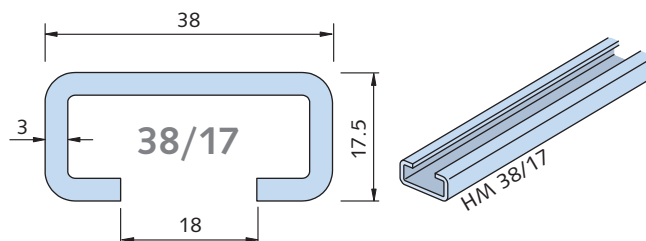
## Framing Channels – Light Duty Framing Systems

### Framing channel HM 36/36, HL 36/36 and HM 38/17

#### HM 36/36 resp. HL 36/36 cold-rolled



#### HM 38/17 cold-rolled



Suitable HALFEN Bolts  
HS 38/17 → see page 46

Dimensions and cross-section properties									Load capacities					
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Dending load capacity at span L			
Material	Order no.		G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	≤ e <sub>w</sub>				
HM 36/36	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[kN]	[cm]	0.5 m	1.0 m	1.5 m	
WB	070-00001	6000	2.2	2.80	4.54	5.89	2.19	3.27	F <sub>z,Rd</sub>	44	F <sub>Rd</sub>			
FV	070-00002								6.2		5.5	2.7	1.8	
A4	070-00003								allow. F <sub>z</sub>		allow. F			
									4.4		3.9	1.9	1.3	
HL 36/36	0281.													
WB	050-00001	6000	2.0	2.42	3.65	5.78	1.97	3.21	F <sub>z,Rd</sub>	36	F <sub>Rd</sub>			
FV	050-00002								6.2		4.5	2.2	1.5	
A4	050-00003								allow. F <sub>z</sub>		allow. F			
									4.4		3.2	1.6	1.1	
HM 38/17	0290.													
WB	020-00001	6070	1.78	2.27	0.84	4.13	0.80	2.20	F <sub>z,Rd</sub>	11	F <sub>Rd</sub>			
FV	020-00002								6.7		2.10	0.84	0.42	
A2 ②	020-00003								allow. F <sub>z</sub>		allow. F			
A4	020-00004								4.8		1.5	0.6	0.3	

① F<sub>z</sub> = 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

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

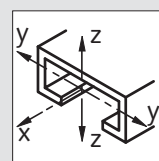
HPE 36/36 Channel end cap for HM and HL 36/36

→ see page 58

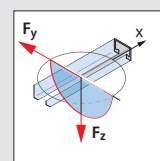
SIC 38/17 Locking washer → see page 56

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

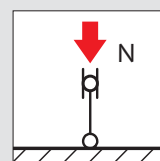
### Further design properties



Cross section data  
pages 62, 64



Point-load capacities  
page 68



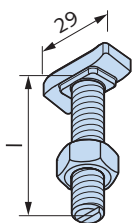
Flexural buckling  
page 71



# HALFEN FRAMING SYSTEMS

## HALFEN Bolts – Light Duty Framing Systems

### HALFEN Bolts HS 38/17



HS 38/17

HALFEN Bolt  
incl. nut

Li = left-hand thread

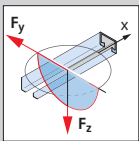
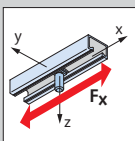
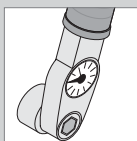
High corrosion resistant stainless steel  
HCR on request

#### HS 38/17 available bolts

Length l [mm]	M10	M12	M16	Length l [mm]	M10	M12	M16
20	GVs 4.6	GVs 4.6	GVs 4.6 ①	60	GVs 4.6 A4-70	GVs 4.6	GVs 4.6
25		A4-70	A4-50 ①			GVs 8.8 A4-70	GVs 8.8
30	GVs 4.6	GVs 4.6	GVs 4.6	70		FV 8.8	FV 8.8 A4-50
	FV 4.6 A4-70	FV 4.6 A2-70 A4-70	FV 4.6 A2-50 ① A4-50	80	GVs 4.6	GVs 4.6 A4-70	GVs 4.6 A4-50 A4-70 ①
40	GVs 4.6 A4-70	GVs 4.6 A2-70 A4-70	GVs 4.6 FV 4.6 A2-50 ① A4-50	80 Li			A4-50
				100	GVs 4.6	GVs 4.6 A4-50	GVs 4.6 FV 4.6 A4-50
50	GVs 4.6 A4-70	GVs 4.6 FV 4.6 A2-70 A4-70	GVs 4.6 FV 4.6 A4-50	125		GVs 4.6	GVs 4.6
				150	GVs 4.6	GVs 4.6 A4-50 ①	GVs 4.6 A4-50
				200		GVs 4.6 A4-50 ①	GVs 4.6 A4-50 ①

① on request

#### Load bearing capacities for HALFEN Bolts ①

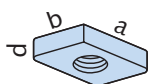
	Load capacities for HALFEN Bolts					Recommended load bearing capacities per HALFEN Bolt in channel longitudinal direction			Recommended torques			
												
Thread Ø		F [kN]					F <sub>x</sub> [kN] ②			T <sub>inst</sub> [Nm]		
38/17		HS				HS			HS			
		4.6	8.8	A2-50 A4-50	A2-70 A4-70	4.6	8.8	A2-50; A4-50; A2-70; A4-70	4.6	8.8	A2-50; A4-50	A2-70; A4-70
M10	F <sub>Rd</sub>	8.3	18.6	7.3	15.6	0.42	1.54	0.42	15	40	15	30
	allow. F	5.9	13.3	5.2	11.2	0.3	1.1	0.3				
M12	F <sub>Rd</sub>	12.1	27.0	10.6	22.7	0.7	2.2	0.7	25	70	25	50
	allow. F	8.6	19.3	7.6	16.2	0.5	1.6	0.5				
M16	F <sub>Rd</sub>	22.6	50.2	19.8	42.2	1.3	4.2	1.26	65	180	60	130
	allow. F	16.1	35.9	14.1	30.2	0.9	3.0	0.9				

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 bolts

GV	A4	a [mm]	b [mm]	d [mm]
M6	M6	33.5	17.5	6
M8	M8			
M10	M10			
M12	M12			

#### Load capacities GWP 38/17

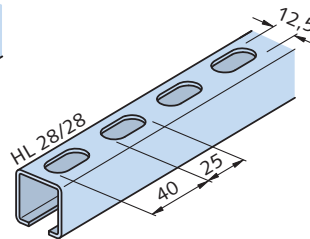
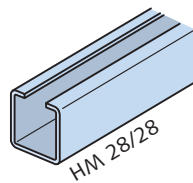
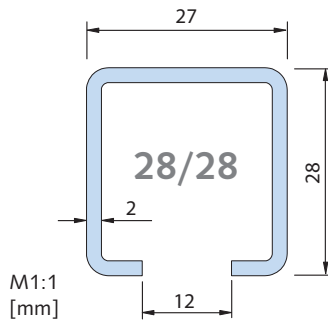
Thread	Load capacity [kN]	
	$F_{Rd}$	allow. F
M6	$F_{Rd}$	3.1
	allow. F	2.2
M8	$F_{Rd}$	5.6
	allow. F	4.0
M10	$F_{Rd}$	8.0
	allow. F	5.7
M12	$F_{Rd}$	8.0
	allow. F	5.7

# HALFEN FRAMING SYSTEMS

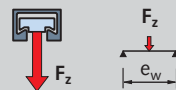
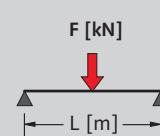
## Framing Channels – Light Duty Framing Systems

### Framing channels HM 28/28 and HL 28/28

HM 28/28 resp. HL 28/28 cold-rolled



Suitable HALFEN Bolts  
HS 28/15 → see page 51

Dimensions and cross-section 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	Order no.				$I_y$	$I_z$	$W_y$	$W_z$						
HM 28/28	0280.	[mm]	[kg/m]	[cm²]	[cm⁴]	[cm⁴]	[cm³]	[cm³]	$F_z$ ① [kN]	$\leq e_w$ [cm]	0.5 m	1.0 m	1.5 m	
WB	050-00001	6000	1.36	1.73	1.70	2.01	1.08	1.49	$F_{z,Rd}$	31.0	$F_{Rd}$			
SV	050-00003								4.2		2.7	1.3	0.7	
FV	050-00002								allow. $F_z$		allow. F			
A4	050-00004								3.0		1.9	0.9	0.5	
HL 28/28	0281.													
WB	060-00001	6000	1.22	1.48	1.33	1.98	0.95	1.47	$F_{z,Rd}$	25.5	$F_{Rd}$			
SV	060-00003								4.2		2.10	1.12	0.56	
FV	060-00002								allow. $F_z$		allow. F			
A4	060-00004								3.0		1.5	0.8	0.4	

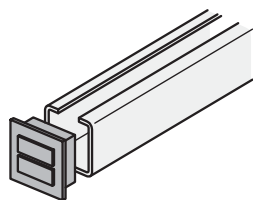
①  $F_z$  = max. load bearing capacity of the channel lips

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

### Accessories

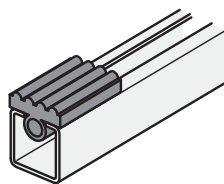
#### HPE 28/28

Channel end cap  
→ see page 58

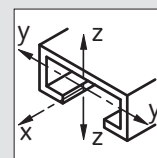


#### SDM - 28/6

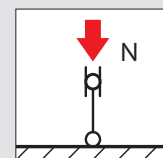
Rubber vibration absorber  
→ see catalogue MT-FFC



### Further design properties



Cross section data  
pages 62, 64



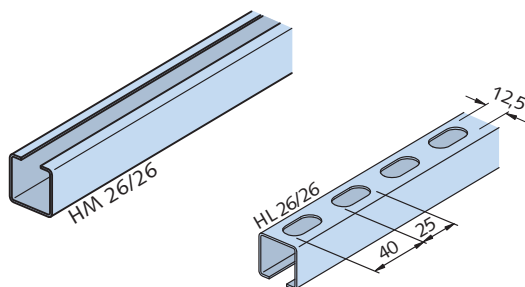
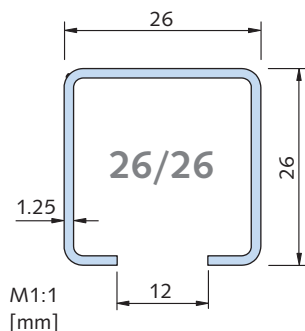
Flexural buckling  
page 71

# HALFEN FRAMING SYSTEMS

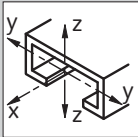


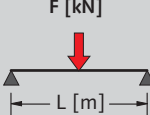
## Framing Channels – Light Duty Framing Systems

### Framing channel HM 26/26 and HL 26/26

HM 26/26 resp. HL 26/26 cold-rolled



Suitable HALFEN Bolts  
HS 28/15 → see page 51

Dimensions and cross-section 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	Order no.				$I_y$	$I_z$	$W_y$	$W_z$					
HM 26/26	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	$F_z$ ①	$\leq e_w$	0.5 m	1.0 m	1.5 m
SV	040-00001	6000	0.82	1.05	0.95	1.19	0.64	0.92	$F_{z,Rd}$	50.0	$F_{Rd}$		
									1.54		1.53	0.77	0.40
									allow. $F_z$		allow. F		
									1.10		1.10	0.55	0.28
HL 26/26	0281.												
SV	070-00001	6000	0.72	0.89	0.73	1.16	0.56	0.89	$F_{z,Rd}$	40.0	$F_{Rd}$		
									1.54		1.26	0.56	0.31
									allow. $F_z$		allow. F		
									1.10		0.9	0.4	0.22

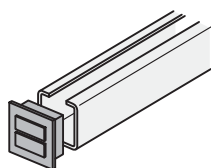
①  $F_z$  = max. load bearing capacity of the channel lips

① F<sub>z</sub> = max. load bearing capacity of the channel lips

### Accessories

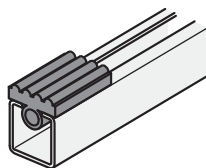
#### HPE 26/26

Channel end cap  
→ see page 58

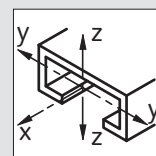


#### SDM - 28/6

Rubber vibration absorber  
→ see catalogue MT-FFC



### Further design properties



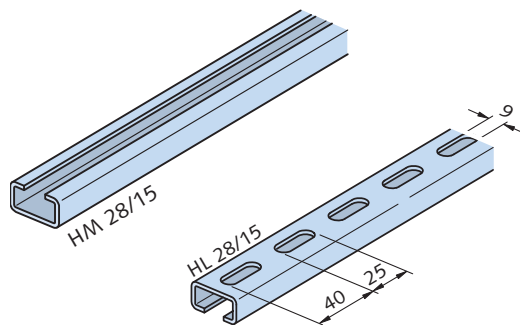
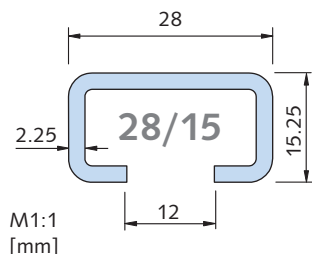
Cross section data  
pages 62, 64

# HALFEN FRAMING SYSTEMS

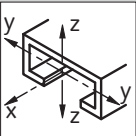
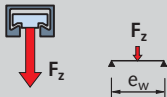
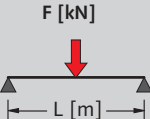
## Framing Channels – Light Duty Framing Systems

### Framing channel HM 28/15 and HL 28/15

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



Suitable HALFEN Bolts  
HS 28/15 → see page 51

Dimensions and cross-section properties									Load capacities					
		Length [mm]	Weight G [kg/m]	Cross section area A [cm <sup>2</sup> ]	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L			
Material	Order no.				$I_y$ [cm <sup>4</sup> ]	$I_z$ [cm <sup>4</sup> ]	$W_y$ [cm <sup>3</sup> ]	$W_z$ [cm <sup>3</sup> ]				$F_z$ ① [kN]	$\leq e_w$ [cm]	0.5 m
HM 28/15	0280.	[mm]	[kg/m]	A [cm <sup>2</sup> ]	$I_y$ [cm <sup>4</sup> ]	$I_z$ [cm <sup>4</sup> ]	$W_y$ [cm <sup>3</sup> ]	$W_z$ [cm <sup>3</sup> ]	$F_{z,Rd}$	8.2	$F_{Rd}$			
WB	010-00001								5.5		1.15	0.38	0.17	
FV	010-00002								allow. $F_z$		allow. F			
A2 ②	010-00004								3.9		0.82	0.27	0.12	
A4 ②	070-00003													
HL 28/15	0281.													
WB	080-00001	6070	0.86	1.16	0.32	1.35	0.40	0.98	$F_{z,Rd}$	7.0	$F_{Rd}$			
FV	080-00004								5.5		0.98	0.31	0.14	
A2 ②	080-00002								allow. $F_z$		allow. F			
A4	080-00003								3.9		0.7	0.22	0.10	

