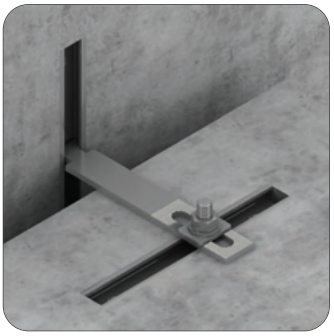
Anchor Channels
Technical Catalogue
HAZ-AC-EN/02.26

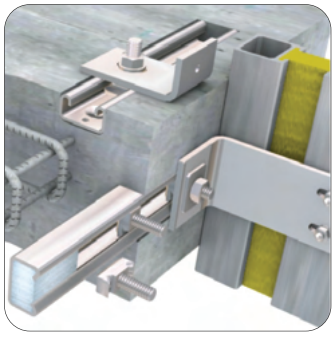
HAZ METAL

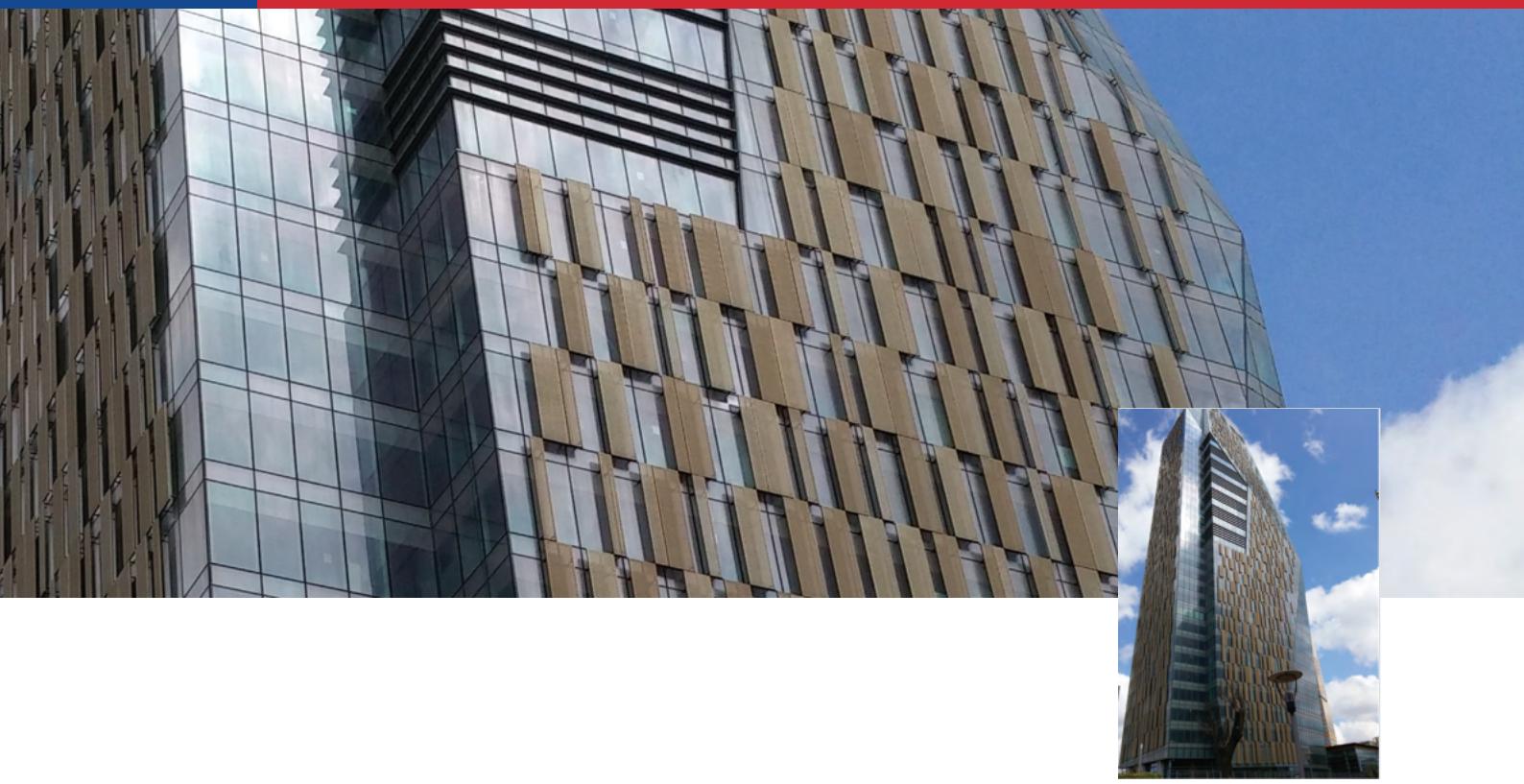
Your Fixing Systems Specialist

Anchor Channels

Product Technical Catalogue







Contents

HAZ Anchor Channels - Introduction

HMPR-CE Anchor channels are rolled steel sections with pressed studs that are used for connections made to concrete structures.

This system allows simple, fast and secure fixations to structures such as concrete slabs, beams and columns. HTB T head bolts and HMLN lock nuts are used to allow convenient connections on to anchor channels.

The use of this system is applicable in a wide range of construction works.

Features of HMPR-CE anchor channels are as follows:

• Designed in accordance with the design rules of EOTA TR 047 and DIN EN 1992-4:2019

• Allow users working with low edge distances.

• Load resistances can be improved by using higher concrete strength class on loading.

• Shear and tensile resistance in concrete can be improved with additional reinforcement.

HMPR-CE Anchor channels are manufactured by HAZ Metal A.S. in Turkey with engineering and product development provided from its sister company in Germany, HAZ Deutschland GmbH.

Since 2004 HAZ Metal has built an effective product development system to increase the integrity of its products and production procedures.

HMPR-CE channels have been tested in IFBT Leipzig in accordance to the EOTA guidelines and have received good results. The HMPR-CE anchor channels have been awarded an ETA certificate as well as German national approval.

HMPR-CE anchor channels are specified and manufactured according to the following Q&A principles:

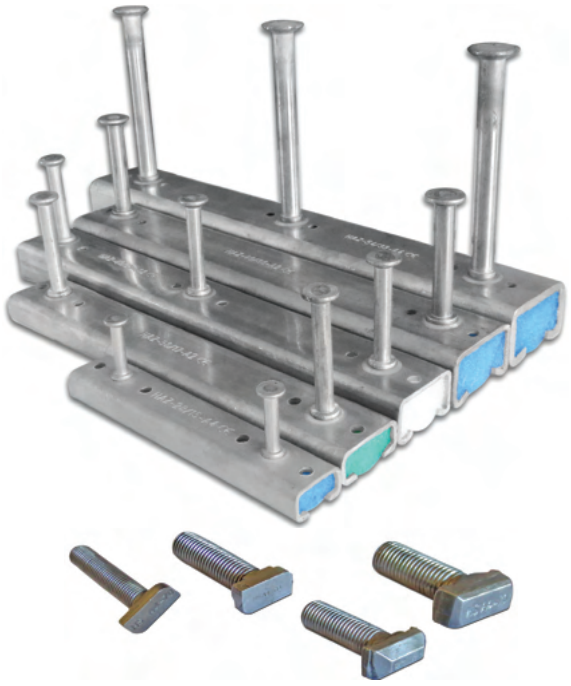
• Quality production with strict control according to European requirements.

• Periodic factory and production inspections carried out by third party authorized controlling body.

• Management and Service quality certified by ISO 9001:2015

• Euro code compatible design and product dimensioning using product selection software which is available upon request.

• Customized design & engineering is made in accordance to Eurocodes by HAZ Metal Technical department according to Eurocodes for offering solutions to meet special product requirements.



CE European Technical Approval

CE marking & (DoP)
Declaration of Performance

EOTA European Organisation for Technical Assessment

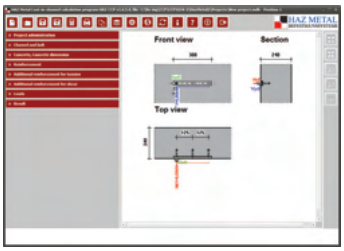
ETA European Technical Assessment ETA-17/0549 & ETA-20/0698

MFPA Advisory opinion No: GS 3.2/12-286-2

High Fire Resistance

ISO 14001 TÜV SÜD ISO 9001 OHSAS 18001 TÜRKAK

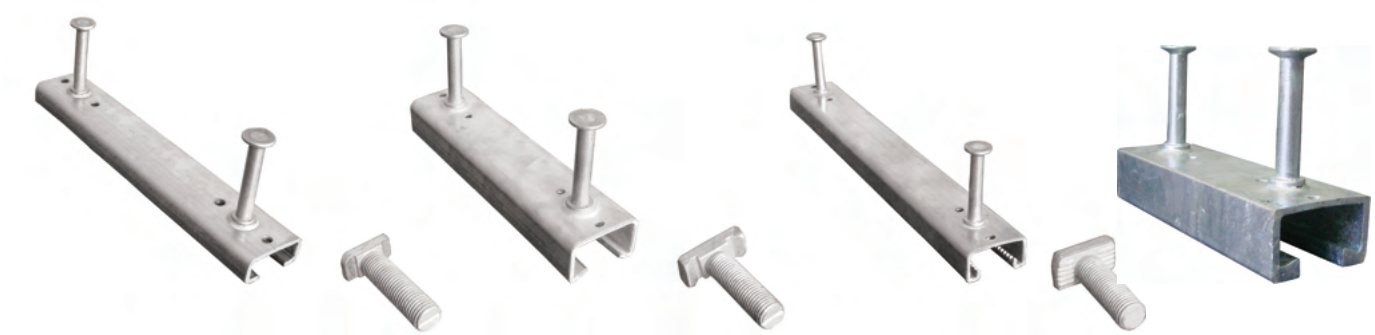
ISO 9001:2008 certified



• HAZ Channel selection software.

• Determination of load capacity with the HAZ dimensioning program

• Based on the EOTA design rule TR 047 and DIN EN 1992-4



• HMPR Cold rolled anchor channels

• HMPR-S Toothed, cold rolled anchor channels

• HMPR-H Hot rolled anchor channels

HAZ Anchor Channels - Introduction

Advantages

- No drilling on site
- Quick and easy fixing
- Fixing without damaging concrete
- Adjustable and flexible
- Safe near edges on concrete
- High load capacity
- Fixing without electrical tools
- Safe and secure fixing
- No dust particles falling onto facade
- No electricity needed
- Easy connections with T head bolts and lock nuts
- Compensation of tolerances of the structure
- Fixtures are removable and new fixing can be made

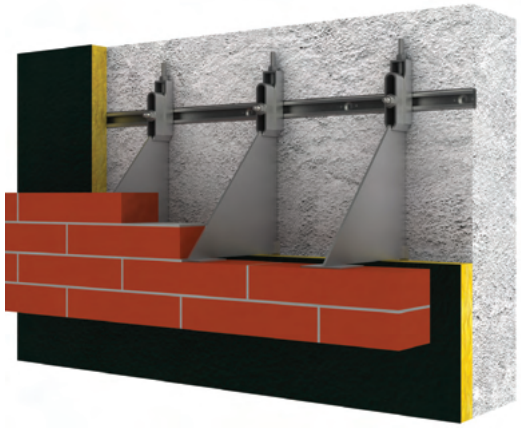
Planning

Careful planning needs to be done prior to concrete casting. Anchor channel types should be determined according to the load capacities, edge distances, area of applications etc. Anchor channel positioning should be incorporated in to the shop drawings of the form works in order to provide clear instructions for installation on site.

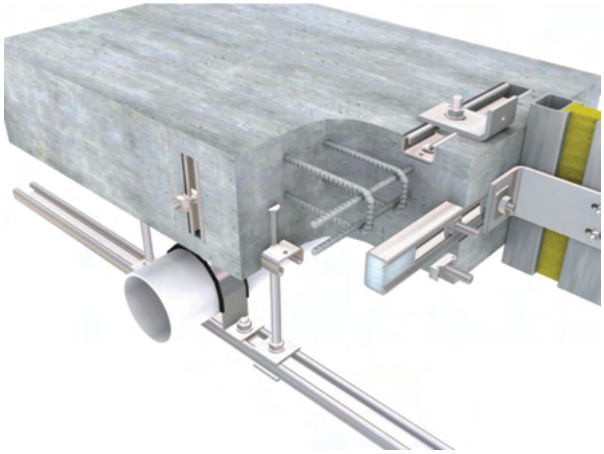
Applications

Anchor channels are widely used for the installation of curtain walls. Unitised panels with materials such as glass and natural stone already incorporated are pre-assembled in to the curtain wall panels. These panels are erected to the buildings elevation and are quickly and easily fixed on to the anchor channels using T head bolts and special brackets.

Brick walls are installed using special support brackets that are fixed on to the anchor channels using T head bolts. A continuous anchor channel embedded into the concrete wall provides high adjustability and enables quick installation of the masonry brackets. Anchor channels cover the load capacity requirements for the brickwork installation.



Anchor channels are used for a variety of construction applications which require attachments made on to concrete. Pipe and duct installation and the installation of electrical wiring are the most common applications that are made using anchor channels.



The prefabricated concrete industry is among the fastest growing fields within the construction industry. The use of anchor channels enhance the fast and economical solutions that are offered using prefabricated concrete panels. Speed and security are the benefits of using anchor channels.

ETA - European Technical Assessment

European Technical Assessment ETA

In June 2013 HMPR-CE anchor channels have been certified with an ETA certificate from DIBT (German Institute of Building Technology). HMPR-CE anchor channels are Euro code compatible that can be designed and dimensioned according to EOTA TR 047 and DIN EN 1992-4:2019 with the approved loadings in the HAZ ETA assesment. The channels that are dimensioned according to EOTA TR 047 and DIN EN 1992-4:2019 are distinguished with a code HMPR-CE and the products are stamped with the CE marking.

The ETA approval includes thorough specifications on internal and third party quality control of an on-going production. Therefore quality assurance is in place to be certain that the quality of the HMPR-CE channels correspond with the samples tested during the approval procedure.

European Standard EOTA TR 047 and DIN EN 1992-4:2019

The European EOTA standard has been implemented for the purpose of standardising the dimensioning of fastenings used for concrete structures. Any connections in to concrete such as anchor bolts and anchor channels are regulated with this standard.

CEN/ TS standards committee for the Design of fastenings for concrete was founded in 2000. In 2009 the set of regulations were published as CEN/TS 1992-4. This technical specification document is treated as a preliminary standard with an objective to turn in to a European standard. With the publication of this standard a representation of advanced fixing technology is used in practice.

Benefits of using HMPR-CE Anchor Channels

A comprehensive test program is conducted on the products in accordance to the new guidelines of ETA. Channels are wet tested to consider failure loads on channels, studs and concrete in various situations such as load direction and reduced edge distances.

With the resistance loads derived from extensive testing, greater flexibility is achieved in the design of connections into concrete. Regarding whether the concrete is reinforced or non-reinforced, cracked or uncracked, load carrying connections can be provided. Therefore numerous options are achieved which influence the results. These values can be used to achieve the most economic and effective solution for the application at hand.

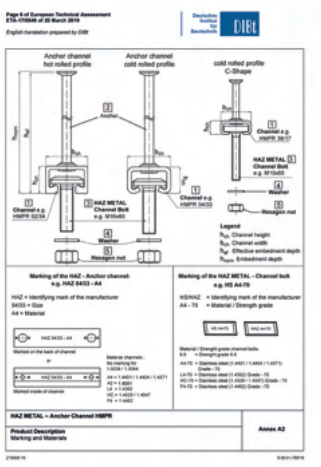
The advantages of the HMPR-CE channels can be summarized as below:

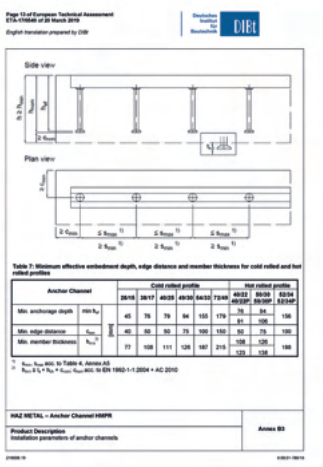
- Possibility to consider various concrete strength classes
- Recognizing reinforcement when designing the location of the anchor channel
- Highest cost effectiveness in choosing the most effective selection
- Small edge distances are possible with verified loadings
- Increased loads with additional or closely positioned reinforcements
- Optimised design by taking into account concrete strength, reinforcement lay out and component thickness

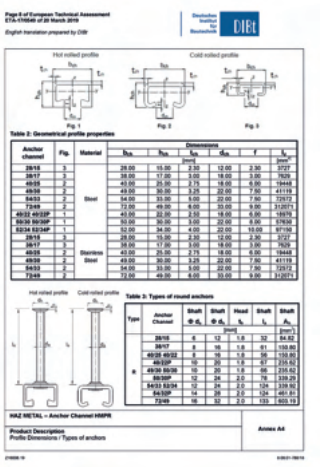
ETA - European Technical Assessment

The European Technical Assessment ETA- 17/0549 for the HMPR-CE Anchor Channels was issued by the Deutsches Institut für Bautechnik (DIBt) in 2019. This new assessment is valid on all states of Europe.

This ETA catalogue includes the dimensioning of the anchor channels in accordance with the new European standards series EOTA TR 047 and DIN EN 1992-4:2019 “Design of fastenings for use in concrete - Anchor Channels“.







Product Verification Method according to ETA

EOTA TR 047 and DIN EN 1992-4:2019

EOTA TR 047 and DIN EN 1992-4:2019 lays down a newly developed method for the design and dimensioning of anchor channels. The verification guideline is shown in the following table.

Verifications for HMPR-CE anchor channels acc. to EOTA TR 047 and DIN EN 1992-4:2019					
Tension Loading			Shear Loading		
Failure Mode			Failure Mode		
Steel Failure	Anchor	$N^a_{Ed} \le N^a_{Rd,s,a}$	Steel Failure	Anchor	$V^a_{Ed} \le V^a_{Rd,s,a}$
	Connection between anchor and channel	$N^a_{Ed} \le N^a_{Rd,s,c}$		Connection between anchor and channel	$V^a_{Ed} \le V^a_{Rd,s,c}$
	Local flexure of channel lip	$N_{Ed} \le N^a_{Rd,s,l}$		Local flexure of channel lip	$V_{Ed} \le V^a_{Rd,s,l}$
	Special screw	$N_{Ed} \le N^a_{Rd,s,s}$		Special screw	$V_{Ed} \le V^a_{Rd,s,s}$
	Flexure of channel	$M_{Ed} \le M_{Rd,s,flex}$	Pry-out failure		$V_{Ed} \le V^a_{Rd,cp}$
Pull-out failure		$N^a_{Ed} \le N_{Rd,p}$	Concrete edge failure		$V^a_{Ed} \le V^a_{Rd,c}$
Concrete cone failure		$N^a_{Ed} \le N_{Rd,c}$			

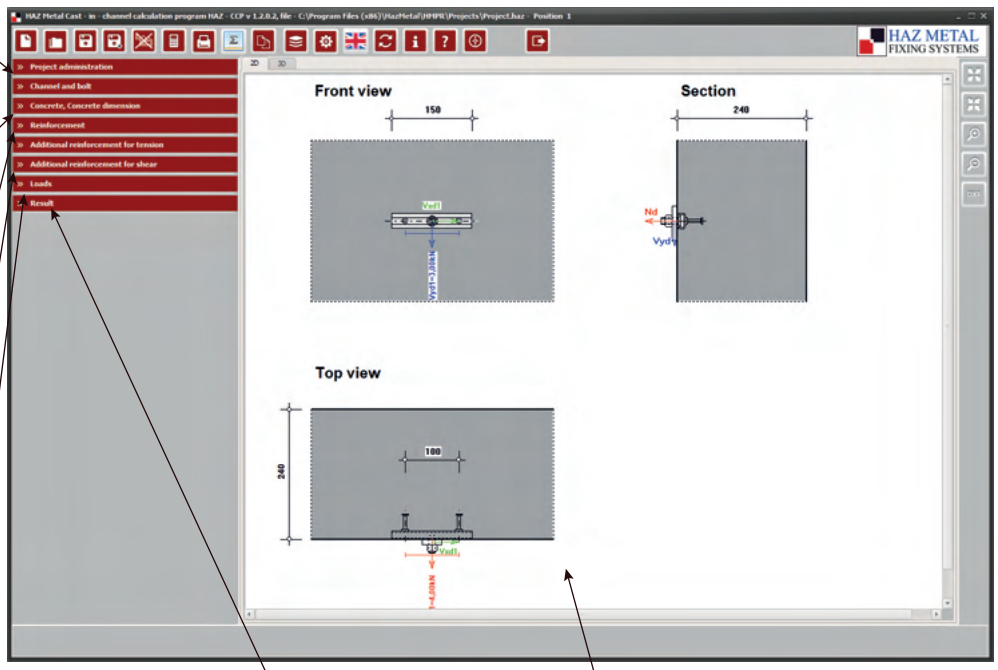
* On verification table, N_{Ed} and V_{Ed} loads represent design tensile and shear loads of channels which act on the bolt, while N^a_{Ed} and V^a_{Ed} are the loads that result on studs of the channel.

* All proofs of failure types should be checked acc. to verification table.

Dimensioning Software

The new HAZ CCP (Anchor Channel Calculation Program) for calculating HAZ Anchor channels with rules of European Technical Assessment (ETA) is a convenient and very powerful tool for users.

With this program, users will be able to design channels in a few seconds concerning with various parameters such as concrete grade, small edge distances, additional reinforcements, loads types and so on. That would require an optimum design for the user.



Channel & bolt
The type and size of the product under analysis are entered in this field

Concrete & dimension
The concete strength and the concrete member dimensions entered in this field

Reinforcement
Information on the availabilty and type of reinforcement is entered in this field

Additional reinforcement
Information on additional reinforcement for tension and shear