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

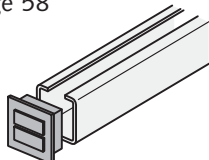
② Stainless steel A2 on request; Note: [high corrosion resistant stainless steel HCR for HM 28/15 on request](#)

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

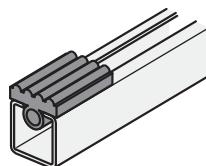
② Stainless steel A2 on request; Note: high corrosion resistant stainless steel HCR for HM 28/15 on request

### Accessories

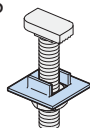
**HPE 28/15** Channel end cap  
→ see page 58



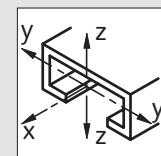
**SDM 28/6** Rubber vibration absorber  
→ see catalogue MT-FFC



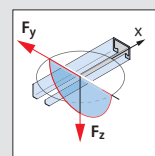
**SIC 28/15** Locking washer  
→ see page 56



### Further design properties



Cross section data  
pages 62, 64



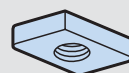
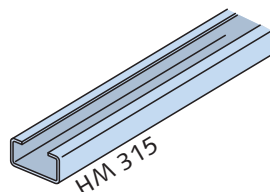
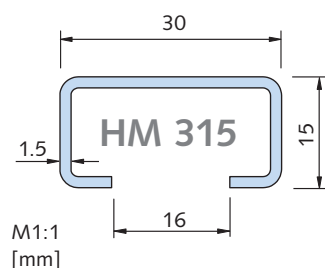
Point-load capacities  
page 68

# HALFEN FRAMING SYSTEMS

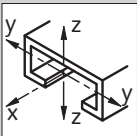
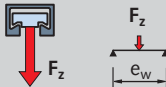
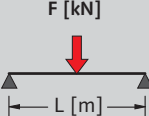
## Framing Channels – Light Duty Framing Systems

### Framing channel HM 315 (C30)

#### HM 315 (C30) cold-rolled



Suitable locking plates  
GWP 28/15 → see page 51

Dimensions and cross-section 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	Order no.		G	A	Iy	Iz	Wy	Wz	Fz ①	≤ ew			
HM 315	0280.	[mm]	[kg/m]	[cm²]	[cm⁴]	[cm⁴]	[cm³]	[cm³]	[kN]	[cm]	0.5 m	1.0 m	1.5 m
WB	060-00001	6000	0.77	0.97	0.30	1.26	0.32	0.84	Fz,Rd	17.7	FRd		
									2.32		0.81	0.28	0.13
FV	060-00002								allow. Fz		allow. F		
									1.66		0.58	0.20	0.09

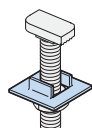
① Fz = max. load bearing capacity of the channel lips

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

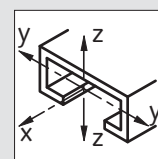
### Accessories

#### SIC 28/15 Locking plate

→ see page 56



### Further design properties



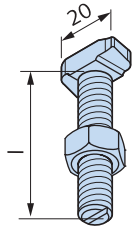
Cross section data  
page 62



# HALFEN FRAMING SYSTEMS

## HALFEN Bolts – Light Duty Framing Systems

### HALFEN Bolts HS 28/15



**HS 28/15**  
HALFEN Bolts  
incl. nut  
Li = left-hand  
thread

Not for HM 315

High corrosion resistant stainless steel  
HCR on request

#### HS 28/15 available bolts

Length l [mm]	M6	M8	M10	M12	Length l [mm]	M6	M8	M10	M12
15	GVs 4.6	GVs 4.6	GVs 4.6		50		GVs 4.6	GVs 4.6 FV 4.6	GVs 4.6
20	GVs 4.6	GVs 4.6 GVs 8.8 A2-70 A4-70	GVs 4.6 A2-70 A4-70		60		GVs 4.6	GVs 4.6 GVs 8.8 A4-70	
25	GVs 4.6	GVs 4.6 A2-70	GVs 4.6 A2-70 A4-70		80		GVs 4.6	GVs 4.6 GVs 8.8 A4-70	GVs 4.6
30	GVs 4.6	GVs 4.6 A2-70 A4-70	GVs 4.6 FV 4.6 A2-70 A4-70	GVs 4.6	100		GVs 4.6	GVs 4.6 A4-50	
35				GVs 4.6	125			GVs 4.6 A4-50	
40	GVs 4.6	GVs 4.6	GVs 4.6 FV 8.8 A2-70 A4-70		150		GVs 4.6 ①	GVs 4.6 A4-50	
					200			GVs 4.6 A4-50	

① on request

#### Load bearing capacities for HALFEN Bolts ①

Thread Ø		Load capacities for HALFEN Bolts				Recommended load bearing capacity per HALFEN Bolt in channel longitudinal direction		Recommended torque			
		F [kN]				F <sub>x</sub> [kN] ②		T <sub>inst</sub> [Nm]			
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	F <sub>Rd</sub>	2.9	6.4	2.5	5.4	0.14	0.14	3	-	3	-
	allow. F	2.1	4.6	1.8	3.8	0.1	0.1				
M8	F <sub>Rd</sub>	5.3	11.7	4.6	9.9	0.28	0.28	8	20	8	15
	allow. F	3.8	8.3	3.3	7.1	0.2	0.2				
M10	F <sub>Rd</sub>	8.3	18.6	7.3	15.6	0.42	0.42	15	40	15	30
	allow. F	5.9	13.3	5.2	11.2	0.3	0.3				
M12	F <sub>Rd</sub>	12.1	27.0	10.6	22.7	0.7	0.7	25	70	25	50
	allow. F	8.6	19.3	7.6	16.2	0.5	0.5				

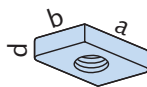
① Note: do not exceed the max. channel load bearing capacity

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

GV	A4	a [mm]	b [mm]	d [mm]
M5	-			
M6	M6	24.5	13.0	4
M8	M8			
M10	M10	33.5	17.5	5

#### GWP 28/15 Load capacities

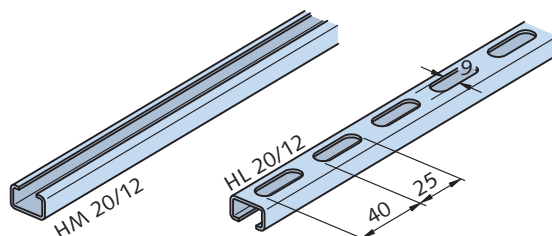
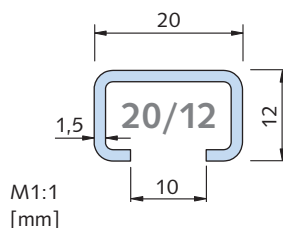
Thread	F <sub>z</sub> [kN]	
	F <sub>Rd</sub>	allow. F
M5	2.1	1.5
	2.7	1.9
M6	3.9	2.8
	4.2	3.0
M8	4.2	3.0
	4.2	3.0
M10	4.2	3.0
	4.2	3.0

# HALFEN FRAMING SYSTEMS

## Framing Channels – Light Duty Framing Systems

### Framing channel HM 20/12 and HL 20/12

HM 20/12 resp. HL 20/12 cold-rolled



Suitable HALFEN Bolt  
HS 20/12 → see page 53

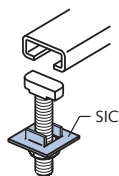
Dimensions and cross-section properties									Load capacities				
		Length	Weight	Cross section area	Moment of inertia		Elastic section modulus		Max. point-load bearing capacity		Bending load capacity at span L		
Material	Order no.				G	A	I <sub>y</sub>	I <sub>z</sub>	W <sub>y</sub>	W <sub>z</sub>	F <sub>z</sub> ①	≤ e <sub>w</sub>	
HM 20/12	0280.	[mm]	[kg/m]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	F <sub>z</sub> ①	≤ e <sub>w</sub>			

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

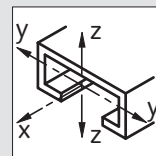
### Accessories

SIC 20/12 Locking washer

→ see page 56



### Further design properties

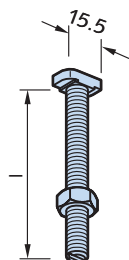


Cross section data  
pages 62, 64

# HALFEN FRAMING SYSTEMS

## HALFEN Bolts – Light Duty Framing Systems

### HALFEN Bolts HS 20/12



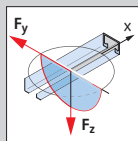
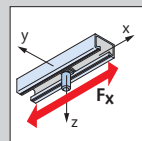
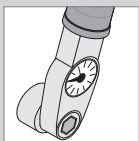
**HS 20/12**  
HALFEN Bolts  
incl. nut

#### HS 20/12 available bolts

Length l [mm]	M6	M8	Length l [mm]	M6	M8
15	-	GVs 4.6	40	GVs 4.6	GVs 4.6
20	GVs 4.6	GVs 4.6	-	-	A2-70
-	-	A2-70	50	-	GVs 4.6
25	-	GVs 4.6	-	-	A2-70 ①
-	-	A2-70	60	-	GVs 4.6
30	GVs 4.6	GVs 4.6	80	-	GVs 4.6
-	-	A2-70	100	-	GVs 4.6 ①

① on request

#### Load bearing capacities for HALFEN Bolts ①

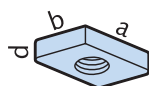
Load capacities for HALFEN Bolts		Recommended load capacity per HALFEN Bolt in channel longitudinal direction		Recommended torque		
Thread Ø						
	F [kN]		F <sub>x</sub> [kN] ②		T <sub>inst</sub> [Nm]	
20/12		HS	HS		HS	
		4.6      A2-70	4.6      A2-70		4.6      A2-70	
M6	F <sub>Rd</sub>	2.9      5.4	0.14      0.14	3	-	
	allow. F	2.1      3.8	0.1      0.1			
M8	F <sub>Rd</sub>	5.3      9.9	0.28      0.28	8	8	
	allow. F	3.8      7.1	0.2      0.2			

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

② Load capability due to friction

### Locking plates

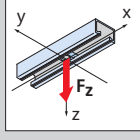
#### Locking plate GWP 20/12



#### GWP 20/12 available plates

GV Thread	A4 Thread	a [mm]	b [mm]	d [mm]
M5	M5			
M6	M6	16	9	4

#### Load capacities for GWP 20/12

	Thread	F <sub>z</sub> [kN]	
		<i>F<sub>Rd</sub></i>	allow. F
20/12	M5	2.1	1.5
	M6	2.7	1.9

# HALFEN FRAMING SYSTEMS

## Accessories: HALFEN Bolts

Framing Channels	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				
	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				
																					
Heavy Duty Framing Systems	[mm]	M20	M24	M27	M30	M20	M10	M12	M16	M20	M24	M16	M20	M10	M12	M16	M16	M10	M12	M16	
	15																				
	20														GVs4.6	GVs4.6			GVs4.6	GVs4.6	GVs4.6
	25																			A4-70	A4-50
Medium Duty Framing Systems	30						GVs4.6 FV4.6	GVs4.6 A4-70	GVs4.6 A4-50					GVs4.6 A4-70	GVs4.6 GVs8.8 FV4.6 A4-50	GVs4.6 A4-50		GVs4.6 FV4.6 A4-70	GVs4.6 FV4.6 A2-70 A4-70	GVs4.6 FV4.6 A2-50 A4-50	
	35									GVs4.6											
	40						GVs4.6 FV4.6 A4-70	GVs4.6 GVs8.8 FV4.6 A4-50				FV 8.8		GVs4.6 A4-70	GVs4.6 GVs8.8 A4-50 A4-70	GVs4.6 A4-70	GVs8.8	GVs4.6 A4-70	GVs4.6 A2-70 A4-70	GVs4.6 FV4.6 A2-50 A4-50	
	45							GVs8.8		GVs4.6 GVs8.8 A4-50			GVs8.8		GVs8.8						
Light Duty Framing Systems	50	FV4.6	FV4.6 A4-50				GVs4.6	GVs4.6 A4-70	GVs4.6 FV4.6 A4-50					GVs4.6 A4-70	GVs4.6 FV4.6 A4-50 A4-70	GVs4.6 A4-50		GVs4.6 A4-70	GVs4.6 FV4.6 A2-70 A4-70	GVs4.6 FV4.6 A4-50	
	55								GVs4.6 FV4.6 A4-50												
Accessories	60	FV 8.8						GVs4.6 GVs8.8	GVs4.6 GVs8.8 FV 8.8 A4-50			GVs8.8	GVs8.8	GVs4.6	GVs4.6 GVs8.8	GVs4.6 GVs8.8 FV4.6 A4-50	GVs8.8	GVs4.6 A4-70	GVs4.6 GVs8.8 A4-70	GVs4.6 FV 8.8 A4-50	
	63																				
	65									GVs4.6											
	70																			FV 8.8	
Statics	75	FV4.6 GVs8.8	FV4.6 FV 8.8	FV4.6	FV4.6	FV 8.8				GVs4.6 A4-50 FA-70	FV4.6		GVs8.8								
	80							GVs4.6 GVs8.8	GVs4.6 GVs8.8 A4-50 A4-70 A4-50					GVs4.6	GVs4.6 GVs8.8 A4-50	GVs4.6 A4-50		GVs4.6	GVs4.6 A4-70	GVs4.6 A4-50 A4-70	
	80 Li																				
	100	FV4.6 GVs8.8	FV4.6 GVs8.8 A4-50	FV4.6 FV 8.8	FV4.6			GVs4.6 A4-50	GVs4.6 GVs8.8 FV4.6 FV4.6 A4-50 FA-70						GVs4.6	GVs4.6 GVs8.8 A4-50	GVs4.6 FV4.6 A4-50		GVs4.6	GVs4.6 A4-50 A4-50	GVs4.6 FV4.6 A4-50
Mechanical engineering	125							GVs4.6	GVs4.6 A4-50						GVs4.6	GVs4.6			GVs4.6	GVs4.6	
	150	FV4.6	FV4.6 GVs8.8		FV4.6			GVs4.6	GVs4.6 FV4.6 A4-50 A4-50						GVs4.6 A4-50	GVs4.6 A4-50		GVs4.6	GVs4.6 A4-50	GVs4.6 A4-50	
	200	FV4.6	FV4.6		FV4.6			GVs4.6	GVs4.6	GVs4.6					GVs4.6	GVs4.6			GVs4.6 A4-50	GVs4.6 A4-50	
	250															GVs4.6					
	300								GVs4.6	GVs4.6						GVs4.6					
Li = left-hand thread; Zl = zinc flake coated																					