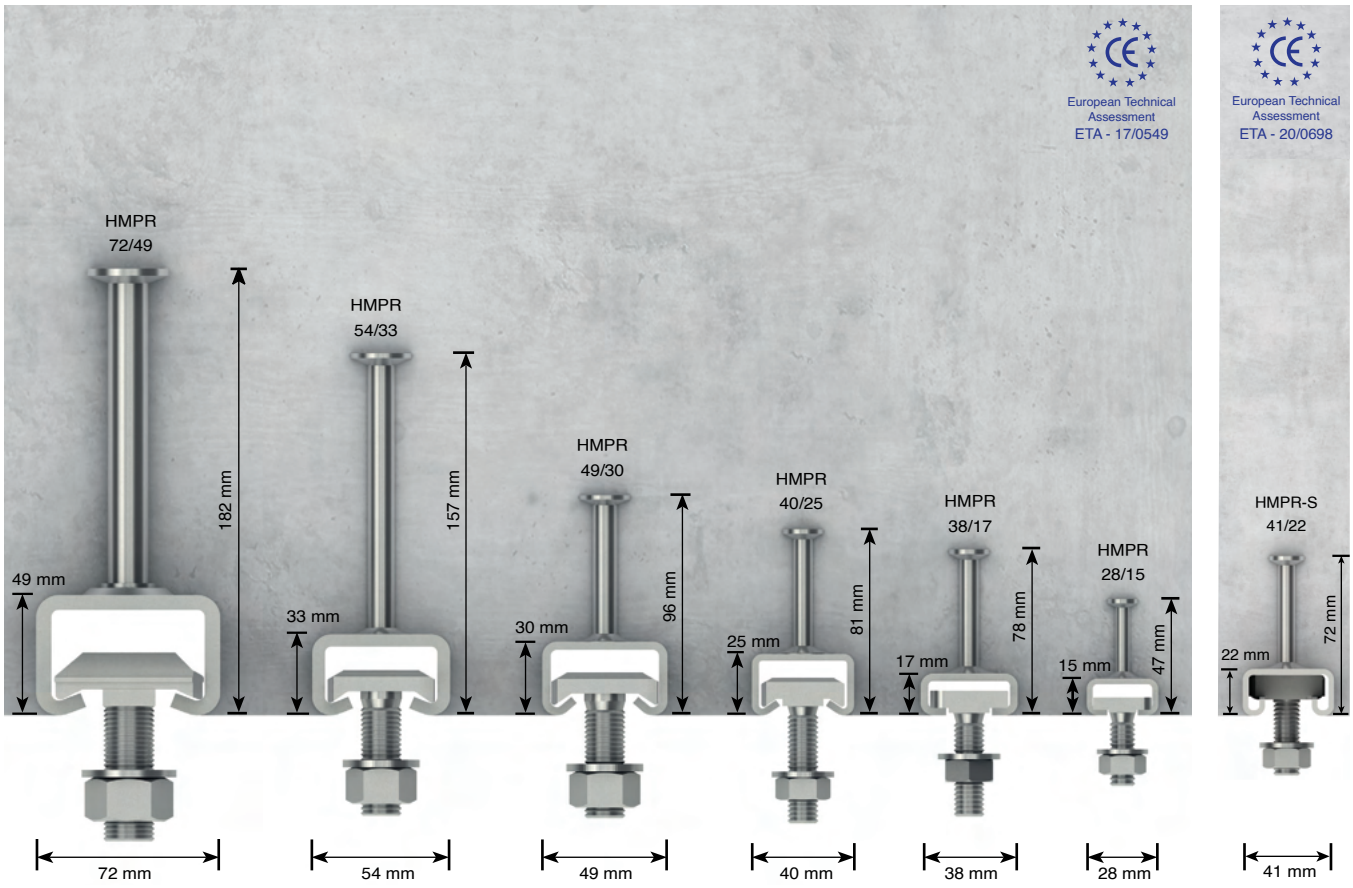
Loads
Information on loading applications are enterd in this field

Result
The results of design resistances of the product are displayed in this section

Graphics screen
Input information is diplayed in the graphics screen

HAZ Anchor Channels - Product Range

Cold rolled anchor channels - applicaple for static loads



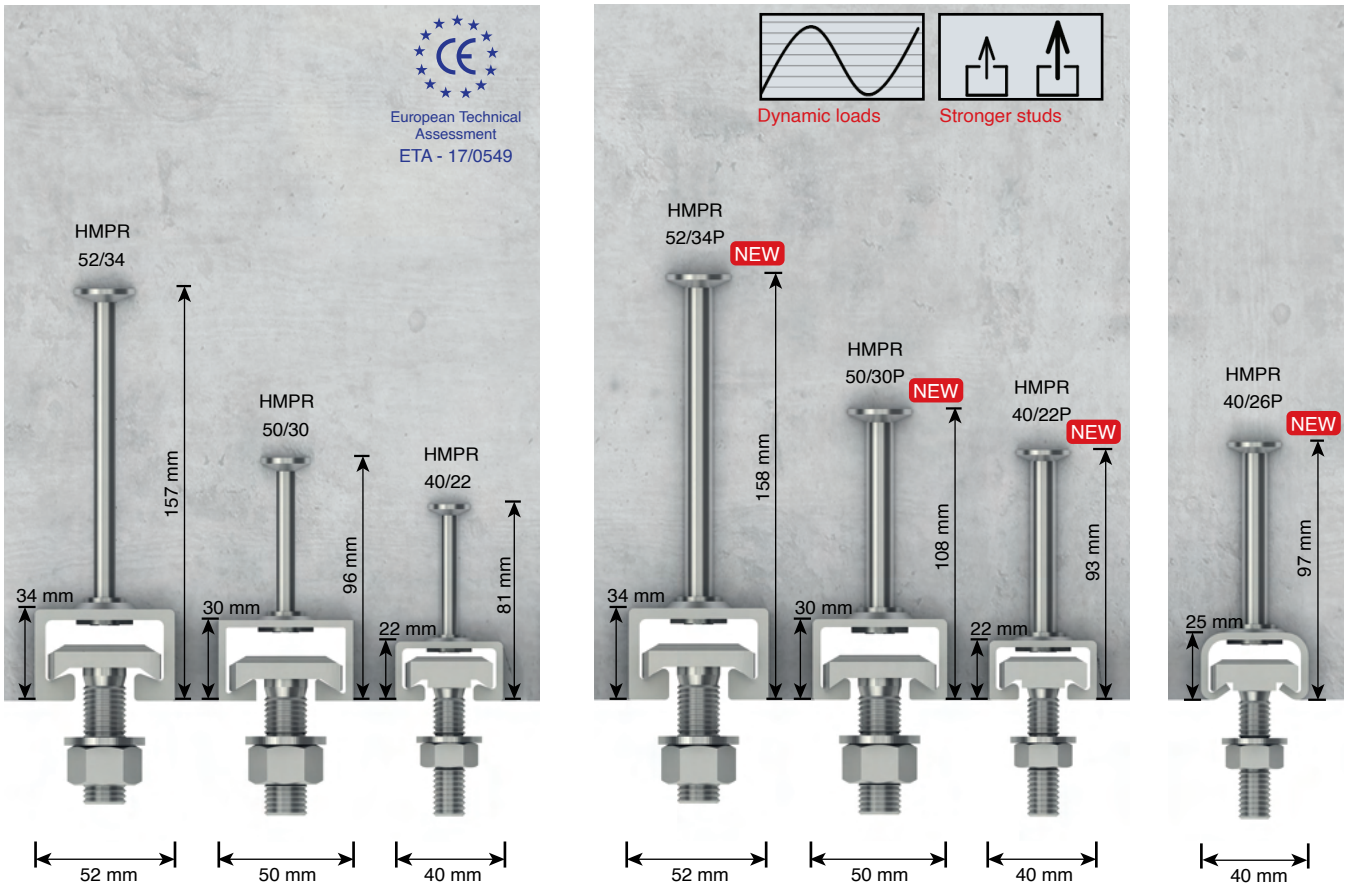
HMPR Cold rolled channels are suitable to withstand static loads. HMPR-S toothed channels are suitable to resist longitudinal loads when used with toothed t head bolts. The range available can cover resistance loads ($N_{Rd} = V_{Rd}$) between 7,2 kN and 50,5 kN. Channels are available in stainless steel 1.4301 & 1.4401 and hot dip galvanised mild steel 1.0038 & 1.0976 (S235 JR & S355 MC).

Anchor Channel Product Code	HMPR-CE 72/49	HMPR-CE 54/33	HMPR-CE 49/30	HMPR-CE 40/25	HMPR-CE 38/17	HMPR-CE 28/15	HMPR-S-CE 41/22
Channel Section	72/49	54/33	49/30	40/25	38/17	28/15	41/22
Load Capacity (kN) $N_{Rd} = V_{Rd}$ Steel / Stainless steel	45 / 50.5	41.67 / 36.6	17.2 / 25	12.2 / 15	10.5 / 12.2	7.2 / 8.3	7.27 / 11.77
Channel Flexure (Nm) Steel / Stainless steel $M_{Rd,s,flex}$	9868 / 6408	2832 / 2696	1646 / 1600	1179 / 911.3	517.4 / 566.1	303.5 / 302.6	420 / 299.13

T Head Bolt Product Code	HAZ-HS HTB-72			HAZ-HS HTB-50			HAZ-HS HTB-50			HAZ-HS HTB-40			HAZ-HS HTB-38			HAZ-HS HTB-28			HAZ-HS HTB-S-41	
Metric Size	M20	M24	M30	M12	M16	M20	M12	M16	M20	M10	M12	M16	M10	M12	M16	M8	M10	M12	M12	M16
T.Bolt min spacing (mm) S_{slb}	100	120	150	60	80	100	60	80	100	50	60	80	50	60	80	40	50	60	60	80

HAZ Anchor Channels - Product Range

Anchor channels - applicape for static & fatigue loads



HMPR Hot rolled channels are suitable to with stand dynamic loads as well as static loads. HMPR-P Hot rolled "powered" channels are a new version product with stronger and longer pressed studs that are tested and certified for use under dynamic loading. These channels are available in hot dip galvanized mild steel finish 1.0038 (S235JR). A new and patented cold rolled channel type HMPR 40/26P that certified for dynamic loads is also available to offer an economic option. The HMPR 40/26P channel is available in stainless steel as well as Hot dip galvanized mild steel finish 1.0038 (S235JR).

Anchor Channel Product Code	HMPR-CE 52/34	HMPR-CE 50/30	HMPR-CE 40/22	HMPR-CE 52/34P	HMPR-CE 50/30P	HMPR-CE 40/22P	HMPR-CE 40/26P
Channel Section (mm)	52/34	50/30	40/22	52/34P	50/30P	40/22P	40/26P
Load Capacity (kN) $N_{Rd} = V_{Rd}$ Steel / Stainless steel	29.77	17.67	12.61	28.66	22.33	13.22	12.66 / 14.77
Channel Flexure (Nm) Steel / Stainless steel $M_{Rd,s,flex}$	2440	2704	1261	2440	2704	1261	1260 / 911

T Head Bolt Product Code	HAZ-HS HTB-50			HAZ-HS HTB-50			HAZ-HS HTB-40			HAZ-HS HTB-50			HAZ-HS HTB-50			HAZ-HS HTB-40			HAZ-HS HTB-40		
Metric size	M12	M16	M20	M12	M16	M20	M10	M12	M16	M12	M16	M20	M12	M16	M20	M10	M12	M16	M10	M12	M16
T.Bolt min spacing (mm) S_{slb}	60	80	100	60	80	100	50	60	80	60	80	100	60	80	100	50	60	80	50	60	80

Standard Lengths

Standard Channel Lengths

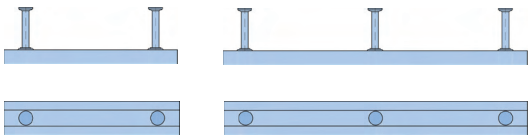
The list of the standard product range is showed on the table in accordance with European Technical Approval requirements. Other lengths and anchor numbers can be supplied depending on request.

For further information please contact us.