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

Accessories: HALFEN Bolts

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

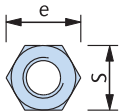


# HALFEN FRAMING SYSTEMS

## Accessories

### MU

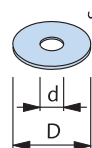
Hexagonal nuts  
EN ISO 4032/  
DIN 934



GV Galvanized F.k. 8 Thread	A4 Stainless steel A4 Thread	S/m DIN [mm]	S/m ISO [mm]	e [mm]
M6	M6	10/5	10/6	11.5
M8	M8	13/6.5	13/7.5	15.0
M10	M10	17/8	16/ 9.5	19.6
M12	M12	19/10	18/12	21.9
M16	M16	24/13	24/15.5	27.7
M20	M20	30/16	30/19	34.6
M24	-	36/19	36/22	41.5
FV Hot-dip galvanized Thread	A2 Stainless steel A4 Thread	S/m DIN [mm]	S/m EN [mm]	e [mm]
M6, M8	M8	13/6.5	13/7.5	15.0
M10	M10	17/08	16/9.5	19.6
M12	M12	19/10	18/12	21.9
M16	M16	24/13	24/15.5	27.7

### US

Washers  
DIN 9021/  
EN ISO  
7094/  
DIN 440

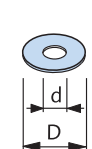


DIN	GV Galvanized For bolt	A4 Stainless steel A4 For bolt	D [mm]	d [mm]	s [mm]
440	M6	-	22	6.6	2
9021	M8	M8	24	8.4	2
9021	M10	M10	30	10.5	2.5
440	M12	-	45	13.5	4
9021	M12	M12	37	13	3
9021	M16	M16	50	17	3
440	M20	-	72	22	6

Ordering example: US - M12 - GV - DIN 9021

### US

Washers  
EN ISO  
7089/  
DIN 125



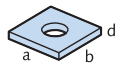
GV Galvanized For bolt	A4 Stainless steel A4 For bolt	D [mm]	d [mm]	s [mm]
M6	M6	12	6.4	1.6
M8	M8	16	8.4	1.6
M10	M10	21	10.5	2
M12	M12	24	13	2.5
M16	M16	30	17	3
M20	M20	37	21	3
M24	-	44	25	4
FV Hot-dip galva- nized For bolt	A2 Stainless steel A2 For bolt	D [mm]	d [mm]	s [mm]
-	M8	17	8.4	1.6
M10	M10	21	10.5	2
M12	M12	24	13	2.5
M16	M16	30	17	3

Ordering example: US - M12 - GV - DIN 125

### VUS

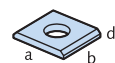
Square washers

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



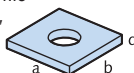
FV Hot-dip galvanized For bolt size:	A4 Stainless steel A4 For bolt size:	a x b x d [mm]
M10	M10	40 x 40 x 5
M12	M12	40 x 40 x 5
M16	M16	40 x 40 x 5

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



M10	M10	37 x 37 x 5
M12	M12	37 x 37 x 5
M16	M16	37 x 37 x 5
M20	M20	37 x 37 x 5

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



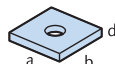
M16	M16	50 x 50 x 6
M20	M20	50 x 50 x 6

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



M20	M20	54 x 54 x 6
M24	M24	54 x 54 x 6
M27	M27	54 x 54 x 6
M30	M30	54 x 54 x 6

VUS 41/41  
for all  
41/..  
profiles

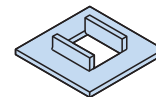


M6	M6	40 x 40 x 6
M10	M10	40 x 40 x 6
M12	M12	40 x 40 x 6

Ordering example: VUS 52/34 - FV - M20

### SIC

Locking  
washer

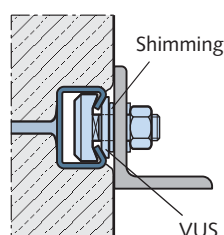


GV Galvanized	A4 Stainless steel	Suitable for HALFEN Bolts	
Type	Dimensions	Type	Dimensions
SIC - 50/30 - GV	SIC - 50/30 - A4	50/30	M16, M20
SIC - 40/22 - GV	SIC - 40/22 - A4	38/17 40/22	M16
SIC - 38/23 - GV	-	38/23	M16
SIC - 29/20 - GV	-	29/20	M12
SIC - 38/17 - GV	SIC - 38/17 - A4	38/17 40/22	M12, M10
SIC - 28/15 - GV	SIC - 28/15 - A4	28/15	M8, M10
SIC - 20/12 - GV	SIC - 20/12 - A4	20/12	M8

Ordering example: SIC - 38/17 - GV

### Application VUS:

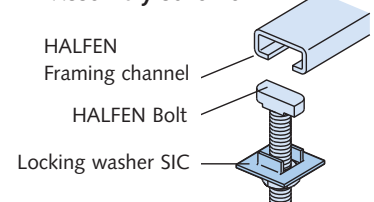
for shimming non-flush  
installation of HALFEN  
Anchor channels or for  
stand-off installations  
→ see page 69



### Application SIC:

for securing HALFEN Bolts;  
prevents bolts turning when  
tightening nuts

### Assembly scheme:

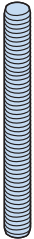


# HALFEN FRAMING SYSTEMS

## Accessories

### GWS

Threaded rods  
DIN 976-1

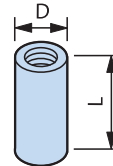


GV	A4	Length	F <sub>Rd</sub>	allow. F
Galvanized F.k. 4.6 Thread	Stainless steel A4 Thread	[mm]	① [kN]	[kN]
M6	M6	1000	3.1	2.2
M8	M8	1000	5.6	4.0
M10	M10	1000	9.0	6.4
M12	M12	1000	13.0	9.3
M16	M16	1000	24.2	17.3
M20	M20	1000	37.8	27.0
M24	-	1000	54.3	38.8

Ordering example: GWS - M12 × 1000 - GV

### VBM

Coupler sleeves,  
round

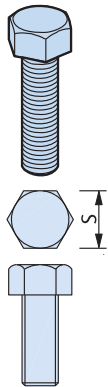


GV	A4	D	L	F <sub>Rd</sub>	allow. F
Galvanized Thread	Stainless steel Thread	[mm]	[mm]	① [kN]	[kN]
M6	M6	10/10	15	3.1	2.2
M8	M8	12/14	20	5.6	4.0
M10	M10	13/16	25	9.0	6.4
M12	M12	16/20	30	13.0	9.3
M16	M16	21/25	40	24.2	17.3
M20	M20	26/32	50	37.8	27.0

Ordering example: VBM - A4 - M16

### HSK

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

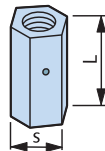


Hex bolts are used  
in combination with  
HALFEN Locking  
plates

GV 8.8	A4	S	S
Galvanized FK 8.8 Dimensions	Stainless steel Dimensions	DIN [mm]	EN ISO [mm]
M 6 × 12		10	10
M 6 × 25			
M 8 × 25	M 8 × 25	13	13
M 8 × 40			
M 10 × 20			
M 10 × 30	M 10 × 30	17	16
M 10 × 45	M 10 × 45		
M 10 × 60			
M 10 × 70			
M 12 × 22			
M 12 × 25	M 12 × 25	19	18
M 12 × 30	M 12 × 30		
M 12 × 40	M 12 × 40		
M 12 × 50			
M 12 × 60	M 12 × 60		
M 12 × 80	M 12 × 80		
M 12 × 90			
M 16 × 40	M 16 × 40	24	24
M 16 × 60	M 16 × 60		
M 16 × 90	M 16 × 90		

### SKM

Hexagonal coup-  
ler sleeves with  
view holes

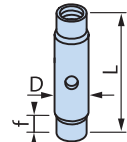


FV	A4	S	L	F <sub>Rd</sub>	allow. F
Hot-dip galvanized Thread	Stainless steel Thread	[mm]	[mm]	① [kN]	[kN]
M10	M10	13	40	9.0	6.4
M12	M12	17	40	13.0	9.3
M16	M16	22	50	24.2	17.3

Ordering example: SKM - FV - M12

### SPH

Turnbuckles  
with right-  
and left-hand  
thread



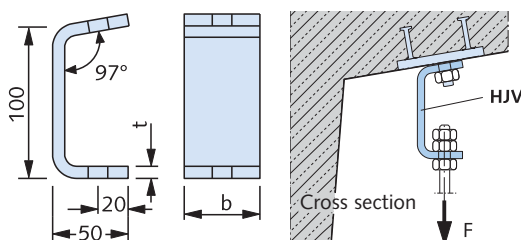
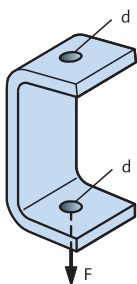
f = min. screw  
depth  
M12 ≅ 10mm  
M16 ≅ 13 mm

A4	A4	D	D
Stainless steel Thread M12 × Length L [mm]	Stainless steel Thread M16 × Length L [mm]	For M12 [mm]	For M16 [mm]
M 12 × 60	M 16 × 60	16	22
M 12 × 75	M 16 × 75	16	22
M 12 × 95	M 16 × 95	16	22
M 12 × 115	M 16 × 115	16	22
M 12 × 135	M 16 × 135	16	22
allow. F = 5 kN F <sub>Rd</sub> = 7 kN	allow. F = 10 kN F <sub>Rd</sub> = 14 kN		

Ordering example: SPH - A4 - M12 × 75

### HJV

Adjustment  
coupler



FV	A4	t	b	d	max. F <sub>Ed</sub>	allow. F
Hot-dip galvanized Type	Stainless steel Type	[mm]	[mm]	[mm]	② [kN]	[kN]
1	1	6	40	13	2.1	1.5
2	2	8	50	17	4.6	3.3
3	3	10	50	17	7.0	5

### RM

Ring nut  
DIN 582  
from 2003-8



GV	d	F <sub>Rd</sub>	allow. F
C 15E, galvanized Thread	[mm]	① [kN]	[kN]
M8	20	2.0	1.4
M10	25	3.2	2.3
M12	30	4.8	3.4
M16	35	9.8	7.0
M20	40	16.8	12.0

Ordering example: RM - GV - M12

- ① Recommended design value of the load capacity with a centric tensile stress
- ② Recommended design value of the load

# HALFEN FRAMING SYSTEMS

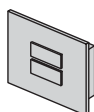
## Accessories

### HPE Channel end caps

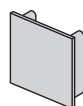
#### Channel end caps in plastic



Type **HPE 63/63**  
Colour: blue



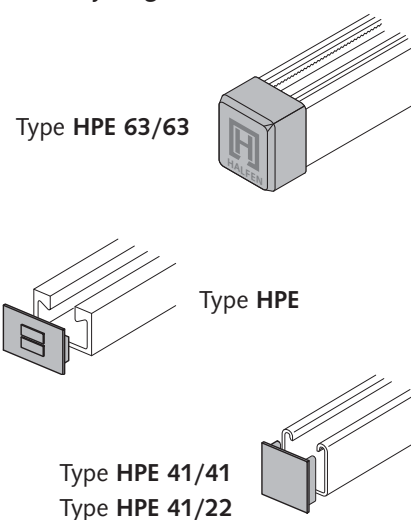
Type **HPE**  
Colour: black



Type **HPE 41/41**  
Type **HPE 41/22**  
Colour: black

Product range		
Description	Order 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:



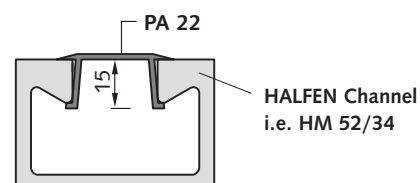
### PA Channel cover

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
Quality: hard PVC (KS)			
	white	medium grey	medium grey
Quality: steel sendzimir zinc plated (SV)			

#### Assembly diagram:



#### Available types

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

# HALFEN FRAMING SYSTEMS

## HALFEN Cantilevers

### Cantilevers KON

#### Flexible comprehensive support system

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

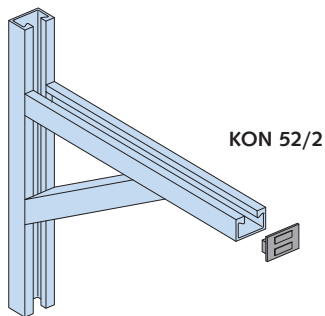
#### Short assembly times

The flexibility of HALFEN Cantilevers/ Bolts make them ideal when the positions and sizes of bolts can not 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.



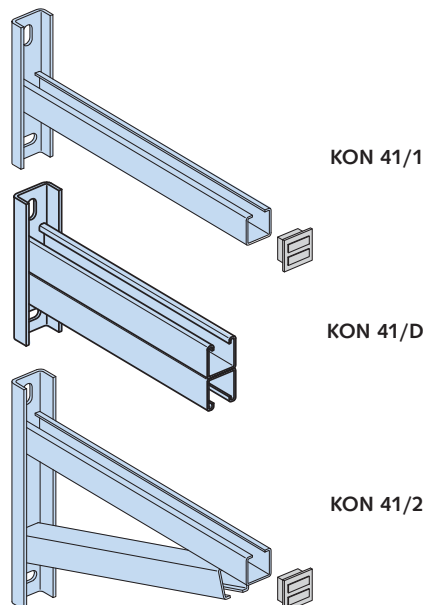
Pipe supports with cantilevers brackets in a sewage treatment plant

#### Cantilever 52:

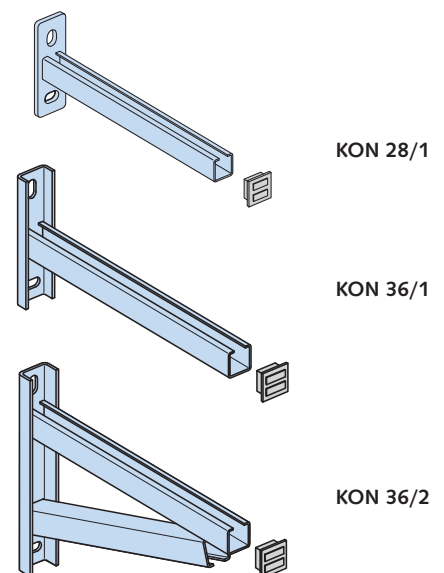


Note: Depending on the number of items ordered, custom cantilevers are available

#### Cantilever 41:



#### Cantilever 36/28:



Further information on HALFEN Cantilevers is available at [www.halfen.de](http://www.halfen.de)  
Take a look at our catalogue "Flexible Framing Connections":  
"HALFEN Flexible Framing Connections" Technical Product Information, MT-FFC.





### HALFEN Framing Channels, Hot-Rolled, Non-Slotted – Bending Load Capacities

- ① Observe the minimum distance  $a_e$  between the channel end and the load point (HALFEN Bolt, locking plate):  
**heavy and medium duty framing systems:  $a_e \geq 30 \text{ mm}$ ,**  
**light duty framing systems:  $a_e \geq 20 \text{ mm}$ .**
- ② Do not exceed the bolt load capacity or the max. channel load bearing capacity.
- ③ For maximum point-load capacity:  
 $F_z = \text{max. load bearing capacity of the channel lips.}$
- ④ Take constructive measures to prevent failure caused by bulging, tilting and buckling.
- ⑤ On request.

## HALFEN FRAMING SYSTEMS

### HALFEN Framing Channels, Hot-Rolled, Non-Slotted – Bending Load Capacities

Material: steel, type WB, FV E= 210.000 N/mm <sup>2</sup>																	
Bending load capacity at span L (single span element) ②																	
F [kN]						F [kN]						q [kN/m]					
allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>
0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m	
22.3	31.2	11.2	15.6	7.4	10.4	16.7	23.4	8.4	11.7	5.6	7.8	89.3	125.0	22.3	31.2	9.9	13.9
16.8	23.5	8.4	11.7	5.6	7.8	12.6	17.6	6.3	8.8	3.3	4.6	67.0	93.8	16.8	23.5	6.0	8.4
8.8	12.3	4.4	6.1	2.8	3.9	6.6	9.2	3.3	4.6	1.6	2.3	35.1	49.1	8.8	12.3	3.0	4.2
5.4	7.5	2.7	3.7	1.6	2.2	4.0	5.6	2.0	2.8	0.9	1.3	21.4	30.0	5.4	7.5	1.7	2.3
2.6	3.7	1.3	1.9	0.6	0.8	2.0	2.8	0.8	1.1	0.3	0.5	10.6	14.8	2.1	3.0	0.6	0.9
1.00 m		2.00 m		3.00 m		1.00 m		2.00 m		3.00 m		1.00 m		2.00 m		3.00 m	
33.7	47.2	16.8	23.6	11.2	15.7	25.3	35.4	12.6	17.7	8.4	11.8	67.4	94.3	16.8	23.6	7.5	10.5
24.5	34.3	12.2	17.1	7.9	11.0	18.4	25.7	9.2	12.8	4.6	6.5	49.0	68.5	12.2	17.1	4.2	5.9
12.5	17.4	6.2	8.7	3.8	5.4	9.3	13.1	4.7	6.5	2.3	3.2	24.9	34.9	6.2	8.7	2.1	2.9
7.0	9.8	3.5	4.9	2.0	2.8	5.3	7.4	2.6	3.7	1.2	1.6	14.1	19.7	3.5	4.9	1.1	1.5
3.5	4.9	1.7	2.4	0.8	1.1	2.6	3.7	1.0	1.4	0.4	0.6	7.0	9.8	1.4	1.9	0.4	0.6
0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m	
24.8	34.8	12.4	17.4	7.1	10.0	18.6	26.1	9.3	13.0	4.2	5.8	99.4	139.1	24.8	34.8	7.6	10.6
12.4	17.3	6.2	8.6	2.7	3.8	9.3	13.0	3.6	5.1	1.6	2.3	49.4	69.2	9.9	13.8	2.9	4.1
6.8	9.5	2.6	3.7	1.2	1.6	5.1	7.1	1.5	2.2	0.7	1.0	27.2	38.1	4.2	5.9	1.2	1.7
4.2	5.9	1.4	2.0	0.6	0.9	3.2	4.4	0.8	1.2	0.4	0.5	16.8	23.5	2.3	3.2	0.7	0.9
2.4	3.3	0.7	1.0	0.3	0.4	1.6	2.3	0.4	0.6	0.2	0.3	8.8	12.3	1.1	1.5	0.3	0.5
1.00 m		2.00 m		3.00 m		1.00 m		2.00 m		3.00 m		1.00 m		2.00 m		3.00 m	
34.8	48.7	17.4	24.3	9.6	13.4	26.1	36.5	12.6	17.7	5.6	7.8	69.5	97.3	17.2	24.1	5.1	7.1
16.5	23.1	7.8	10.9	3.5	4.8	12.4	17.3	4.6	6.4	2.0	2.8	33.0	46.2	6.2	8.7	1.8	2.6
9.3	13.0	3.3	4.7	1.5	2.1	7.0	9.8	2.0	2.7	0.9	1.2	18.6	26.0	2.7	3.7	0.8	1.1
5.5	7.6	1.7	2.4	0.7	1.0	4.0	5.5	1.0	1.4	0.4	0.6	10.8	15.1	1.3	1.9	0.4	0.6
3.2	4.4	0.9	1.2	0.4	0.5	2.0	2.8	0.5	0.7	0.2	0.3	5.5	7.7	0.7	1.0	0.2	0.3

All load capacities are calculated using the elastic-plastic method acc. to EN 1993-1, partial safety factor  $\gamma_F = 1.4$ ; deflection  $\leq l / 150$ .

Determination of the allowable value

$$\text{allow. } F_z = F_{Rd} / 1.4$$

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

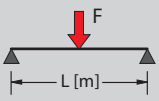
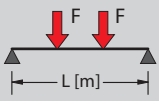
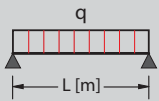


### HALFEN Framing Channels, Cold-Rolled, Non-Slotted – Bending Load Capacities

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- ③ For maximum point-load capacity:  
 $F_z = \text{max. load bearing capacity of the channel lips}$ .
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- ⑤ On request.

## HALFEN FRAMING SYSTEMS

### HALFEN Framing Channels, Cold-Rolled, Non-Slotted – Bending Load Capacities

Material: steel, type WB, FV, SV E= 210.000 N/mm <sup>2</sup>																	
Bending load capacity at span L (single span element) ②																	
 F [kN]						 F [kN]						 q [kN/m]					
allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>
0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m	
4.3	6.1	2.2	3.0	1.2	1.7	3.3	4.6	1.6	2.3	0.7	1.0	17.4	24.3	4.3	6.1	1.3	1.9
2.6	3.6	1.3	1.8	0.6	0.9	1.9	2.7	0.8	1.1	0.4	0.5	10.3	14.5	2.2	3.1	0.7	0.9
6.8	9.5	3.4	4.7	2.3	3.2	5.1	7.1	2.5	3.5	1.5	2.1	27.0	37.8	6.8	9.5	2.8	3.9
3.3	4.6	1.7	2.3	0.9	1.2	2.5	3.5	1.2	1.6	0.5	0.7	13.2	18.5	3.2	4.5	0.9	1.3
1.8	2.5	0.9	1.2	0.4	0.5	1.3	1.9	0.5	0.7	0.2	0.3	7.1	10.0	1.4	1.9	0.4	0.6
0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m	
5.6	7.8	2.8	3.9	1.9	2.6	4.2	5.9	2.1	2.9	1.3	1.8	22.3	31.2	5.6	7.8	2.4	3.3
5.5	7.7	2.7	3.8	1.8	2.6	4.1	5.7	2.1	2.9	1.3	1.8	21.9	30.6	5.5	7.7	2.3	3.3
1.9	2.7	0.9	1.2	0.4	0.5	1.5	2.0	0.5	0.7	0.2	0.3	7.8	10.9	1.4	1.9	0.4	0.6
1.9	2.7	0.8	1.2	0.4	0.5	1.4	2.0	0.5	0.7	0.2	0.3	7.6	10.6	1.4	1.9	0.4	0.6
1.00 m		2.00 m		3.00 m		1.00 m		2.00 m		3.00 m		1.00 m		2.00 m		3.00 m	
8.4	11.7	4.2	5.9	2.8	3.9	6.3	8.8	3.1	4.4	1.9	2.7	16.8	23.5	4.2	5.9	1.7	2.4
5.3	7.4	2.6	3.7	1.6	2.2	3.9	5.5	2.0	2.8	0.9	1.3	10.5	14.7	2.6	3.7	0.8	1.2
1.00 m		1.50 m		2.00 m		1.00 m		1.50 m		2.00 m		1.00 m		1.50 m		2.00 m	
7.6	10.6	5.1	7.1	3.8	5.3	5.7	8.0	3.8	5.3	2.8	4.0	15.2	21.2	6.7	9.4	3.8	5.3
7.4	10.3	4.9	6.9	3.7	5.2	5.5	7.7	3.7	5.2	2.8	3.9	14.8	20.7	6.6	9.2	3.7	5.2
2.5	3.5	1.7	2.3	1.0	1.4	1.9	2.6	1.1	1.5	0.6	0.8	5.0	6.9	1.9	2.7	0.8	1.1
2.4	3.4	1.6	2.2	1.0	1.4	1.8	2.5	1.0	1.4	0.6	0.8	4.8	6.7	1.9	2.6	0.8	1.1
15.3	21.4	10.2	14.3	7.7	10.7	11.5	16.1	7.7	10.7	5.7	8.0	30.6	42.9	13.6	19.1	7.7	10.7
0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m	
3.9	5.5	1.9	2.7	1.3	1.8	2.9	4.1	1.5	2.0	0.8	1.1	15.6	21.8	3.9	5.5	1.4	2.0
1.5	2.1	0.6	0.8	0.3	0.4	1.1	1.6	0.3	0.5	0.15	0.2	5.9	8.3	0.9	1.3	0.3	0.4
0.6	0.8	0.2	0.3	0.1	0.1	0.4	0.6	0.12	0.16	0.05	0.07	2.3	3.2	0.3	0.4	0.1	0.1
1.9	2.6	0.9	1.3	0.5	0.7	1.4	2.0	0.7	0.9	0.3	0.4	7.5	10.5	1.8	2.6	0.5	0.8
1.1	1.5	0.5	0.8	0.3	0.4	0.8	1.1	0.4	0.5	0.17	0.2	4.4	6.1	1.0	1.4	0.3	0.4
0.8	1.2	0.3	0.4	0.12	0.17	0.6	0.9	0.16	0.2	0.07	0.1	3.3	4.6	0.4	0.6	0.13	0.2
0.3	0.42	0.08	0.11	0.03	0.05	0.18	0.26	0.05	0.06	0.02	0.03	1.0	1.40	0.12	0.17	0.04	0.05

All load capacities were calculated using the elastic-plastic method acc. to EN 1993-1, partial safety factor  $\gamma_F = 1.4$ ; deflection  $\leq l / 150$ .

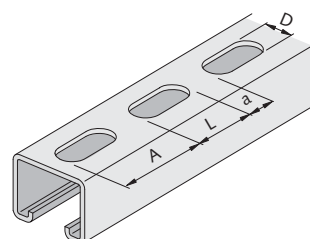
Determination of the allowable value

$$\text{allow. } F_z = F_{Rd} / 1.4$$

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

### HALFEN Framing Channels, Cold-Rolled, Slotted – Bending Load Capacities

HL/HZL channel dimensions/holes and spacings				
Profile HL/HZL	D [mm]	L [mm]	A [mm]	a [mm]
50/40	18	40	60	20
63/63	14	28	250	222
41/41	14	28	50	22
41/22	14	28	50	22
41/83	14	28	50	22
41/62	14	28	50	22
36/36	15	40	60	20
28/28	12.5	25	40	15
26/26	12.5	25	40	15
28/15	9	25	40	15
20/12	9	25	40	15



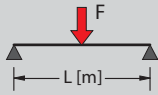
Other hole sizes and spacings on request

# HALFEN FRAMING SYSTEMS

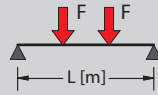
## HALFEN Framing Channels, Cold-Rolled, Slotted – Bending Load Capacities

Material: steel, type WB, FV, SV E= 210.000 N/mm<sup>2</sup>

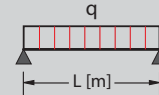
Bending load capacity at span L (single span element) ②



F [kN]



F [kN]



q[kN/m]

allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>
0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m	
5.7	7.98	2.9	4.06	1.9	2.66	4.3	6.02	2.1	2.94	1.3	1.82	22.9	32.06	5.7	7.98	2.3	3.22

allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>
0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m	
16.5	23.1	8.2	11.5	5.5	7.7	12.4	17.4	6.2	8.7	4.1	5.7	66	92.4	16.5	23.1	7.3	10.2
4.7	6.6	2.3	3.2	1.6	2.2	3.5	4.9	1.7	2.4	1.1	1.5	18.7	26.2	4.7	6.6	1.9	2.7
1.6	2.2	0.7	1.0	0.3	0.4	1.2	1.7	0.4	0.6	0.17	0.2	6.2	8.7	1.1	1.5	0.3	0.4
4.5	6.3	2.3	3.2	1.5	2.1	3.4	4.8	1.7	2.4	1	1.4	18.1	25.3	4.5	6.3	1.9	2.7
1.5	2.1	0.6	0.8	0.3	0.4	1.1	1.5	0.4	0.6	0.16	0.2	6	8.4	1	1.4	0.3	0.4

allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>
1.00 m		2.00 m		3.00 m		1.00 m		2.00 m		3.00 m		1.00 m		2.00 m		3.00 m	
7.3	10.2	3.7	5.2	2.4	3.4	5.5	7.7	2.8	3.9	1.6	2.2	14.7	20.6	3.7	5.2	1.5	2.1
4.5	6.3	2.2	3.1	1.3	1.8	3.4	4.8	1.7	2.4	0.8	1.1	9	12.6	2.2	3.1	0.7	1.0

allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. F <sub>z</sub>	F <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>	allow. q <sub>z</sub>	q <sub>Rd</sub>
0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m		0.50 m		1.00 m		1.50 m	
3.20	4.48	1.60	2.24	1.10	1.54	2.40	3.36	1.20	1.68	0.60	0.84	12.90	18.06	3.20	4.48	1.20	1.68
1.50	2.10	0.80	1.12	0.40	0.56	1.10	1.54	0.50	0.70	0.23	0.32	6.10	8.54	1.40	1.96	0.40	0.56
0.70	0.98	0.22	0.31	0.10	0.14	0.50	0.70	0.13	0.18	0.06	0.08	2.70	3.78	0.30	0.42	0.10	0.14
0.90	1.26	0.40	0.56	0.22	0.31	0.70	0.98	0.30	0.42	0.13	0.18	3.50	4.90	0.80	1.12	0.23	0.32
0.23	0.32	0.06	0.08	0.03	0.04	0.14	0.20	0.04	0.06	0.02	0.03	0.80	1.12	0.10	0.14	0.03	0.04

- ① Observe minimum distance  $a_e$  between channel end and load point (HALFEN Bolt, locking plate):  
**heavy and medium duty framing systems:**  $a_e \geq 30$  mm,  
**light duty framing systems:**  $a_e \geq 20$  mm.
- ② Do not exceed the 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.