Product Length Range of HAZ HMPR-CE Anchor Channels - Length / Number of Anchors													
Cold Rolled Anchor Channels for Static Loads							Anchor Channels for Fatigue & Static Loads						
HMPR-CE 72/49	HMPR-CE 54/33	HMPR-CE 49/30	HMPR-CE 40/25	HMPR-CE 41/22	HMPR-CE 38/17	HMPR-CE 28/15	HMPR-CE 52/34	HMPR-CE 50/30	HMPR-CE 40/22	HMPR-CE 52/34P	HMPR-CE 50/30P	HMPR-CE 40/22P	HMPR-CE 40/26P
170/2	170/2	150/2	150/2	150/2	100/2	100/2	170/2	150/2	150/2	170/2	150/2	150/2	150/2
200/2	200/2	200/2	200/2	200/2	150/2	150/2	200/2	200/2	200/2	200/2	200/2	200/2	200/2
250/2	250/2	250/2	250/2	250/2	200/2	200/2	250/2	250/2	250/2	250/2	250/2	250/2	250/2
300/2	300/2	300/2	300/2	300/2	250/2	250/2	300/2	300/2	300/2	300/2	300/2	300/2	300/2
350/2	350/3	350/3	350/3	350/3	300/3	300/3	350/3	350/3	350/3	350/3	350/3	350/3	350/3
450/3	400/3	400/3	400/3	400/3	350/3	350/3	400/3	400/3	400/3	400/3	400/3	400/3	400/3
650/3	550/3	550/3	550/3	550/3	450/3	450/3	550/3	550/3	550/3	550/3	550/3	550/3	550/3
970/4	820/4	800/4	800/4	800/4	550/4	550/4	820/4	800/4	800/4	820/4	800/4	800/4	800/4
	1070/5	1050/5	1050/5	1050/5	850/5	850/5	1070/5	1050/5	1050/5	1070/5	1050/5	1050/5	1050/5
	3070/13	3050/13	3050/13	3050/13	1050/6	1050/6	3070/13	3050/13	3050/13	3070/13	3050/13	3050/13	3050/13
	6070/25	6050/25	6050/25	6050/25	3050/16	3050/16	6070/25	6050/25	6050/25	6070/25	6050/25	6050/25	6050/25
					6050/31	6050/31							
130≤Ss≤ 400	100 ≤ Ss ≤ 250				50 ≤ Ss ≤ 200		100 ≤ Ss ≤ 250						
Ss = Anchor spacing													

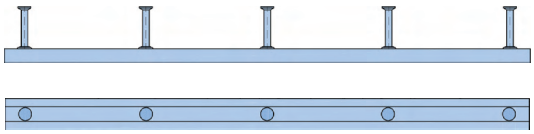
Standard short length channels

Short lenght channels are available from 100 mm to 950 mm with stud quantities and spacings according to the table above.



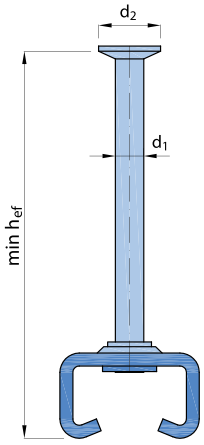
Standard long length channels

Long length channels are supplied in 1050, 3030 and 6070 mm lengths with varying stud spacings according to section type of the channel.



Types of round anchors studs

Type	Anchor	Shaft d1	Head d2	min hef
		(mm)	(mm)	(mm)
Round Studs	28/15	6	12	45
	38/17	8	16	76
	40/25	8	16	79
	49/30	10	20	94
	54/33	12	24	155
	72/49	16	32	179
	40/22	8	16	76
	50/30	10	20	94
	52/34	12	24	156
HMPR Round Studs	40/22P	10	20	91
	50/30P	12	24	106
	52/34P	14	28	156
	40/26P	10	20	94

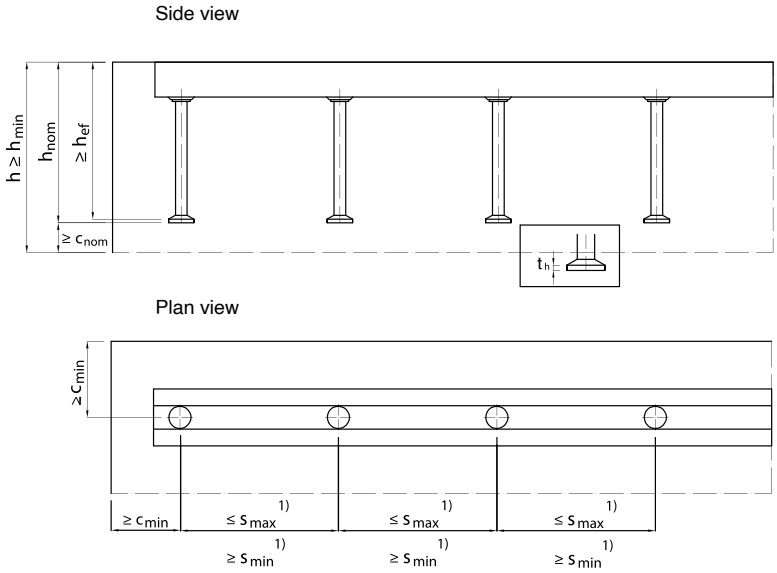


Anchor Spacings & Minimum Edge Distances

Anchor stud spacings

In order to meet the resistance loads, anchor stud spacings should be positioned according to the tables below.

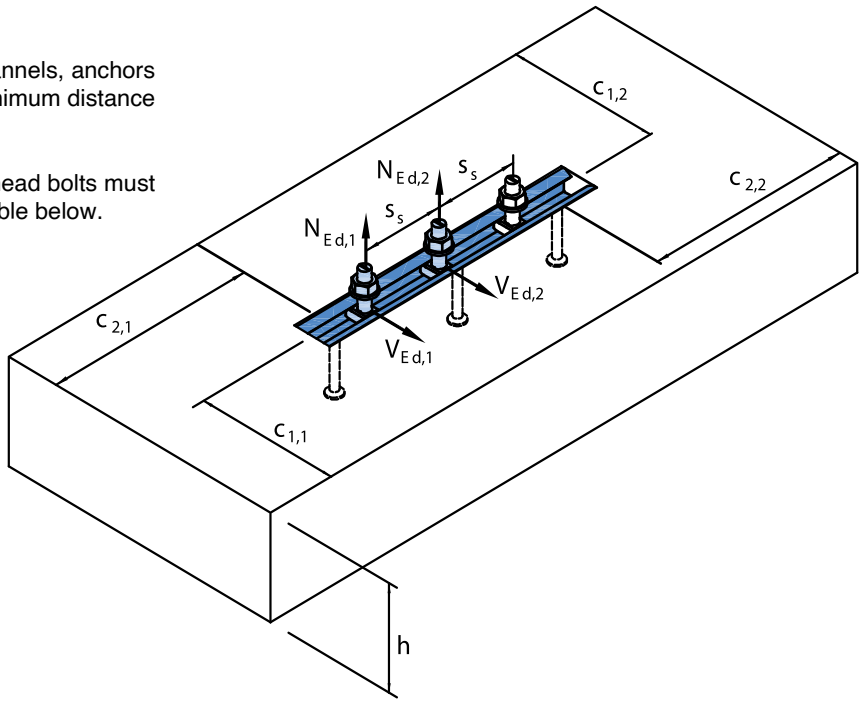
Anchor Channel	Anchor Spacing		End Spacing (x)	Min. Effect. Embed. hef (x)
	smin	smax	Round Anchor	Round Anchor
	(mm)			
28/15	50	200	25	45
38/17	50	200	25	76
40/25	100	250	25	79
41/22	100	250	25	79
49/30	100	250	25	94
50/30	100	250	35	35
50/30	100	250	35	35
54/33	100	250	35	35
52/34	100	250	35	35
72/49	130	400	35	35
40/22P	100	250	25	25
50/30P	100	250	35	35
52/34P	100	250	35	35
40/26P	100	250	25	25



Minimum edge distances

Depending on the type of the channels, anchors studs must be positioned at a minimum distance from the component edges.

The minimum spacings of the T head bolts must be adhered to according to the table below.



Anchor Channel			28/15			38/17			40/22P & 40/26P 40/25 & 40/22			50/30P 49/30 & 50/30			50/30P 54/33 & 52/34			72/49		
Special screws	M	[mm]	8	10	12	10	12	16	10	12	16	12	16	20	12	16	20	20	24	30
Min. spacing of screws	Ss,min		40	50	60	50	60	80	50	60	80	60	80	100	60	80	100	100	120	150
Min. anchorage dept	min hef		45			76			79			94			155			179		
Min. edge distance	Cmin		40			50			50			75			100			150		
Min. member thickness	hmin		hef + t h + Cnom																	

Installation Details & Section Views

Installation of the anchor channels

The correct and safe use of the anchor channel can be guaranteed according to the following installation conditions:

• The installation of the anchor channels must be made with competent and experienced persons.

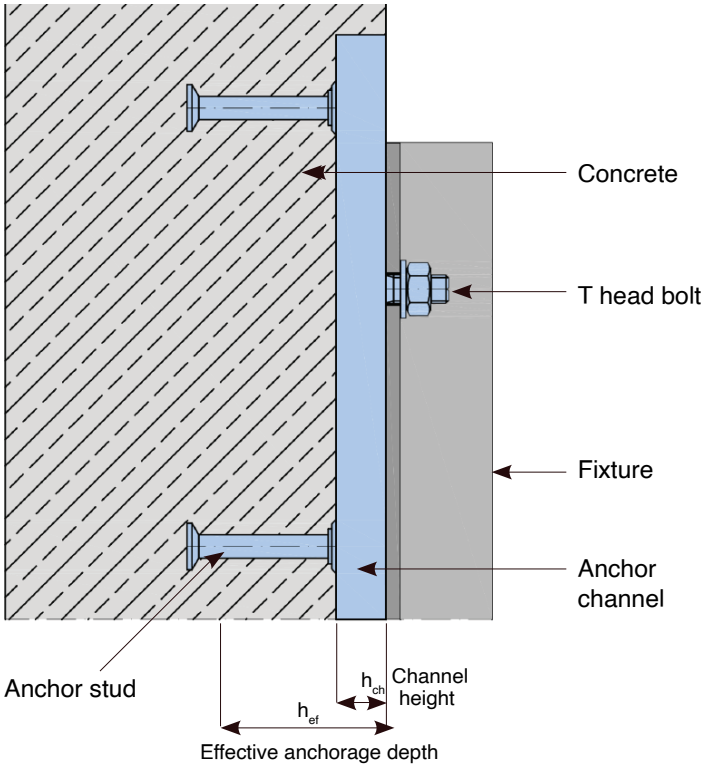
• Installation must be made with the manufacturers specifications and drawings.

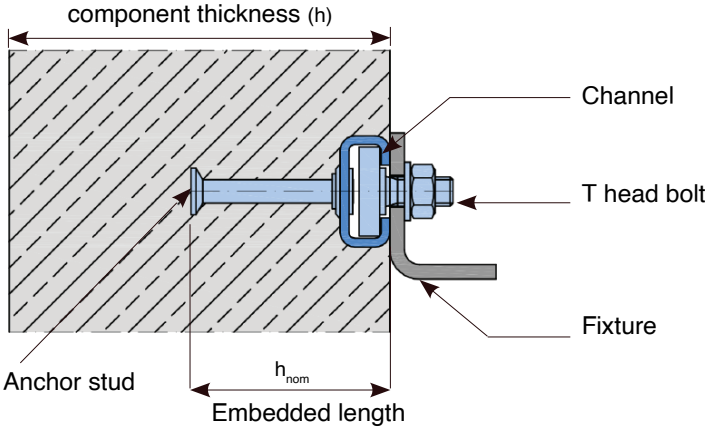
• Fixing on the form work must be done tightly. No movement of the channels should occur during laying of reinforcement bars. Pouring, compacting of the concrete should not effect the position of the anchor channels.