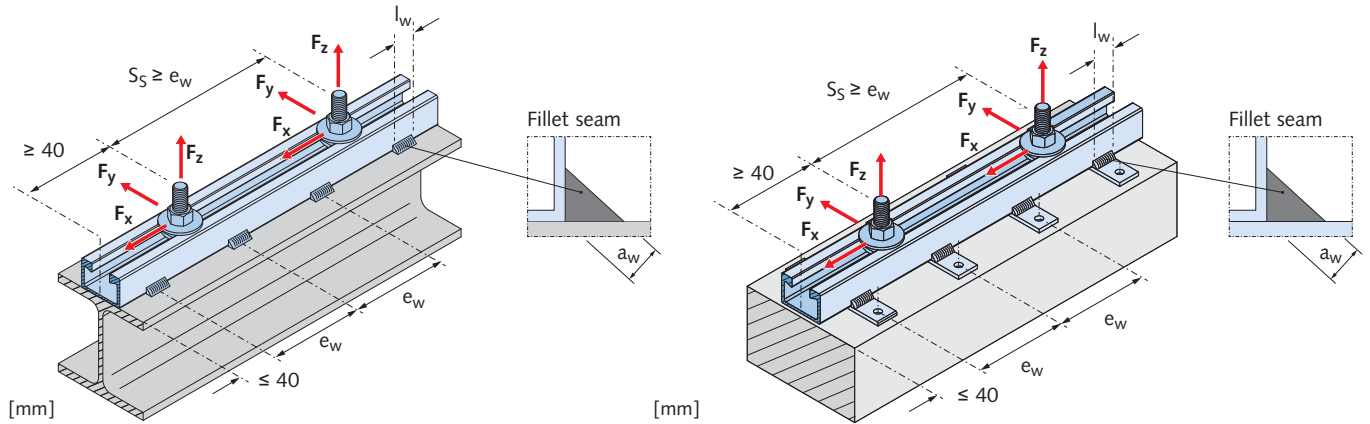
All load capacities were calculated using the elastic-plastic method acc. to EN 1993-1, partial safety factor  $\gamma_F = 1.4$ ; deflection  $\leq l / 150$ .  
Determination of the allowable value  
**allow.  $F_z = F_{Rd} / 1.4$ .**

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

## HALFEN FRAMING SYSTEMS

### Load Bearing Capacities for Welded or Bolted HALFEN Framing Channels

#### Hot-rolled framing channels welded or bolted to structural elements



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

Hot-rolled	Profile	Weld seams			Point-load bearing capacity ⑤						HALFEN Bolts	
					allowable load F① [kN]			Design values of resistance FRd① [kN]			Bolt size	Spacing
		aw [mm]	lw [mm]	ew [mm]	allow. Fz	allow. Fy	allow. Fx	Fz,Rd	Fy,Rd	Fx,Rd	diam. [mm]	Ss
	HM 72/48	5	50	300	47.0	10.8 ④	②	65.8	15.2 ④	②	M24	Ss ≥ ew
	HM 55/42	4	30	250	38.6	17.2		54.0	24.0		M20	
	HM 52/34	4	30	200	25.9	14.9		36.3	20.9		M20	
	HM 50/30	4	30	200	14.4	10.0		20.2	14.0		M20	
	HM 40/22	3	30	150	8.2	4.7		11.4	6.6		M16	
	HZM 64/44	5	40	250	38.1	12.5	27.0	53.3	17.4	37.8	M24	
	HZM 53/34	4	30	200	30.9	9.3	22.0/19.0 ③	43.3	13.1	30.8/26.6 ③	M20	
	HZM 41/27	4	30	200	17.8	4.4	12.0	25.0	6.2	16.8	M16	
	HZM 38/23	4	30	200	12.8	4.2	12.0	18.0	5.9	16.8	M16	
	HZM 29/20	3	30	150	8.0	1.5	8.0	11.2	2.0	11.2	M12	

② Recommended load bearing capacities in channel longitudinal direction for standard (non-serrated) channels can be found on the dedicated product page

③ For stainless steel

④ For this determined value, failure of the A4 bolt is decisive

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

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

resp.

$$\frac{F_{z,Ed}}{F_{z,Rd}} + \frac{F_{y,Ed}}{F_{y,Rd}} + \frac{F_{x,Ed}}{F_{x,Rd}} \leq 1$$

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

resp.

$F_{x,Ed}, F_{y,Ed}, F_{z,Ed}$  = Design values of action;

$F_{x,Rd}, F_{y,Rd}, F_{z,Rd}$  = Design values of resistance

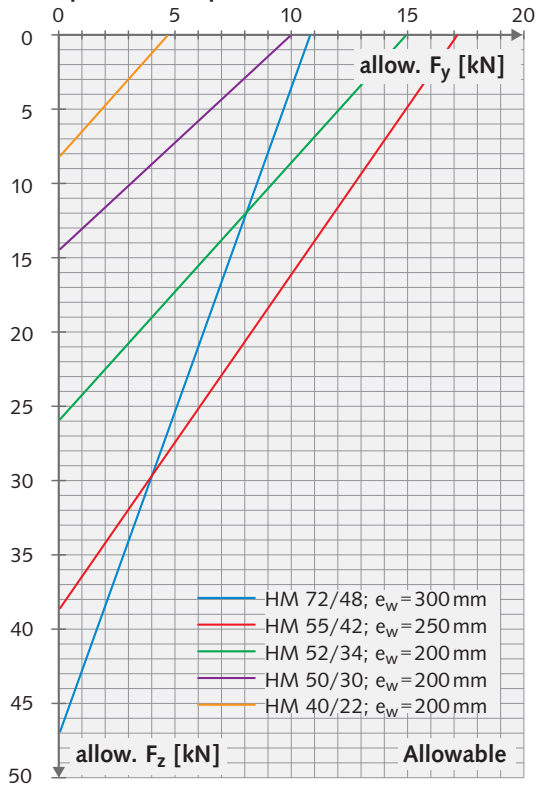
⑤ The bearing capacities are for loads acting on the front edge of the channel. For off-set transverse load (e.g. stand-off installations) the bending moment of the bolt must be considered and superimposed with the tensile load, see page 69.

# HALFEN FRAMING SYSTEMS

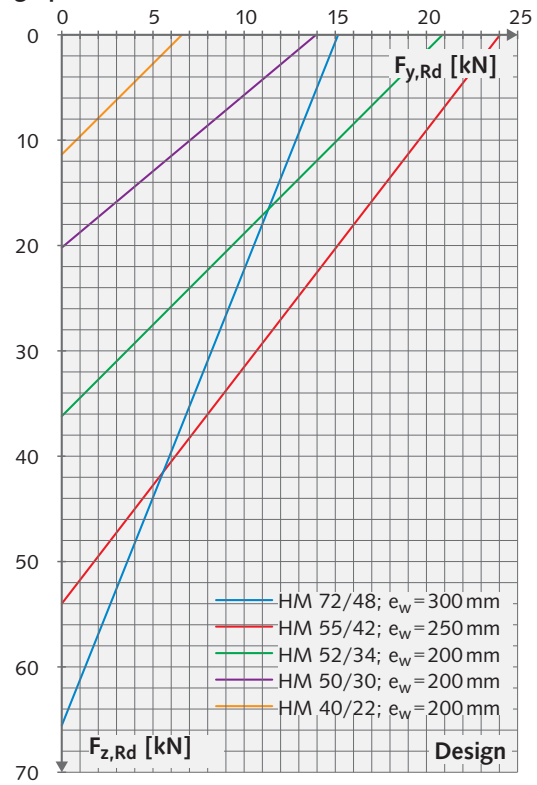
## Load Bearing Capacities for Welded or Bolted HALFEN Framing Channels

Framing channels welded or bolted to structural elements

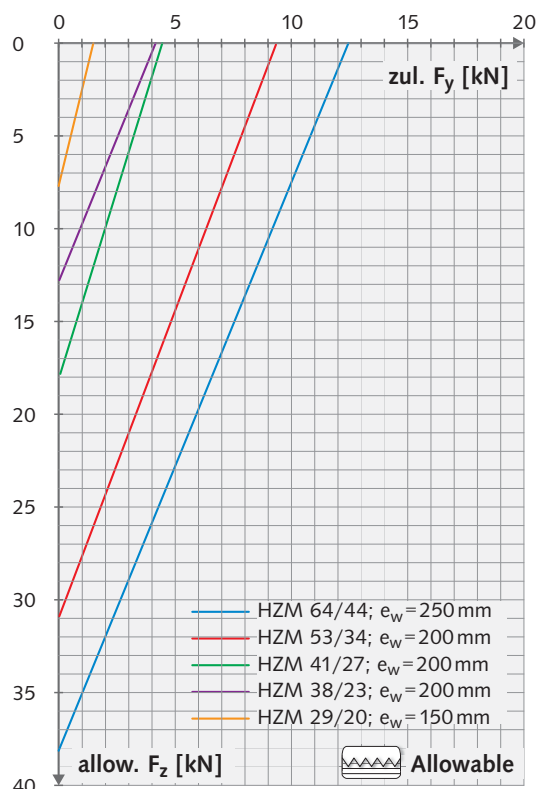
Allowable point-load capacities for HM Channels



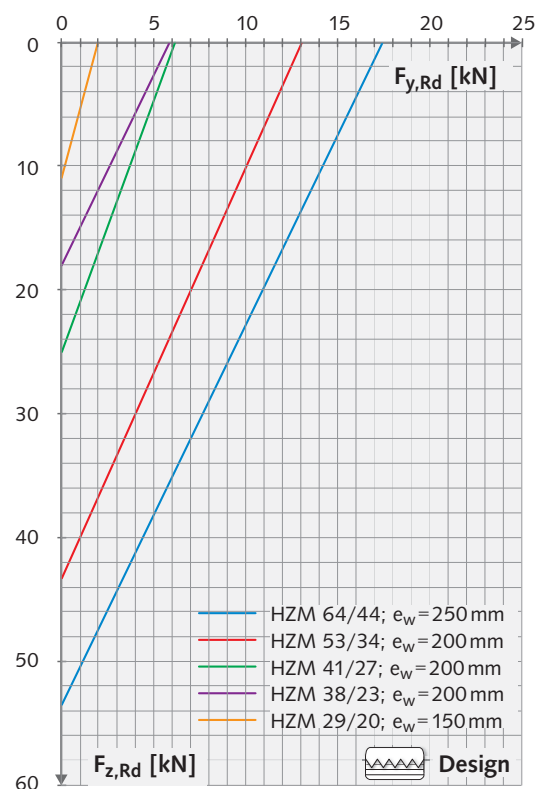
Design point-load for HM Channels



Allowable point-load capacities for HZM Channels



Design point-load for HZM Channels

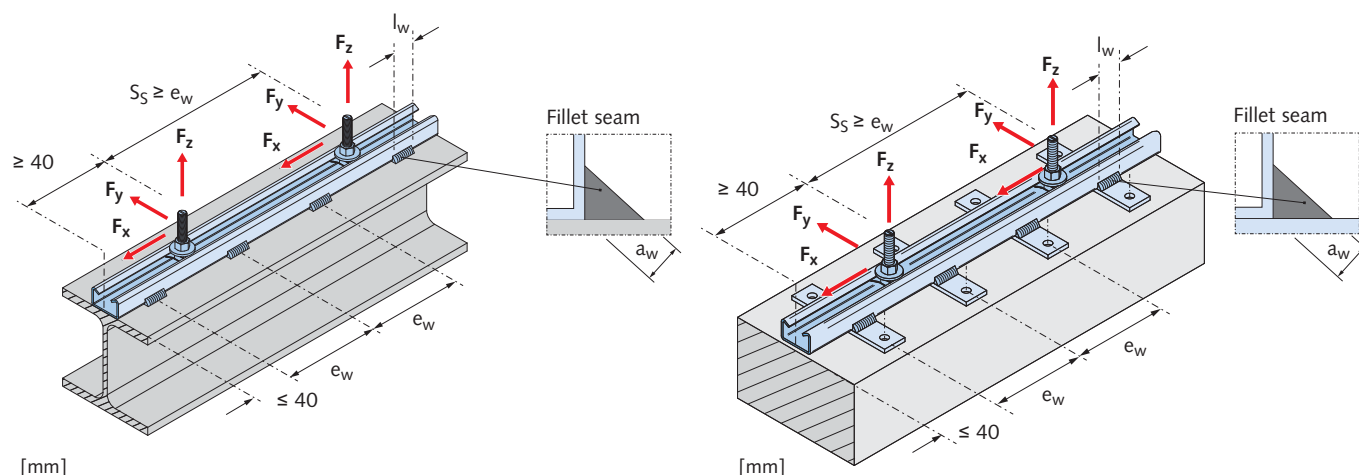




# HALFEN FRAMING SYSTEMS

## Load Capacities for Welded or Bolted HALFEN Framing Channels

### Cold-rolled framing channels welded or bolted to structural elements



### Load bearing capacities for welded or bolted cold-rolled framing channels

Cold-rolled	<p>Tension area <math>\alpha \leq 60^\circ</math></p> <p>Transverse tension area <math>\gamma &lt; 60^\circ</math></p>	Profil	Weld seams			Point-load bearing capacities ②				Longitudinal tension	
			$a_w$ [mm]	$l_w$ [mm]	$e_w$ [mm]	Tension $\alpha \leq 60^\circ$ $F_z$ [kN]		Transverse tension $\gamma < 60^\circ$ $F_y$ [kN]		allow. $F_x$	$F_{x,Rd}$
						allow. $F_z$	$F_{z,Rd}$	allow. $F_y$	$F_{y,Rd}$		
		HM 50/40	3	30	400	5.4	7.6	1.9	2.7	①	①
		HZM 41/41	3	30	300	5.6	7.8	1.2	1.7	5.0	7.0
		HZM 41/22	3	30	120	5.6	7.8	1.5	2.1	5.0	7.0
		HM 41/41	3	30	300	5.6	7.8	1.2	1.7	①	①
		HM 41/22	3	30	120	5.6	7.8	1.5	2.1		
		HM 36/36	3	30	300	4.4	6.2	1.2	1.7		
		HM 38/17	3	30	100	4.8	6.7	2.5	3.5		
		HM 28/15	3	30	100	2.5	3.5	1.2	1.7		

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

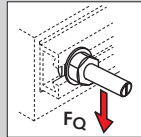
② The bearing capacities are for loads acting on the front edge of the channel. For off-set transverse load (e.g. stand-off installations) the bending moment of the bolt must be considered and superimposed with the tensile stress, see page 69.