• The concrete under the head of the anchor channels must be properly compacted

• Size and positioning of the T head bolts must correspond to the specification and drawings

• Setting torques of the T head bolts must not be exceeded





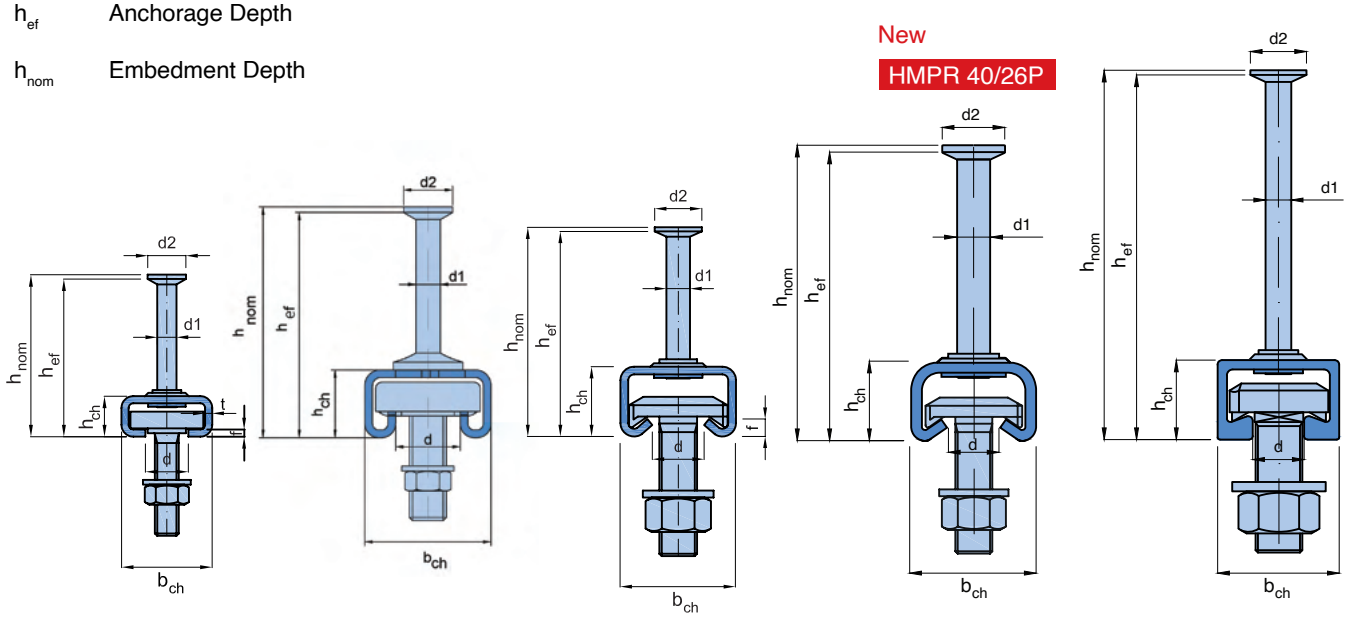
Typical Section Views

Legend:

h_{ch}	Channel Height
b_{ch}	Width of Channel
h_{ef}	Anchorage Depth
h_{nom}	Embedment Depth

New

HMPR 40/26P

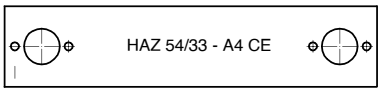


Anchor Channel Marking & Material Grades

Marking

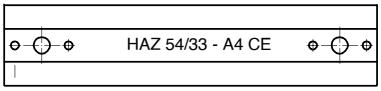
Marking of the HAZ - anchor channel :
e.g. HAZ 54/33 - A4

HAZ = Identifying mark of the manufacturer
54/33 = Size
A4 = Material



Marked on back of channel

or



Marked inside of channel

Stainless Steel & Mild Steel
Material of channels:

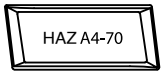
A2 = 1.4301

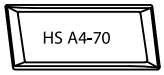
A4 = 1.4401 / 1.4404 / 1.4571

HDG = 1.0038 /1.0044
Hot dip Galvanized
coating thickness ≥ 50 µm

Marking of the HAZ - special screw
e.g. HS A4-70

HS & HAZ = Identifying mark of the manufacturer
A4-70 = Material / Strength grade





Material / Strength grade special screws:
4.6 = Strength grade 4.6
8.8 = Strength grade 8.8
A4-50 = Stainless steel (1.4401 / 1.4404 / 1.4571) Strength grade - 50
A4-70 = Stainless steel (1.4401 / 1.4404 / 1.4571) Strength grade - 70
A4-70 = Stainless steel (1.4362 / 1.4462) Grade - 70

Material Types

Materials and intended use				
Spesification	Dry conditions	Internal conditions with usual humidity	Medium corrosion exposure	High corrosion exposure
	Material types required for use in structures subject to dry internal conditions with the exception of usual humidity (e.g. accomodations, offices schools, hospitals etc.)	Material types required for use in structures subject to internal conditions with usual humidity (e.g. kitchen, bath and laundry in residential buildings)	Material types required for use in structures subject to external atmospheric exposure (including industrial and marine environment) or in permanently damp internal conditions.	Material types required for use in structures subject to exposure in particular aggressive conditions (e.g. immersion of sea water, chloride atmosphere) or atmosphere with chemical polution (e.g. in desulphurization plants)
Channel material grade	Steel 1.0038;1.0044 EN 10025 hot-dip-galv ≥ 50 um	Steel 1.0038;1.0044 EN 10025 hot-dip-galv ≥ 50 um	Stainless steel 1.4401/1.4404/1.4571 1.4362, EN 10088	Stainless steel 1.4462/1.4529/1.4547 EN 10088
Anchor material grade	Steel 1.0038;1.0214,1.0401 1.1132,1.5525 EN 10263 hot-dip-galv ≥ 50 um	Steel 1.0038;1.0214,1.0401 1.1132,1.5525 EN 10263 hot-dip-galv ≥ 50 um	Stainless steel 1.4401/1.4404/1.4571 1.4362, EN 10088	Stainless steel 1.4462/1.4529/1.4547 EN 10088
T head bolt material grade	Steel strength grade 8.8/4.6 EN ISO 898-1 e-galv ≥ 5 um	Steel strength grade 8.8/4.6 EN ISO 898-1 hot-dip-galv ≥ 50 um	Stainless steel 1.4401/1.4404/1.4571 1.4362, EN 3506-1	Stainless steel 1.4462/1.4529/1.4547 EN 3506-1
Washer material grade	Steel EN 10025 e-galv ≥ 5 um	Steel EN 10025 hot-dip-galv ≥ 50 um	Stainless steel 1.4401/1.4404/1.4571 EN 10088	Stainless steel 1.4462/1.4529/1.4547 EN 10088
Nut material grade	Steel strength grade 8.8 EN 20898-2 e-galv ≥ 5 um	Steel strength grade 8.8 EN 20898-2 hot-dip-galv ≥ 50 um	Stainless steel 1.4401/1.4404/1.4571 EN ISO 3506-2	Stainless steel 1.4462/1.4529/1.4547 EN ISO 3506-2

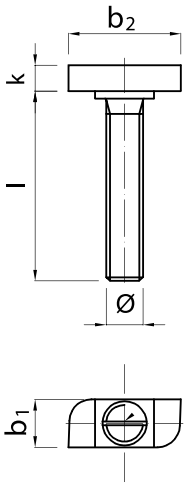
1) Available on request
2) Steel acc. to EN 10025, 1.0038 not for anchor channels 28/15 and 38/17
3) Electroplated acc. to EN ISO 4042
4) Hot-dip galvanized on the basis of EN ISO 1461, and coating thickness ≥ 50 µm

T Head Bolts Dimensioning

Dimensions of the HAZ METAL Special Screws & Strength Grade

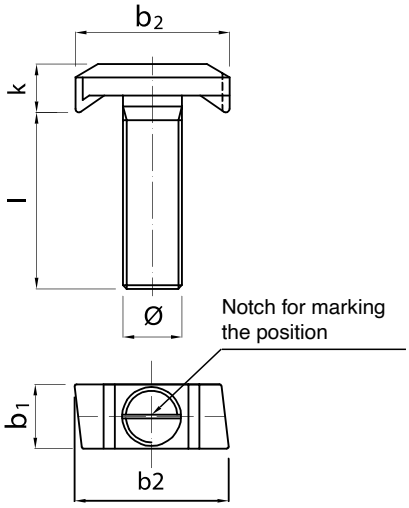
Hammer-head screw

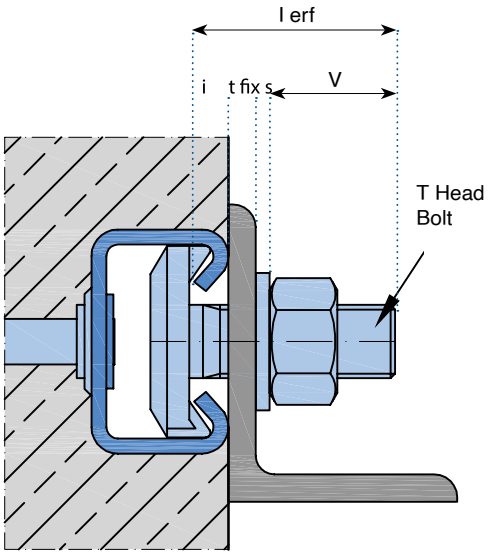
Fig. 1



Hook-head special screw

Fig. 1





l erf Bolt length
i Channel lip thickness
t fix Fixture thickness
s Washer thickness
V Minimum thread length

Dimensions of the HAZ METAL Special Screws:

Anchor Channel	Fig.	Dimensions [mm]				Length l [mm]
		b1	b2	k	Ø	
28/15	1	10	23	4	8	15-200
	1	10	23	5	10	20-300
38/17	1	13	31	6	8	20-300
	1	13	31	6	10	20-300
	1	13	31	7	12	20-300
	1	13	31	7	16	20-300
40/22P 41/22 40/25 40/26P	2	14	35	7,5	10	20-300
	2	14	35	7,5	12	20-300
	2	14	34	8,5	16	20-300
49/30 50/30P 52/34P 54/33	2	13	43,3	10	10	20-300
	2	13	43,3	10	12	20-300
	2	17	43,3	11	16	20-300
	2	21	43,3	12	20	30-300
72/49	2	23	58	14	20	50-300
	2	25	58	16	24	50-300
	2	31	58	20	30	50-300

Special Screws	Steel 1)		Stainless Steel 1)	
Strength grade	4.6	8.8	A4-50	A4-70
f_{uk} [N/mm^2]	400	800	500	700
f_{yk} [N/mm^2]	240	640	210	450
Finish	z.p., h.d.g			

1) Materials according to Annex 3, Table 1

• The length of the T bolt must be determined using the formula
(L erf = tfix + i + s + v)

Dimensions V_{min}

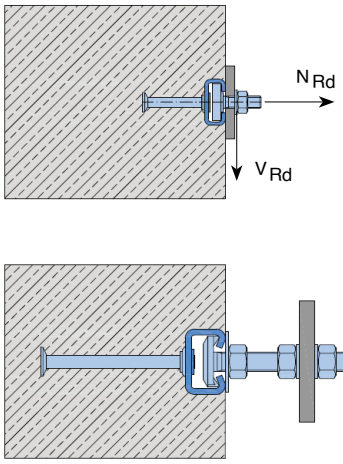
T head bolt Metric size	V_{min} (mm)
M8	12.5
M10	14.5
M12	17.0
M16	20.5
M20	26.0
M24	29.0
M30	33.5

Dimensions of channel lip i

Anchor Channel	i (mm)
28/15	2.25
38/17	3.00
40/25	5.60
49/30	7.39
54/33	7.90
72/49	9.90

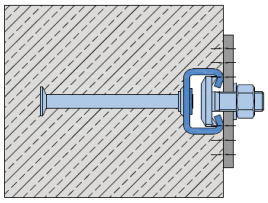
T head Bolts Load Properties

T head bolts characteristic load values

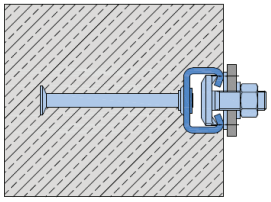


T Head Bolt		M8	M10	M12	M16	M20	M24	M30
max fixture hole dia. (mm)		9	12	14	18	22	26	33
4.6	N_{Rd}	7.3	11.6	16.9	31.4	49.0	70.6	112.2
	V_{Rd}	4.3	6.9	12.1	22.6	34.7	50.7	80.6
	M_{Rd}	9.0	17.9	31.4	79.8	155.4	268.9	538.7
8.8	N_{Rd}	19.5	30.9	44.9	76.0	122.0	165.6	242.5
	V_{Rd}	11.7	18.6	27.0	50.2	78.4	99.2	145.6
	M_{Rd}	24.0	47.8	84.0	213.0	415.4	718.4	1439.2
A4-50	N_{Rd}	6.4	10.1	14.8	27.4	42.8	61.7	98.1
	V_{Rd}	3.8	6.1	10.6	19.8	30.9	44.5	70.7
	M_{Rd}	7.9	15.7	27.5	70.0	136.3	235.8	472.5
A4-70	N_{Rd}	13.7	21.7	31.3	58.8	82.4	132.1	210.0
	V_{Rd}	8.2	13.0	18.9	35.2	49.2	95.1	151.0
	M_{Rd}	16.8	33.5	58.8	149.4	291.3	503.7	1009.2

Minimum spacing and setting torque of T head bolts



General:
The fixture is braced to the concrete and channel respectively. The stated torque values must not be exceeded.

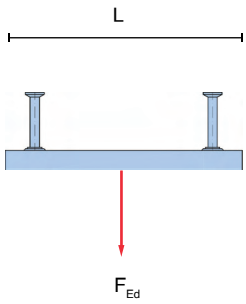


Steel to steel:
The fixture is braced to channel with use of a suitable washer. The stated torque values must not be exceeded.

Cast-in Channel	T Head Bolt Diameter	T bolt spacing Ss,min	Setting Torque T_{inst}		
			General	Steel-steel contact 8.8	Steel-steel contact A4-70
28/15	M8	40	8	20	20
	M10	50	13	40	40
	M12	60	15	50	50
38/17	M10	50	15	40	40
	M12	60	25	70	70
	M16	80	45	100	120
40/22P 40/25 40/26P	M10	50	15	40	40
	M12	60	25	70	70
	M16	80	45	150	150
49/30 50/30P	M12	60	25	70	50
	M16	80	60	180	180
	M20	100	75	90	190
52/34P 54/33	M12	60	25	70	50
	M16	80	60	180	180
	M20	100	120	120	320
72/49	M20	100	120	360	-
	M24	120	200	360	-
	M30	150	380	400	-

Load Tables & Calculation Examples

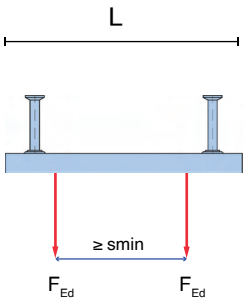
Single Loading



Channel Type	T Head bolt	Minimum edge distance ar (mm)	Component minimum thickness h (mm)	Resistance Load FRd (kN) Resultant load / Single Loads						
				Channel length L (mm) / no of anchor studs						
				150 (2)	200 (2)	250 (2)	300 (2)	350 (2)	350 (3)	1050
28/15	M8,10,12	65	100	6.5	6.9	6	-	-	6.9	5.6
38/17	M12,16	100	130	10.5	10.5	10.3	-	-	10.5	8.3
40/25 41/22 40/22	M16	130	150	12.2	12.2	12.2	12.2	-	12.2	7.4
49/30 50/30	M16,20	195	180	17.2	17.2	17.2	17.2	-	17.2	9.3
54/33 52/34	M20	260	250	39.5	40.8	41.1	41.3	-	39.8	13.9
72/49	M24,30	325	300	-	44.8	44.9	44.9	44.9	-	17

Concrete grade

Pair Loading

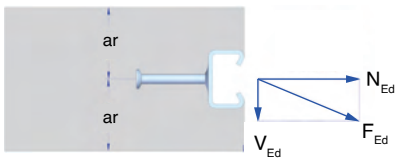


Channel Type	T Head bolt	Minimum edge distance ar (mm)	Component minimum thickness h (mm)	Resistance Load FRd (kN) Resultant loads / Pair Loads				
				Channel length L (mm) / no of anchor studs				
				200 (2)	250 (2)	300 (2)	350 (2)	350 (3)
28/15	M8,10,12	65	100	4	-	4.3	-	4.3
38/17	M12,16	100	130	6.6	-	6.8	-	7.2
40/25 41/22 40/22	M16	130	150	8.6	8.8	-	-	9.2
49/30 50/30	M16,20	195	180	13	13.4	-	-	13.7
54/33 52/34	M20	260	250	20.9	21.3	-	-	21.5
72/49	M24,30	325	300	27.2	27.7	-	28.1	-
Minimum t bolt spacing s min (mm)				100	125	125	150	150

Concrete grade

Load arrangement

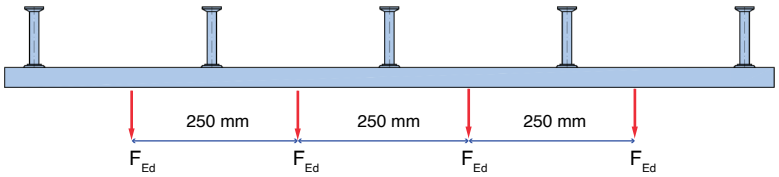
Resultant Desgined Load



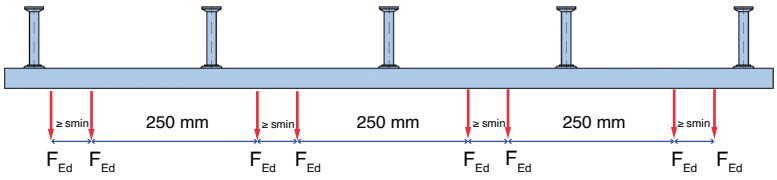
N_{Ed} = Design value of an action tensile load
V_{Ed} = Design value of an action shear load
F_{Ed} = Design value of an action resultant

$$F_{Ed} = \sqrt{N_{Ed}^2 + V_{Ed}^2}$$

Single loading - long channels



Pair loading - long channels



Calculation examples

Example 1:

Tension N_{Ed} = 5,0 kN
Shear V_{Ed} = 4,0 kN
Resultant $F_{Ed} = \sqrt{5,0^2 + 4,0^2} = 6,4$ kN

Chosen: HMPR-28/15-150: F_{Rd} 6,5 kN

Example 2:

Tension N_{Ed} = 10,5 kN
Shear V_{Ed} = 0 kN
Resultant $F_{Ed} = \sqrt{10,5^2 + 0^2} = 10,5$ kN

Chosen: HMPR-38/17-200: F_{Rd} 10,5 kN

Example 3:

Tension N_{Ed} = 0 kN
Shear V_{Ed} = 15,0 kN
Resultant $F_{Ed} = \sqrt{0^2 + 15,0^2} = 15,0$ kN

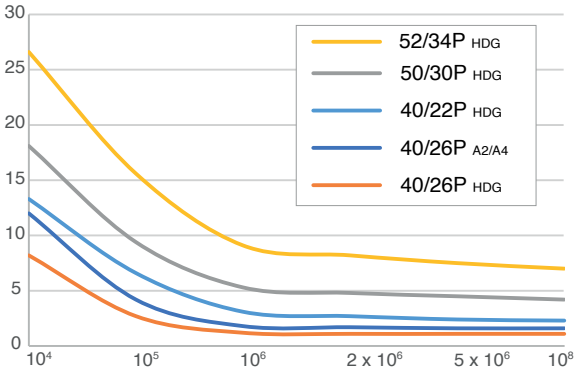
Chosen: HMPR-49/30-200: F_{Rd} 15,0 kN

HAZ Anchor Channels Dynamic Loads

Fatigue resistance at lower limit of amplitude = 0

The fatigue resistance for loads with a load range where the lower limits of amplitude are equel to zero can be read directly from the S-N curve according to ETA-09/0338 for any number of load cycles.

Fatigue resistance $\Delta N_{Rd,0}$ [kN]



Fatigue resistance $\Delta N_{Rd,0}$ [kN]

Load cycles	Characteristic fatigue limit resistance (n → ∞)				
	40/22P HDG - A2/A4	40/26P HDG	50/30P HDG	52/34P HDG	40/26P A2/A4
≤ 10^4	13.3	8.2	18.1	26.6	12
≤ 10^5	6.6	2.7	9.4	15.6	4.2
≤ 10^6	3.1	1.2	5.3	9.1	1.8
≤ 2 x 10^6	2.7	1.1	4.8	8.2	1.7
≤ 5 x 10^6	2.4	1.1	4.5	7.5	1.6
≤ 10^8	2.3	1.1	4.2	7.0	1.6

Combination of anchor channels and T-bolts for cyclic tensile stress

Profile	T-Bolts	
40/26P	M12	8.8, A4
40/22P	M12	8.8
50/30P	M16	8.8
52/34P	M16	8.8

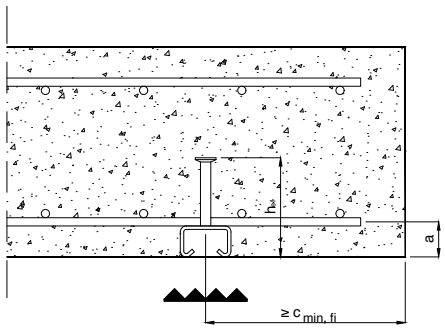
FIRE EXPOSURE

Characteristic resistance under tension and shear load under fire exposure

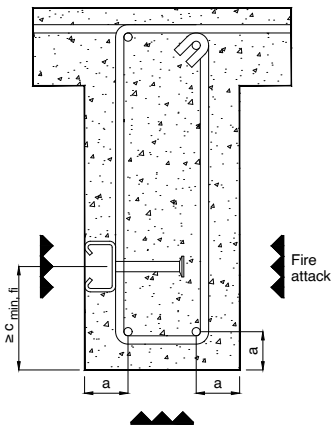
Anchor Channel				28/15	38/17	40/25 40/22 41/22 40/22P 40/26P	49/30 50/30 50/30P 54/33 52/34 52/34P	72/49
Channel Bolts ≥			[mm]	M12	M16	M16	M16	M16
Steel failure: Anchor, connection channel/anchor, local flexure of channel lips								
	R30	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$	[kN]	0.9	1.8	1.8	5.7	5.7
	R60			0.7	1.5	1.5	4.2	4.2
	R90			0.5	1.2	1.2	2.6	2.6
	R120			0.4	1.1	1.1	1.8	1.8
Partial safety factor		$\gamma_{Rk,s,fi}$ 1)	[-]	1.0				

1) In absence of other national regulations

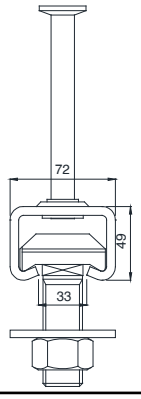
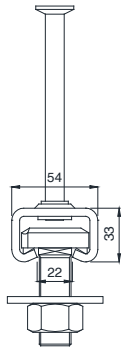
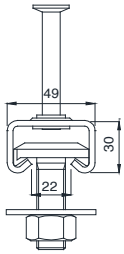
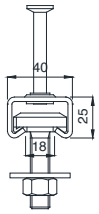
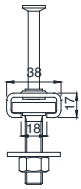
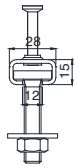
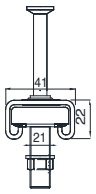
One sided fire exposure



Multi-sided fire exposure

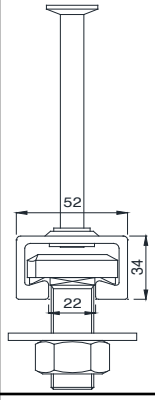
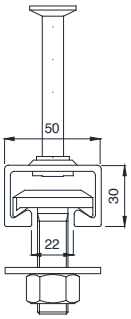
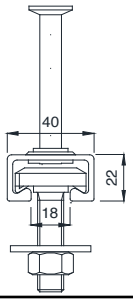
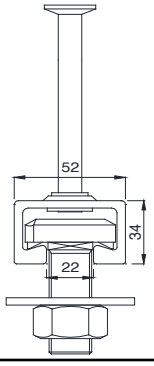
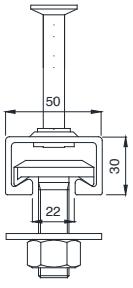
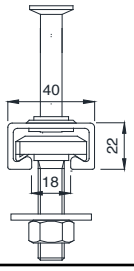
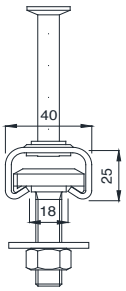