# HALFEN FRAMING SYSTEMS

## HALFEN Bolts – Bending moments

### Bending moments of HALFEN Bolts

#### Bending moments of HALFEN Bolts



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

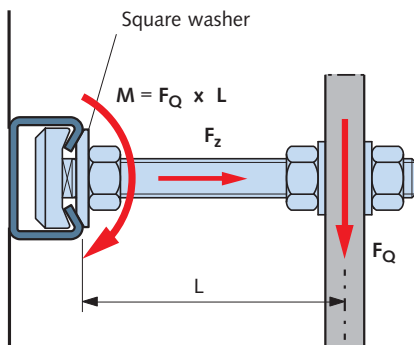
#### Strength class

Thread Ø	4.6		8.8		A2-50; A4-50		A2-70; A4-70	
	allow. M	M <sub>Rd</sub> ①	allow. M	M <sub>Rd</sub> ①	allow. M	M <sub>Rd</sub> ①	allow. M	M <sub>Rd</sub> ①
M6	2.0	2.8	-	-	1.8	2.5	3.8	5.3
M8	5.0	7.0	-	-	4.4	6.2	9.4	13.2
M10	10.0	14.0	24.9	34.9	8.7	12.2	18.7	26.2
M12	17.5	24.5	43.7②	61.2②	15.3	21.4	32.8②	45.9②
M16	44.4	62.2	111.0③	155.4③	38.8	54.3	83.3③	116.6③
M20	86.5	121.1	216.4	303.0	75.7	106.0	162.3	227.2
M24	149.7	209.4	374.2	524.0	131.1	183.3	156.2	218.7
M27	221.9	310.7	554.8	776.7	-	-	-	-
M30	299.9	419.9	-	-	-	-	-	-

① Recommended design value of bending moment capability for HALFEN Bolts

② For profile HM/HL 28/15 bending moment must be reduced to M<sub>Rd</sub> = 42 Nm resp. allow. M = 30 Nm

③ For profile HM/HL 38/17 bending moment must be reduced to M<sub>Rd</sub> = 91 Nm resp. allow. M = 65 Nm



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.



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

$$F_{z,Ed} \leq F_{Rd} \cdot \left(1 - \frac{M_{Ed}}{M_{Rd}}\right)$$

F<sub>z</sub> = existing tension load  
allow. F<sub>z</sub> = allowable load bearing capacity of the bolt  
M = existing bending moment of the bolt  
allow. M = allowable bending moment of the bolt  
resp.

F<sub>z,Ed</sub> = Design value for the existing tension load of the bolt

F<sub>z,Rd</sub> = Design value for the resistance of the bolt

M<sub>Ed</sub> = Design value for the existing bending moment of the bolt

M<sub>Rd</sub> = Design value for bending moment resistance of the bolt

# HALFEN FRAMING SYSTEMS

## Framing Channels as Compression Elements

### HALFEN Framing channels as compression element – hot-rolled

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

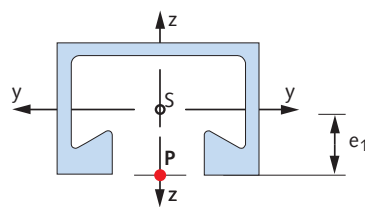
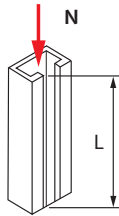


Table footnotes → see page 71

### Load bearing capacities – flexural buckling

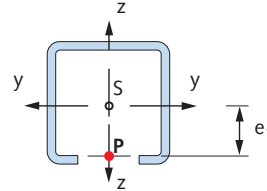
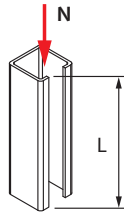
	Type	Cross-section properties					N [kN] ①,② for element length L [mm]											
		A [cm <sup>2</sup> ]	e <sub>1</sub> [cm]	I <sub>y</sub> [cm <sup>4</sup> ]	W <sub>y</sub> [cm <sup>3</sup> ]	W <sub>pl</sub> [cm <sup>3</sup> ]		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
								[kN]										
Hot-rolled framing channels	HM 72/48	11.27	2.40	34.97	14.28	18.28	N <sub>Rd</sub>	104.6	81.6	62.0	50.0	40.0	32.2	26.4	21.8	18.4	15.6	
							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	8.61	2.21	18.75	8.49	11.73	N <sub>Rd</sub>	79.0	57.5	43.0	32.8	25.1	19.8	15.8	12.9	10.7	9.0	
							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	6.34	1.74	9.33	5.35	7.19	N <sub>Rd</sub>	50.4	34.6	25.3	18.5	13.9	10.7	8.5	6.8	5.6	4.7	
							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	4.15	1.63	5.26	3.23	4.38	N <sub>Rd</sub>	31.8	21.4	15.3	11.0	8.2	6.3	4.9	4.0	3.2	2.7	
							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	2.70	1.25	1.99	1.59	2.17	N <sub>Rd</sub>	18.2	11.2	7.3	5.0	3.5	2.6	-	-	-	-	
							allow. N	13.0	8.0	5.2	3.5	2.5	1.9	-	-	-	-	
	HM 72/48 D	22.54	4.85	205.15	42.30	55.20	N <sub>Rd</sub>	195.2	169.2	148.0	128.0	110.0	98.0	87.0	77.0	68.5	61.0	
							allow. N	139.4	120.9	105.7	91.4	78.6	70.0	62.1	55.0	48.9	43.6	
	HM 55/42 D	17.22	4.20	105.70	25.17	34.27	N <sub>Rd</sub>	155.0	130.0	109.0	90.0	78.0	67.0	57.5	46.3	43.0	37.5	
							allow. N	110.7	92.9	77.9	64.3	55.7	47.9	41.1	33.1	30.7	26.8	
	HM 52/34 D	12.70	3.35	51.49	15.37	20.42	N <sub>Rd</sub>	97.0	80.0	64.5	53.5	45.0	37.5	31.8	26.9	23.1	20.0	
							allow. N	69.3	57.1	46.1	38.2	32.1	26.8	22.7	19.2	16.5	14.3	
	HM 50/30 D	8.27	3.00	26.56	8.85	11.52	N <sub>Rd</sub>	61.5	49.0	38.5	31.7	26.0	21.5	17.9	15.0	12.8	11.0	
							allow. N	43.9	35.0	27.5	22.6	18.6	15.4	12.8	10.7	9.1	7.9	
	HM 40/22 D	5.33	2.30	10.06	4.38	5.73	N <sub>Rd</sub>	37.0	27.5	20.9	16.1	12.6	10.0	8.1	6.7	5.6	4.7	
							allow. N	26.4	19.6	14.9	11.5	9.0	7.1	5.8	4.8	4.0	3.4	
	HBM 64/44	9.10	2.30	23.83	10.36	13.66	N <sub>Rd</sub>	91.0	68.0	51.0	39.5	30.5	24.3	19.5	16.0	13.3	11.2	
							allow. N	65.0	48.6	36.4	28.2	21.8	17.4	13.9	11.4	9.5	8.0	
	HBM 53/34	5.88	1.86	9.19	4.95	6.80	N <sub>Rd</sub>	51.8	35.0	25.5	18.5	13.9	10.6	8.4	6.8	5.6	4.7	
							allow. N	37.0	25.0	18.2	13.2	9.9	7.6	6.0	4.8	4.0	3.3	
	HBM 41/27	4.31	1.51	3.90	2.57	3.74	N <sub>Rd</sub>	31.5	20.0	13.2	9.2	6.7	5.0	3.9	3.1	2.5	-	
							allow. N	22.5	14.3	9.4	6.6	4.8	3.6	2.8	2.2	1.8	-	
	HBM 38/23	3.10	1.33	2.11	1.59	2.31	N <sub>Rd</sub>	20.7	12.5	7.9	5.3	3.8	2.8	2.2	-	-	-	
							allow. N	14.8	8.9	5.6	3.8	2.7	2.0	1.6	-	-	-	
	HBM 29/20	1.99	1.12	1.02	0.91	1.31	N <sub>Rd</sub>	12.5	7.1	4.3	2.8	-	-	-	-	-	-	
							allow. N	8.9	5.1	3.1	2.0	-	-	-	-	-	-	
HBM 64/44 D	18.21	4.40	127.94	29.08	38.23	N <sub>Rd</sub>	171.0	144.5	122.0	102.0	88.5	76.5	66.0	57.5	50.0	43.9		
						allow. N	122.1	103.2	87.1	72.9	63.2	54.6	47.1	41.1	35.7	31.4		
HBM 53/34 D	11.75	3.40	46.38	13.64	18.14	N <sub>Rd</sub>	100.0	81.0	63.5	53.0	43.5	36.3	30.3	25.5	21.7	18.8		
						allow. N	71.4	57.9	45.4	37.9	31.1	25.9	21.6	18.2	15.5	13.4		
HBM 41/27 D	8.62	2.70	19.91	7.37	10.22	N <sub>Rd</sub>	65.5	49.5	38.0	29.8	23.5	18.9	15.3	12.7	10.6	9.0		
						allow. N	46.8	35.4	27.1	21.3	16.8	13.5	10.9	9.1	7.6	6.4		
HBM 38/23 D	6.19	2.30	10.04	4.36	6.00	N <sub>Rd</sub>	43.6	30.9	23.4	17.5	13.5	10.6	8.5	6.9	5.8	4.9		
						allow. N	31.1	22.1	16.7	12.5	9.6	7.6	6.1	4.9	4.1	3.5		
HBM 29/20 D	3.97	2.00	5.12	2.56	3.49	N <sub>Rd</sub>	27.9	19.1	13.8	10.0	7.6	5.9	4.6	3.8	3.1	2.6		
						allow. N	19.9	13.6	9.9	7.1	5.4	4.2	3.3	2.7	2.2	1.8		

# HALFEN FRAMING SYSTEMS

## Framing Channels as Compression Elements

### HALFEN Framing 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 [kN] ①,② for element length L [mm]											
		A	e <sub>1</sub>	I <sub>y</sub>	W <sub>y</sub>	W <sub>pl</sub>												
		[cm <sup>2</sup> ]	[cm]	[cm <sup>4</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]												
								500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Cold-rolled framing channels	HM 50/40	4.26	2.18	8.64	3.96	5.53	N <sub>Rd</sub>	33.2	24.6	18.5	14.2	11.1	8.8	7.0	5.8	4.8	4.1	
							allow. N	23.7	17.6	13.2	10.1	7.9	6.3	5.0	4.1	3.5	2.9	
	HM 41/41	3.40	2.31	7.47	3.24	4.57	N <sub>Rd</sub>	26.3	19.7	15.0	11.7	9.2	7.3	6.0	4.9	4.1	3.5	
							allow. N	18.8	14.1	10.7	8.4	6.6	5.2	4.3	3.5	2.9	2.5	
	HM 36/36	2.80	2.07	4.54	2.19	3.19	N <sub>Rd</sub>	19.7	14.1	10.6	8.0	6.1	4.8	3.9	3.2	2.6	2.2	
							allow. N	14.1	10.1	7.5	5.7	4.4	3.4	2.8	2.3	1.9	1.6	
	HM 28/28	1.73	1.58	1.70	1.08	1.54	N <sub>Rd</sub>	11.4	7.5	5.2	3.7	2.7	-	-	-	-	-	
							allow. N	8.1	5.4	3.7	2.6	2.0	-	-	-	-	-	
	HM 26/26	1.05	1.48	0.95	0.64	0.90	N <sub>Rd</sub>	7.0	4.5	3.1	-	-	-	-	-	-	-	
							allow. N	5.0	3.2	2.2	-	-	-	-	-	-	-	
	HJM 41/41	3.36	2.33	7.34	3.15	4.48	N <sub>Rd</sub>	25.5	19.3	14.6	11.4	9.0	7.2	5.8	4.8	4.0	3.4	
							allow. N	18.2	13.8	10.4	8.1	6.4	5.1	4.1	3.4	2.9	2.4	
	HJM 41/41 D	6.71	4.13	36.45	8.83	12.09	N <sub>Rd</sub>	49.0	41.5	35.0	29.1	25.3	21.8	18.8	16.3	14.2	12.5	
							allow. N	35.0	29.6	25.0	20.8	18.1	15.6	13.4	11.6	10.1	8.9	
	HL 50/40	3.73	1.95	7.14	3.65	4.68	N <sub>Rd</sub>	31.5	22.8	16.9	12.8	9.8	7.7	6.1	5.0	4.1	3.5	
							allow. N	22.5	16.3	12.1	9.1	7.0	5.5	4.4	3.6	2.9	2.5	
	HL 41/41	2.98	2.14	6.07	2.84	3.82	N <sub>Rd</sub>	23.8	17.5	13.2	10.1	7.9	6.2	5.0	4.1	3.4	2.9	
							allow. N	17.0	12.5	9.4	7.2	5.6	4.4	3.6	2.9	2.4	2.0	
	HL 36/36	2.42	1.85	3.65	1.97	2.64	N <sub>Rd</sub>	18.3	12.7	9.4	7.0	5.3	4.1	3.2	2.6	-	-	
							allow. N	13.1	9.1	6.7	5.0	3.8	2.9	2.3	1.9	-	-	
	HL 28/28	1.48	1.39	1.33	0.95	1.25	N <sub>Rd</sub>	10.4	6.7	4.5	3.1	2.3	-	-	-	-	-	
							allow. N	7.4	4.8	3.2	2.2	1.6	-	-	-	-	-	
	HL 26/26	0.89	1.29	0.73	0.56	0.72	N <sub>Rd</sub>	6.3	3.9	2.6	-	-	-	-	-	-	-	
							allow. N	4.5	2.8	1.9	-	-	-	-	-	-	-	
	HZL 63/63 ③	7.09	3.01	33.07	10.06	13.51	N <sub>Rd</sub>	65.0	53.2	43.3	35.4	29.7	24.8	20.9	17.7	15.2	13.1	
							allow. N	46.4	38.0	30.9	25.3	21.2	17.7	14.9	12.6	10.9	9.4	
	HZL 41/41	2.90	2.18	5.87	2.69	3.70	N <sub>Rd</sub>	22.5	16.7	12.6	9.7	7.5	6.0	4.8	4.0	3.3	2.8	
							allow. N	16.1	11.9	9.0	6.9	5.4	4.3	3.4	2.8	2.3	2.0	

① N<sub>Rd</sub> = Design value of resistance  
allow. N = allowable load

② allow. N = N<sub>Rd</sub> / 1.4; E = 170 000 N/mm<sup>2</sup>

③ allow. N = N<sub>Rd</sub> / 1.4; E = 210 000 N/mm<sup>2</sup>

#### Note:

For higher excentricity "e > e<sub>1</sub>" a flexural buckling analysis acc. to Eurocode 3 is necessary.