HAZ Anchor Channels Technical Summary

Profiles	Cold Rolled Channels												Toothed	
	HMPR 72/49			HMPR-CE 54/33			HMPR-CE 49/30			HMPR-CE 40/25			HMPR-CE 38/17			HMPR-CE 28/15			HMPR-S 41/22	
Section View																				
Material	A2/A4/HDG			A2/A4/HDG			A2/A4/HDG			A2/A4/HDG			A2/A4/HDG			A2/A4/HDG			A2/A4/HDG	
Marking	HS			HS			HS/HAZ			HS/HAZ			HS/HAZ			HS/HAZ			HS/HAZ	
Bolt Type	72			50			50			40			38			28			40	
Metric size	20	24	30	12	16	20	12	16	20	10	12	16	10	12	16	8	10	12	12	16
Bolt spacing S_{slb} [mm]	100	120	150	60	80	100	60	80	100	50	60	80	50	60	80	50	60	80	60	80
Design Resistance Capacities of Profiles (Design Values)																				
$N_{Rd,s,l} = N_{Rd,s,c}$ [kN] Steel / Stainless steel	45 / 50.5			41.7 / 36.6			17.2 / 25			12.2 / 15			10.5 / 12.2			7.2 / 8.3			7.27 / 11.77	
$V_{Rd,s,l}$ [kN] Steel / Stainless steel	45 / 50.5			41.7 / 36.6			17.2 / 25			12.2 / 15			10.5 / 12.2			7.2 / 8.3			7.27 / 11.77	
$M_{Rd,s,flex}$ [Nm] HDG	9868			2832			1646			1179			517.4			303.5			420	
$M_{Rd,s,flex}$ [Nm] St.St.	6408			2696			1600			911.3			566.1			302.6			299.13	
Geometric Values																				
Channel width b_{ch} [mm]	72			54			49			40			38			28			41	
Channel height h_{ch} [mm]	49			33			30			25			17			15			22	
Embedment depth h_{nom} [mm]	182			157			96			81			78			47			72	
Effective embedment h_{ef} [mm]	179			155			94			79			76			45			70	
Min. edge distance c_{min} [mm]	150			100			75			50			50			40			75	
Min. member thick. h_{min} [mm]	215			187			126			111			108			77			75	

$N_{Rd,s,l}$ = Design load for tension / pull out loads
$V_{Rd,s,l}$ = Design load for shear loads
$M_{Rd,s,flex}$ = Design load for flexure resistance of channel

HAZ Anchor Channels Technical Summary

Profiles	Hot Rolled Channels																		Cold Rolled Channel		
	HMPR 52/34P			HMPR 50/30P			HMPR 40/22P			HMPR 52/34			HMPR 50/30			HMPR 40/22			HMPR 40/26-P		
Section View																					
Material	HDG			HDG			HDG			HDG			HDG			HDG			HDG		
Marking	HS			HS			HS/HAZ			HS			HS			HS/HAZ			HS/HAZ		
Bolt Type	50			50			40			50			50			50			50		
Metric size	12	16	20	12	16	20	10	12	16	12	16	20	12	16	20	12	16	20	12	16	20
Bolt spacing S_{slb} [mm]	60	80	100	60	80	100	50	60	80	60	80	100	60	80	100	60	80	100	60	80	100
Design Resistance Capacities of Profiles (Design Values)																					
$N_{Rd,s,l}$ or $N_{Rd,s,c}$ [kN] Steel / Stainless steel	28.66 / -			22.33 / -			13.22 / -			29.77 / -			17.67 / -			12.61 / -			12.66 / 14.77		
$V_{Rd,s,c}$ or $V_{Rd,s,l}$ [kN] Steel / Stainless steel	28.66 / -			22.33 / -			13.22 / -			30.6 / -			17.67 / -			12.61 / -			12.77 / 15.00		
$M_{Rd,s,flex}$ [Nm] HDG	2440			2704			1261			2440			2704			1261			1260		
$M_{Rd,s,flex}$ [Nm] St.St.	-			-			-			-			-			-			911		
Geometric Values																					
Channel width b_{ch} [mm]	52			50			40			52			50			40			40		
Channel height h_{ch} [mm]	34			30			22			34			30			22			25		
Embedment depth h_{nom} [mm]	158			108			93			158			108			93			96		
Effective embedment h_{ef} [mm]	155.5			106			91.2			155.5			106			91.2			94.2		
Effective embedment c_{min} [mm]	100			75			50			100			75			50			50		
Min. member thick. h_{min} [mm]	188			138			123			188			126			108			120		

$N_{Rd,s,l}$ = Design load for tension / pull out loads
$V_{Rd,s,l}$ = Design load for shear loads
$M_{Rd,s,flex}$ = Design load for flexure resistance of channel

Dimensioning Principles

Required information for channel selection

The information below is required to conduct a full analysis in order to select the most suitable channel for the application.

• Anchor channel type & Type of raw material

• Anchor channel length with number of studs and stud spacing distances

• Positioning of the cast in channel in the concrete component with exact edge distances of the channel on all directions

• Thickness of the concrete component and the strength class of the concrete

• Allocation & layout of reinforcement bars within in the concrete component

• Type and size of t head bolts and their numbers

• Fixture application dimensions & type of fixing whether top of slap or edge of slab

• Tensile and shear loadings on the fixture

Verification areas when selecting an anchor channel

The assesment of the suitable anchor channel dimensions for the intended use with regards to the requirements of the mechanical resistance, stability the safety of the application is done by checking the following areas.

Verifications under tension loads	
1. Distribution of acting tension loads	
2. Steel failure - anchor stud	$N_{Rk,s,a}$
3. Steel failure - t head bolt	$N_{Rk,s,s}$
4. Steel failure - connection between channel & anchor stud	$N_{Rk,s,c}$
5. Steel failure - local flexure of channel lips	$N_{Rk,s,l}$
6. Steel failure - flexure resistance of channel	$M_{Rk,s,flex}$
7. Steel failure - trasnfer of setting torque into prestressing force	T_{inst}
8. Concrete failure - pullout	$N_{Rk,p}$
9. Concrete failure - concrete cone	$N_{Rk,c}$
10. Concrete failure - splitting due to installation	C_{min}, S_{min}, h_{min}
11. Concrete failure - splitting due to loading	$N_{Rk,sp}$
12. Concrete failure - blow out	$N_{Rk,cb}$
13. Reinforcement	$N_{Rk,re}$, $N_{Rd,a}$
14. Displacement under tension loads	σ_N

Verifications under shear loads	
1. Distribution of acting shear loads	
2. Steel failure without lever arm - T head bolt	$V_{Rk,s,s}$
3. Steel failure without lever arm - flexure channel lips	$V_{Rk,s,l}$
4. Steel failure with lever arm	$M^0_{RK,s}$
5. Concrete failure - pry out	VRk,cp
6. Concrete failure - concrete edge	$V_{Rk,c}$
7. Reinforcement	$V_{Rk,c,re}$
8. Displacement under shear loads	σ_V

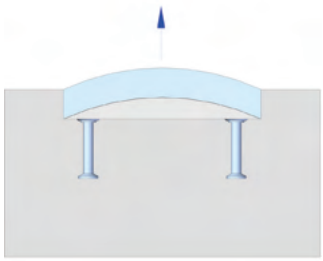
Methods of Verification Against Failures

Anchor channel verification against steel breakout

- Correct channel selection by comparing allowable loads and applied loads
- Determination of the anchor loads from tensile loads and shear forces according to the load influence model verification of the connection between anchor and channel
- Arrangement of the bolts along the channels length

Breakout of T head bolt under tensile loading

Breakout of chanel lips under tensile loading



Breakout due to flexure of channel under tensile loading

Breakout of channel stud under tensile loading

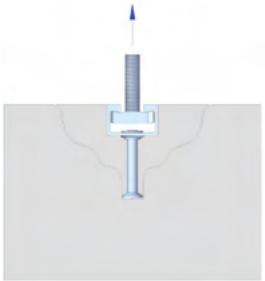
Breakout of stud under tensile loading

Breakout of T head bolt under shear loading

Breakout of channel lips under shear loading

Concrete verification against failures

- Thickness of the concrete component
- Strength class of the concrete
- Condition of the concrete, cracked or non cracked as a special case to be verified
- Verification against concrete edge distance and channels spacings



Failure of concrete cone under tensile loading

Pull out of channel from concrete under tensile loading

Splitting of concrete under tensile loading

Failure of concrete edge under shear loading

Failure of concrete pry out under shear loading

Blow out of concrete under tensile & shear loading

Quality Assurance Control

HAZ Metal readily embraces the responsibility of the business that it is in. The company has established a well planned quality management system and has been awarded the ISO 9001:2008 quality management certificate.

This system is a part of HAZ Metal's operations and there are no compromises in jeopardising the quality level of our products. The QAC department is staffed with knowledgeable and experienced engineers who are trained in the field and form the backbone of this operation.

The factory is equipped with testing machines which are used to conduct chemical and physical tests on all items that enter and exit the warehouse. The production is strictly controlled with periodic in house testing of both raw materials and finished products. This procedure is a part of our day to day operations in order to maintain the performance of HAZ products and to fulfil the safety requirements for use in the construction industry.

1.) 150 kN standing tensile load testing machine. Mechanical testing for manufactured products are carried out using this machine

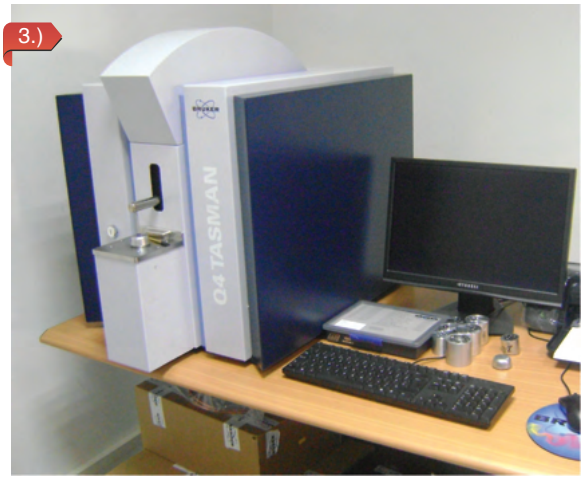
2.) Mechanical testing laboratory with computer aided operations to prepare internal reports and record test results

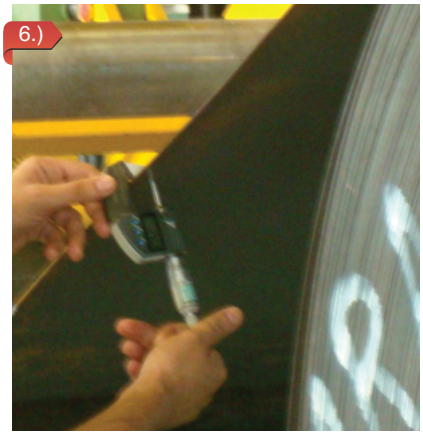
3.) Spectrometer is used for conducting chemical composition analysis for the raw materials and the end product components that are sourced outside production

4.) 100 kN mobile anchor tensile load testing machine. Testing for performance of products on substrates are carried out using this machine

5.) Galvanized coating micro thicknesses are checked using electronic gauges to ensure that corrosion protection is in place for steel products

6.) Material thicknesses are checked using digital micrometers to ensure that the products are produced according to tolerance thicknesses





Quality Assurance Control

Testing procedures have been formulated and are implemented to make sure that the production of anchor channels meet the required standards.

Production

HAZ Metal produces anchor channels since 2001. Modern production lines, innovative tooling and controlled production results in reliable quality of its products.