# HALFEN FRAMING SYSTEMS

## Applications in Mechanical Engineering and Industrial Plant Construction

### 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 bolt  $F_s$  and to the maximum point-load capacity and respectively to the bending load capacity of the HALFEN Framing channel  $F_z$ .

$$F_i \leq \text{MIN} (F_s; F_z) \quad (\rightarrow \text{see page 50})$$

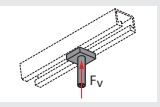
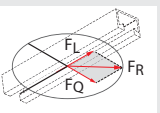
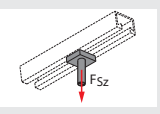
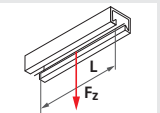
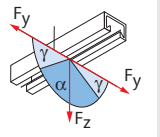
$$F_i \leq \text{MIN} (F_{\text{Bolt}}; F_{\text{Channel}}); F_{\text{Channel}} \rightarrow \text{see page 60 ff.}$$

Design value of the resistance:  $F_{R,d} = 1.4 \times F \text{ (Forces)}$

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

All following load specifications are allowable loads.

#### Symbols and definitions used for mechanical engineering — steel construction industry

HALFEN Bolts	$F_v$		<b>Preloading force, bolt</b> The preloading force of the bolt occurs by applying a torque on the bolt and is calculated according to VDI 2230 guidelines.
	$F_R$		<b>Resulting force</b> The resulting force $F_R$ is the vector addition of the external loads $F_L$ in the longitudinal channel direction and the external load $F_Q$ transverse to the longitudinal channel direction; the resulting force is frictionally connected to the channel. $F_R = \sqrt{(F_L^2 + F_Q^2)}$
	$F_{sz}$		<b>Force in the longitudinal bolt direction</b> 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 Framing channels	$F_z$		<b>Maximum point-load-carrying capacity — centric load</b> 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.
	$F_y$		<b>Load capacity of the channels under transverse load angle <math>\gamma &lt; 60^\circ</math></b> Permissible load for a defined angle to the welded or bolted channels.
Statics	$F_z$		<b>Load capacity of the channels under transverse load angle <math>\alpha \leq 60^\circ</math></b> Permissible load for a defined load angle to the welded or bolted channels.

The force  $F_{sz}$  along the screw longitudinal axis must be less or equal to the maximum point-load capacity of the framing channel  $F_z$ .

$$F_{sz} \leq F_z$$

The force  $F_Q$  transverse to the longitudinal channel direction must be less or equal to the load capacity transverse to the longitudinal channel direction of the framing channel  $F_y$ .

$$F_Q \leq F_y$$

## HALFEN FRAMING SYSTEMS

### Applications in Mechanical Engineering and Industrial Plant Construction

#### Required bolt length $L_{\text{bolt}}$

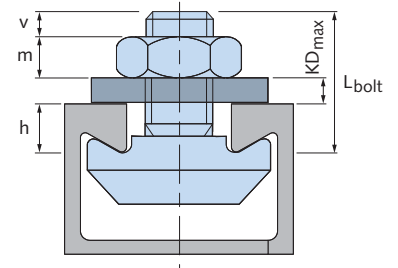
The required bolt length  $L_{\text{bolt}}$  is the sum of the clamp thickness  $KD$  and the minimum required supplement  $L_{\text{sup}}$ .

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

$$L_{\text{bolt}} = KD + L_{\text{sup}}$$

$$L_{\text{sup}} = h + m + v$$

**Minimum required supplement  $L_{\text{sup}}$**   
according to the table below



Minimum required supplement for HALFEN Bolts (heavy duty framing systems) [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	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-
M10	-	25	24	20	20	18	18	18	-	-	18	17	15	-	-
M12	-	29	27	24	23	22	22	22	-	-	21	21	16	19	18
M16	-	35	33	30	29	28	28	28	-	28	27	27	20	23	22
M20	42	39	38	34	34	-	-	-	34	32	-	-	-	29	28
M24	47	-	-	-	-	-	-	-	40	-	-	-	-	33	32
M27	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M30	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Minimum required supplement for HALFEN Bolts (medium duty framing systems) [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	-	18	18	18	18	18	18
M10	-	19	19	19	19	19	19
M12	19	23	23	23	23	23	23
M16	23	29	29	29	29	29	29
M20	29	-	-	-	-	-	-
M24	33	-	-	-	-	-	-

Minimum required supplement for HALFEN Bolts (light duty framing systems) [mm]

Thread	HM 36/36	HM 38/17	HM 28/28	HM 26/26	HM 28/15	HM 315	HM 20/12
M6	-	-	-	-	-	-	-
M8	-	-	10	9	10	9	9
M10	15	15	13	12	13	12	12
M12	18	19	14	13	14	14	-
M16	24	25	18	17	18	17	-



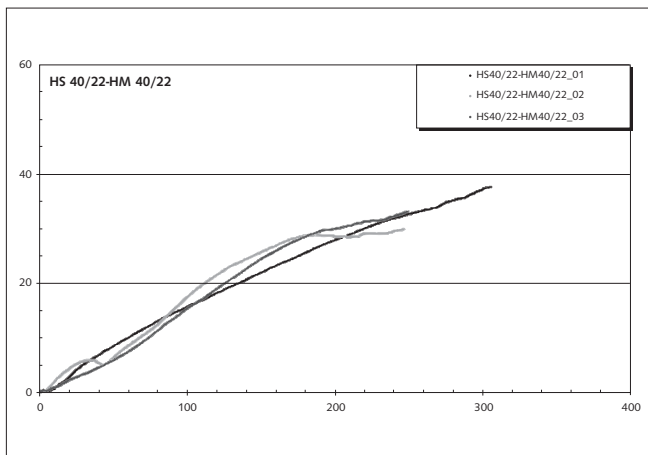
## HALFEN FRAMING SYSTEMS

### Applications in Mechanical Engineering and Industrial Plant Construction

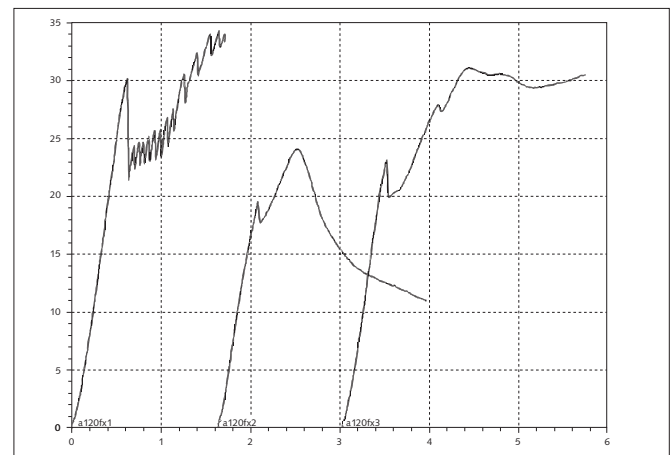
#### Static and dynamic tension tests

The transferability of static and dynamic loads for adjustable assembly systems was intensely studied in cooperation with the State Material Testing Institute at the TU Darmstadt (Technical University Darmstadt).

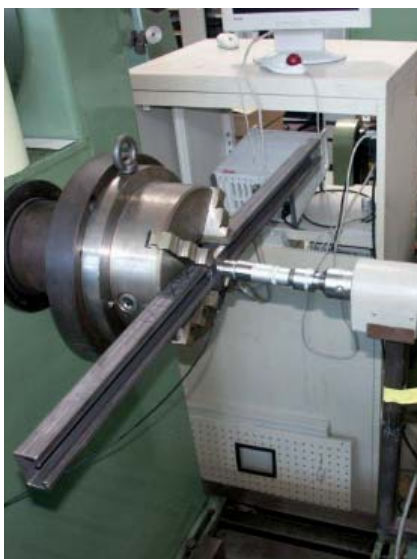
Following VDI guideline 2230, the data acquired from bolt tightening tests, static and dynamic traction tests form the basis of algorithms used for calculating adjustable assembly systems.



Graph; tightening test results



Graph, tension test results



Tightening test



Tension test



Fatigue test

# HALFEN FRAMING SYSTEMS

## Applications in Mechanical Engineering and Industrial Plant Construction

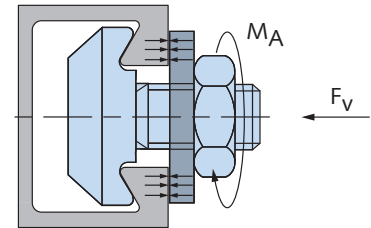
### Generating the preloading force $F_V$

During assembly of bolt connections the torque  $M_A$  induces a preloading force  $F_V$  in the bolt, which results in clamping the component to the framing channel. The preloading force  $F_V$  depends on the torque  $M_A$ , the friction coefficients  $\mu_G$  of the bolt thread and  $\mu_K$  on the nut contact surface.

The preloading forces for stainless steel bolts 50/70 and for HALFEN Bolts in steel, strength class 4.6 and 8.8 are specified in the following tables (ref. Rohloff-Matek).

The data listed for the torque  $M_A$  are recommended values. Standard delivery condition for HALFEN Bolts is non-lubricated, installation ready.

The friction coefficients  $\mu_G$  and  $\mu_K$  are 0.24.



Preload force  $F_V$ , strength class 4.6 [kN]

	$M_A$ [Nm]	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	3	3.0	2.6	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.2	1.1
M8	8	6.1	5.3	4.7	4.3	3.9	3.5	3.3	3.0	2.8	2.7	2.5	2.4	2.2
M10	15	9.2	8.0	7.1	6.4	5.8	5.3	4.9	4.6	4.3	4.0	3.8	3.6	3.4
M12	25	12.9	11.3	10.0	9.0	8.2	7.5	6.9	6.4	6.0	5.6	5.3	5.0	4.7
M16	65	25.6	22.3	19.8	17.8	16.1	14.8	13.6	12.6	11.8	11.0	10.4	9.8	9.2
M20	130	40.8	35.6	31.6	28.4	25.7	23.6	21.7	20.1	18.8	17.6	16.5	15.6	14.8
M24	230	60.5	52.8	46.8	42.0	38.2	34.9	32.2	29.9	27.8	26.1	24.5	23.1	21.9
M27	340	79.8	69.5	61.5	55.2	50.0	45.8	42.1	39.1	36.4	34.1	32.0	30.2	28.6
M30	460	96.7	84.2	74.6	67.0	60.7	55.6	51.2	47.5	44.2	41.4	38.9	36.7	34.8

Preload force  $F_V$ , strength class 8.8 [kN]

	$M_A$ [Nm]	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	20	15.2	13.3	11.8	10.6	9.7	8.9	8.2	7.6	7.1	6.6	6.2	5.9	5.6
M10	40	24.4	21.4	19.0	17.1	15.5	14.2	13.1	12.2	11.4	10.7	10.0	9.5	9.0
M12	70	36.1	31.6	28.1	25.2	22.9	21.0	19.4	18.0	16.8	15.7	14.8	14.0	13.2
M16	180	70.8	61.8	54.8	49.2	44.6	40.9	37.7	34.9	32.6	30.5	28.7	27.1	25.6
M20	360	113.1	98.6	87.5	78.5	71.3	65.2	60.1	55.8	52.0	48.7	45.8	43.2	40.9
M24	620	163.1	142.3	126.2	113.3	102.8	94.1	86.8	80.5	75.0	70.3	66.1	62.3	59.0
M27	900	211.2	183.9	162.8	146.1	132.5	121.1	111.6	103.5	96.4	90.2	84.8	80.0	75.7
M30	1200	252.1	219.7	194.7	174.7	158.5	145.0	133.6	123.8	115.4	108.1	101.6	95.8	90.7

Preload force  $F_V$ , strength class 50

	$M_A$ [Nm]	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	3	3.0	2.6	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.2	1.1
M8	7	5.3	4.6	4.1	3.7	3.4	3.1	2.9	2.7	2.5	2.3	2.2	2.1	2.0
M10	14	8.6	7.5	6.7	6.0	5.4	5.0	4.6	4.3	4.0	3.7	3.5	3.3	3.1
M12	25	12.9	11.3	10.0	9.0	8.2	7.5	6.9	6.4	6.0	5.6	5.3	5.0	4.7
M16	60	23.6	20.6	18.3	16.4	14.9	13.6	12.6	11.6	10.9	10.2	9.6	9.0	8.5
M20	120	37.7	32.9	29.2	26.2	23.8	21.7	20.0	18.6	17.3	16.2	15.3	14.4	13.6
M24	200	52.6	45.9	40.7	36.6	33.2	30.4	28.0	26.0	24.2	22.7	21.3	20.1	19.0

Preload force  $F_V$ , strength class 70

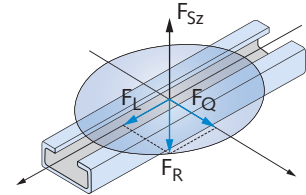
	$M_A$ [Nm]	Friction coefficient $\mu_G = \mu_K$												
		0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30	0.32	0.34	0.36
M6	7	7.0	6.2	5.5	4.9	4.5	4.1	3.8	3.5	3.3	3.1	2.9	2.7	2.6
M8	15	11.4	10.0	8.9	8.0	7.2	6.6	6.1	5.7	5.3	5.0	4.7	4.4	4.2
M10	30	18.3	16.0	14.3	12.8	11.7	10.7	9.9	9.2	8.5	8.0	7.5	7.1	6.7
M12	50	25.8	22.6	20.0	18.0	16.4	15.0	13.8	12.9	12.0	11.2	10.6	10.0	9.4
M16	125	49.2	42.9	38.0	34.2	31.0	28.4	26.2	24.3	22.6	21.2	19.9	18.8	17.8
M20	245	76.9	67.1	59.5	53.5	48.5	44.4	40.9	38.0	35.4	33.1	31.2	29.4	27.8
M24	420	110.5	96.4	85.5	76.8	69.7	63.8	58.8	54.5	50.8	47.6	44.8	42.2	40.0

## HALFEN FRAMING SYSTEMS

### Applications in Mechanical Engineering and Industrial Plant Construction

#### Transfer of static loads

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



Force  $F_{Sz}$  acts positively in the 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 frictionally 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 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 bolt longitudinal axis:

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

When designing the bolt connection the bolt tightening procedure and the 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 bolt connections is difficult to calculate using VDI 2230. Therefore the minimum necessary assembly preloading strength  $F_{M,min}$  is:

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

Taking the bolt tightening procedure into consideration with the tightening factor  $\alpha_A$  the maximum necessary assembly preloading 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 preloading force  $F_{M,max}$  must be smaller than the preloading force  $F_V$  produced by the 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 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 preloading force  $F_{M,max}$ .

# HALFEN FRAMING SYSTEMS

## Applications in Mechanical Engineering and Industrial Plant Construction

Allowable loads $F_R$ and $F_{Sz}$ – channel bolt connection								
Strength class 4.6								
		Delivery condition $\mu_G = \mu_K = 0.24$			Lubricated $\mu_G = \mu_K = 0.14$			
Thread	$M_A$ [Nm]	$F_V$ [kN]	$F_R$ [kN]	$F_Z$ [kN]	$F_V$ [kN]	$F_R$ [kN]	$F_Z$ [kN]	
M6	3	1.6	0.2	0.7	2.6	0.3	1.1	
M8	8	3.3	0.3	1.4	5.3	0.6	2.2	
M10	15	4.9	0.5	2.1	8.0	0.8	3.3	
M12	25	6.9	0.7	2.9	11.3	1.2	4.7	
M16	65	13.6	1.4	5.7	22.3	2.3	9.3	
M20	130	21.7	2.3	9.0	35.6	3.7	14.8	
M24	230	32.2	3.4	13.4	52.8	5.5	22.0	
M27	340	42.1	4.4	17.6	69.5	7.2	28.9	
M30	460	51.2	5.3	21.3	84.2	8.8	35.1	

Allowable loads $F_R$ and $F_{Sz}$ – channel bolt connection								
Strength class 8.8								
		Delivery condition $\mu_G = \mu_K = 0.24$			Lubricated $\mu_G = \mu_K = 0.14$			
Thread	$M_A$ [Nm]	$F_V$ [kN]	$F_R$ [kN]	$F_Z$ [kN]	$F_V$ [kN]	$F_R$ [kN]	$F_Z$ [kN]	
M10	40	13.1	1.4	5.5	21.4	2.2	8.9	
M12	70	19.4	2.0	8.1	31.6	3.3	13.2	
M16	180	37.7	3.9	15.7	61.8	6.4	25.7	
M20	360	60.1	6.3	25.1	98.6	10.3	41.1	
M24	620	86.8	9.0	36.2	142.3	14.8	59.3	
M27	900	111.6	11.6	46.5	183.9	19.2	76.6	

Allowable loads $F_R$ and $F_{Sz}$ – channel bolt connection								
Strength class 50								
		Delivery condition $\mu_G = \mu_K = 0.24$			Lubricated $\mu_G = \mu_K = 0.14$			
Thread	$M_A$ [Nm]	$F_V$ [kN]	$F_R$ [kN]	$F_Z$ [kN]	$F_V$ [kN]	$F_R$ [kN]	$F_Z$ [kN]	
M8	7	2.9	0.3	1.4	4.6	0.6	2.2	
M10	14	4.6	0.5	2.1	7.5	0.8	3.4	
M12	25	6.9	0.7	2.9	11.3	1.2	4.7	
M16	60	12.6	1.3	5.3	20.6	2.2	8.6	
M20	120	20.0	2.1	8.4	32.9	3.4	13.8	
M24	200	28.0	2.9	11.7	45.9	4.8	19.2	

Allowable loads $F_R$ and $F_{Sz}$ – channel bolt connection								
Strength class 70								
		Delivery condition $\mu_G = \mu_K = 0.24$			Lubricated $\mu_G = \mu_K = 0.14$			
Thread	$M_A$ [Nm]	$F_V$ [kN]	$F_R$ [kN]	$F_Z$ [kN]	$F_V$ [kN]	$F_R$ [kN]	$F_Z$ [kN]	
M8	15	6.1	0.6	2.6	10.0	1.0	4.2	
M10	30	9.9	1.0	4.1	16.0	1.7	6.7	
M12	50	13.8	0.9	5.8	22.6	1.4	9.4	
M16	125	26.2	2.7	10.9	42.9	4.5	17.9	
M20	245	40.9	4.3	17.1	67.1	7.0	28.0	
M24	420	58.8	6.1	24.5	96.4	10.0	40.2	

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:	$\mu_T = 0.25$
Tightening factor (electrical-audible torque wrench):	$\alpha_A = 2.0$
Safety factor setting of bolt connection:	$S_{set} = 1.2$

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

$$F_Q \leq F_y$$

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

$$F_{Sz} \leq F_z$$

# HALFEN FRAMING SYSTEMS

## Applications in Mechanical Engineering and Industrial Plant Construction

Point-load capacity of the HALFEN Framing channel							
	Point-load capacities for hot-rolled, welded or bolted HALFEN Framing channels				Point-load capacities for cold-rolled, welded or bolted HALFEN Framing channels		
	Profile	allow. $F_z$ [kN]	allow. $F_y$ [kN]		Profile	tension $\alpha \leq 60^\circ$ allow. $F_z$ [kN]	transverse tension $\gamma < 60^\circ$ allow. $F_y$ [kN]
Hot-rolled	HM 72/48	47.0	10.8	Cold-rolled	HM 50/40	5.4	1.9
	HM 55/42	38.6	17.2		HZM 41/41	5.6	1.2
	HM 52/34	25.9	14.9		HZM 41/22	5.6	1.5
	HM 50/30	14.4	10.0		HM 41/41	5.6	1.2
	HM 40/22	8.2	4.7		HM 41/22	5.6	1.5
	HZM 64/44	38.1	12.5		HM 36/36	4.4	1.2
	HZM 53/34	30.9	9.3		HM 38/17	4.8	2.5
	HZM 41/27	17.8	4.4		HM 28/15	2.5	1.2
	HZM 38/23	12.8	4.2		-	-	-
	HZM 29/20	8.0	1.5		-	-	-

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

### Example:

Specified:	external load in longitudinal channel direction	$F_L = 1.5 \text{ kN}$
	external load transverse to the longitudinal channel direction	$F_Q = 0.5 \text{ kN}$
	external load in longitudinal bolt direction	$F_{S_z} = 2.0 \text{ kN}$
	friction between component – channel	$\mu_T = 0.25$
	setting factor	$S_{set} = 1.2$
	tightening factor	$\alpha_A = 2$

Selected framing channel HM 50/30

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

Selected HALFEN Bolt 50/30, 4.6 in delivery condition	M 20
Preloading $F_v$	21.7 kN

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

$$F_z = 14.4 \text{ kN} > F_{S_z} \quad \checkmark$$

$$F_y = 10.0 \text{ kN} > F_Q \quad \checkmark$$

### Result:

Selected framing channel: **HM 50/30**

Selected HALFEN Bolt: **HS 50/30 – M20 - scl. 4.6 in standard delivery condition**



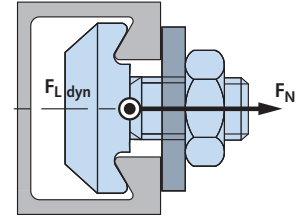
## HALFEN FRAMING SYSTEMS

Applications in Mechanical Engineering, Machine Construction and Industrial Plant Construction

### Transfer of dynamic loads

Hot-rolled assembly channels are suitable for the transfer of dynamic loads when used in conjunction with nibbed HALFEN Bolts (type HSR) or serrated HALFEN Bolts (type HZS).

The dynamic load  $F_{L\ dyn}$  acting on the building component in the longitudinal channel direction, is transferred frictionally via the channel/bolt contact surface to the channel.



A clamping force  $F_{K\ req}$  acting in the 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 bolt connection, the bolt tightening procedure and the bolt setting behavior must be considered.

The setting factor  $S_{set}$  is intended as a safety factor because the setting force loss for adjustable 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 bolt tightening procedure into consideration with the tightening factor  $\alpha_A$  the maximum necessary assembly preloading 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 preloading force  $F_{M\ max}$  must be smaller or equal to the preloading force  $F_V$  of the 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 Bolts HSR and HZS, strength class 8.8							
		Delivery condition			Lubricated		
		$\mu_G = \mu_K = 0.24$			$\mu_G = \mu_K = 0.14$		
Thread	$M_A$ [Nm]	$F_V$ [kN]	$F_{L\ dyn}$ [kN]	Typ	$F_V$ [kN]	$F_{L\ dyn}$ [kN]	Type
M12	80	22.3	2.3	HZS	36.2	3.8	HZS
M16	120	25.2	2.6	HZS	41.3	4.3	HZS
M16	200	42.1	4.4	HSR	68.8	7.2	HSR
M20	400	67.2	7.0	HSR	109.9	11.4	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:  $\mu_T = 0.25$

Tightening factor (electrical-audible torque wrench):  $\alpha_A = 2.0$

Safety factor setting of bolt joint:  $S_{set} = 1.2$

Individual calculation of bolted connections is achieved using the formulas and tables listed above.



## HALFEN FRAMING SYSTEMS

### Invitation to tender

#### Invitation to tender – examples for HALFEN Framing channels and cantilevers

##### HM 52/34 - black steel - 6070

HALFEN - Framing channel HM 52/34 profile, hot-rolled, black steel, with CE-marking in accordance with DIN EN 1090, for the flexible linking of framing constructions using system-compliant HALFEN Bolt connections.

Required framing channel length pursuant to structural requirements.

Nominal profile dimensions (width x height): 52 mm x 34 mm

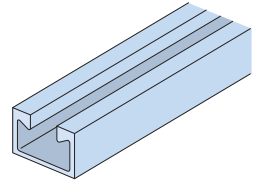
Length (mm): .....

- 6.070

- Fixed length (fixed length surcharge)

Deliver, cut to the required extent (if not fixed length) and assemble.

Please note information provided by the manufacturer regarding assembly and use.



##### HM 50/30 - HDG - 6070

HALFEN - Framing channel HM 50/30 profile, hot-rolled, hot-dip galvanised (hdg), with CE-marking in accordance with DIN EN 1090, for the flexible linking of framing constructions using system-compliant HALFEN Bolt connections.

Required framing channel length pursuant to structural requirements.

Nominal profile dimensions (width x height): 50 mm x 30 mm

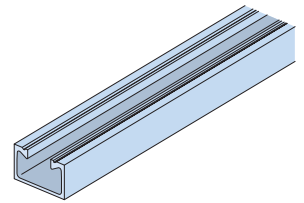
Length (mm): .....

- 6.070

- Fixed length (fixed length surcharge)

Deliver, cut to the required extent (if not fixed length) and assemble.

Please note information provided by the manufacturer regarding assembly and use.



##### HZM 53/34 - A4 - 6070

HALFEN - Framing channel HZM 53/34 profile, hot-rolled and toothed, A4, with CE-marking in accordance with DIN EN 1090, for the flexible linking of framing constructions using system-compliant HALFEN Bolt connections.

Required framing channel length pursuant to structural requirements.

Nominal profile dimensions (width x height): 53 mm x 34 mm

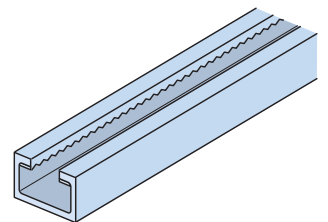
Length (mm): .....

- 6.070

- Fixed length (fixed length surcharge)

Deliver, cut to the required extent (if not fixed length) and assemble.

Please note information provided by the manufacturer regarding assembly and use.



##### HALFEN Cantilever KON 36/2, hot-dip galvanised

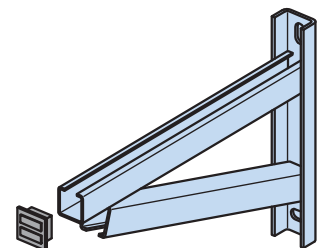
HALFEN - cantilever, KON 36/2, hot-dip galvanized (hdg), with CE-marking in accordance with DIN EN 1090, for the flexible linking of framing constructions using system-compliant HALFEN Bolt connections.

Required cantilever length pursuant to structural requirements.

Length (mm): .....

Deliver and assemble.

Please note information provided by the manufacturer regarding assembly and use.



Further tender specifications at : [www.halfen.de/Service/Tender texts](http://www.halfen.de/Service/Tender%20texts)

## HALFEN POWERCLICK SYSTEM

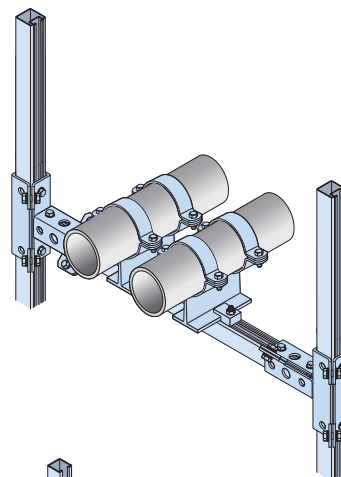
The Innovation in Pipeline Construction

The multi-functional system for any project

### POWERCLICK SYSTEM 63



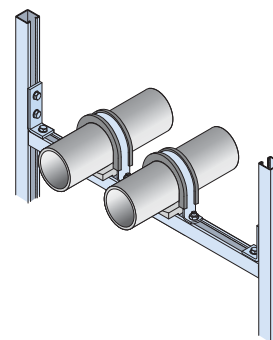
Suitable for pipes with nominal diameters up to DN 150 mm or with separate verification up to 400 mm  
→ Catalogue PC 63



### POWERCLICK SYSTEM 41



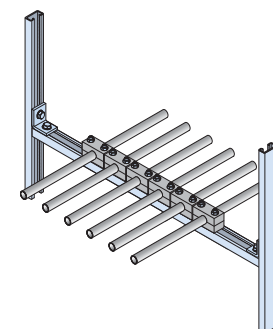
Suitable for pipes with nominal diameters up to 80 mm or with short spans up to 150 mm with separate verifications  
→ Catalogue PC 41



### POWERCLICK SYSTEM 22



Suitable for pipes with nominal diameters up to 25 mm  
→ Catalogue PC 41



### POWERCLICK ACCESSORIES

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



Product information on the internet.  
Catalogues and tender texts available at: [halfen.de/Products/Powerclick](http://halfen.de/Products/Powerclick).  
Or simply scan the code, select the required document and download the PDF.



## HALFEN FRAMING SYSTEMS

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