Quality assurance

The quality assurance system developed by HAZ Metal forms the basis for all interests in the production that is certificated by safety standards authority German Institute TUV SUD for standardization EN ISO 9001:2008.

Our own department, consisting of specially qualified engineers, supervises every working step - in the production, as well as in the service area around the ISO 9001:2008 and the strict application of the total quality plan that is put through by HAZ management.

Factory-owned production control

As a component of the mentioned measures to the quality assurance system,a factory owned test lab provides constant quality checks of the anchor channels. The finished products, as well as the raw materials are tested by a constant and uncompromising control system.

The factory-owned production control is directed with the strict guidelines for the protection of the quality after the test plan of the DIBT which is an obliging component of the universal appraisal licensing.

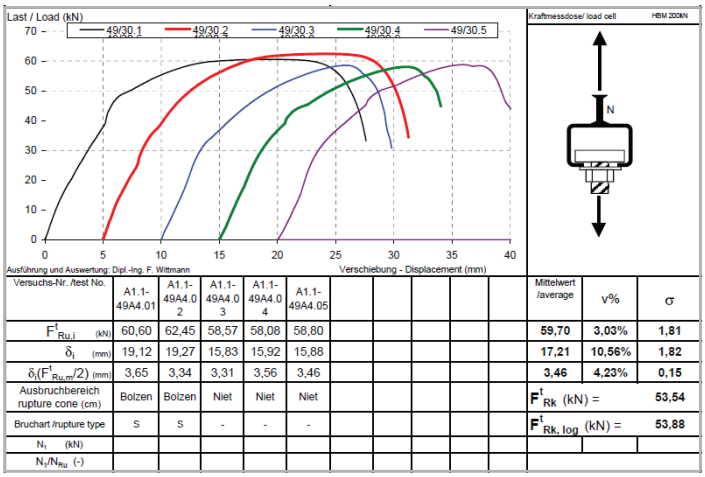
Supervision

An independent and authorized testing laboratory is appointed for the supervision of the production according to the licensing and the matching test plan of the DIBT. The anchor channels are marked after the certification of the independent testing institute which has awarded HAZ with the compliance mark (Ü sign).

HAZ Anchor channel testing procedure

Process	Party	Location
Production tests / export report	Testing Lab.	Independent testing laboratory
Approval	DIBt Berlin	German Construction supervisory board
Factory production control	DIBt Test plan HAZ Production	Production plant Iskenderun Turkey
External quality control	DIBt Test plan Testing Lab.	Production plant Iskenderun Turkey
Certificate inspection mark	Testing Lab.	Independent testing laboratory
HAZ Engineering technical service development	HAZ Production	Production plant Iskenderun Turkey

External Testing - conducted by independent test laboratory



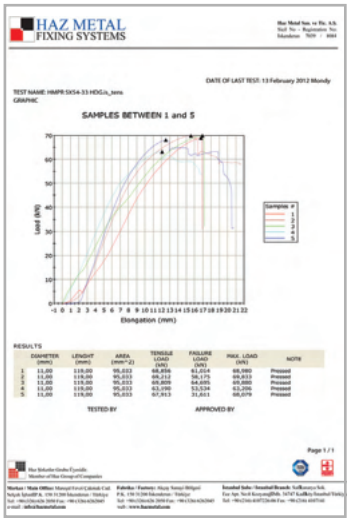
Ausführung und Auswertung: Dipl.-Ing. F. Wittmann

Versuchs-Nr. /test No.	A1.1-49A4.01	A1.1-49A4.02	A1.1-49A4.03	A1.1-49A4.04	A1.1-49A4.05	Mittelwert /average	v%	σ
$F^t_{Ru,i}$ (kN)	60,60	62,45	58,57	58,08	58,80	59,70	3,03%	1,81
δ_i (mm)	19,12	19,27	15,83	15,92	15,88	17,21	10,56%	1,82
$\delta_i(F^t_{Ru,m}/2)$ (mm)	3,65	3,34	3,31	3,56	3,46	3,46	4,23%	0,15
Ausbruchbereich /rupture cone (cm)	Bolzen	Bolzen	Niet	Niet	Niet	F^t_{Rk} (kN) =		53,54
Bruchart /rupture type	S	S	-	-	-	$F^t_{Rk,log}$ (kN) =		53,88
N_i (kN)								
N_i/N_{Ru} (-)								

Internal Testing - conducted in house


HAZ METAL FIXING SYSTEMS

TEST REPORT


HAZ METAL FIXING SYSTEMS

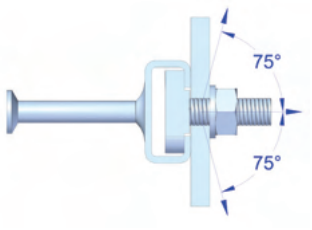
SAMPLES BETWEEN 1 and 5

HAZ Anchor Channels - Installation Information

Load Direction

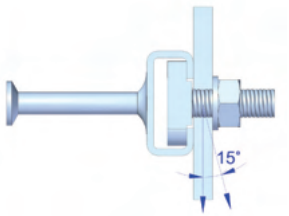
Tensile loading

The loading acts within 150 degrees area towards the face of the channel. Any load acting within this area should be checked with the allowable tensile loads for each channel to choose the appropriate channel.



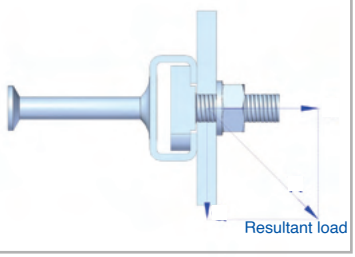
Shear loading

The loading acts within 15 degree angle towards the lower or upper face of the channel. Any load acting within this area should be checked with the allowable shear loads for each channel to choose the appropriate channel



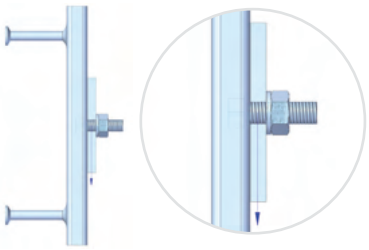
Combined loading

The combined loading is a combination of both tensile and shear loads. Correct calculation must be made in order to determine the acting load and choose the appropriate channel

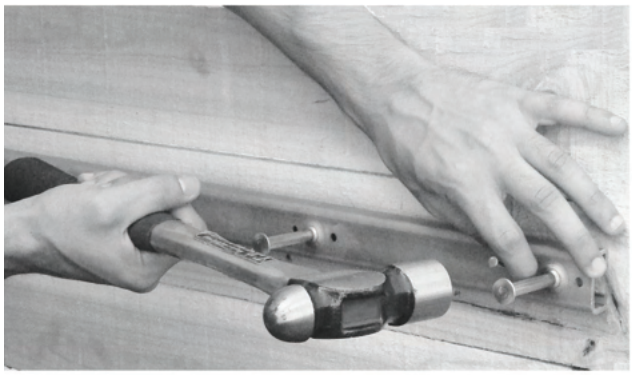


Longitudinal loading

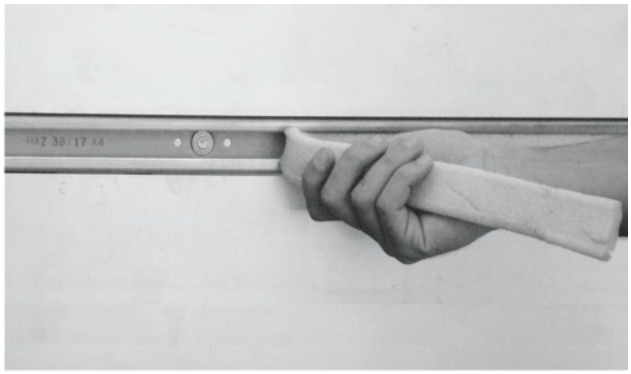
The loading acts along the length of the channel. Each channel has a limited longitudinal load capacity. For strong longitudinal loading a toothed channel must be used



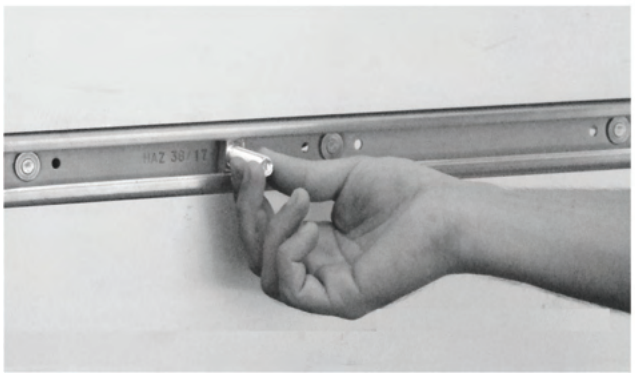
Installation Instruction



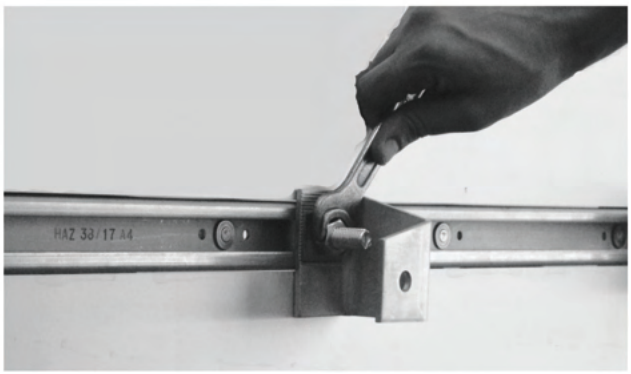
1.) Anchor channels are fixed to form work after careful planning and positioning. Concrete is then cast in to the form work.



2.) After the concrete is cured, the filler inside the channel, set for the purpose of preventing concrete filling the channel's slot, is removed as shown.



3.) Connections to the cast in channels are made with T bolts and lock nuts. T bolts are inserted in to the channels horizontally and then turned right through 90 degrees. This locks them vertically in the channel.

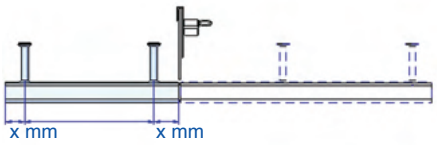


4.) Fixtures are fastened with the T bolts and nuts as shown above. Correct loading and torque values need to be applied in accordance with the allowable loads of the channels and bolts.

HAZ Anchor Channels - Installation Information

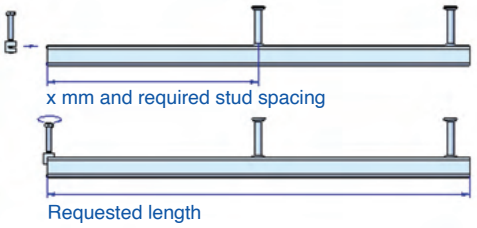
Length Cutting on Site

Standard long lengths can be cut to size on construction sites according to the desired length. Care should be taken in making sure that the minimum distance of 25 mm between the studs and channel end should be met.



• Long lengths can be cut to size providing the X size is no less than 25 mm.

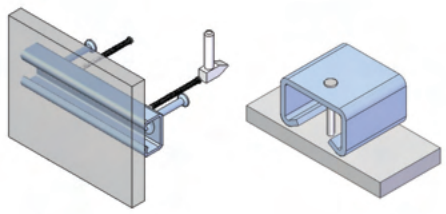
• An end anchor is available to be fixed at the end of the cut channel to avoid wastage.



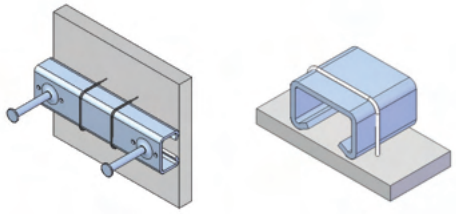
Attachment To Form Work

It is important to firmly attach the anchor channels on to form work. There are a few ways to execute this important procedure which is made onto wood and steel form work.

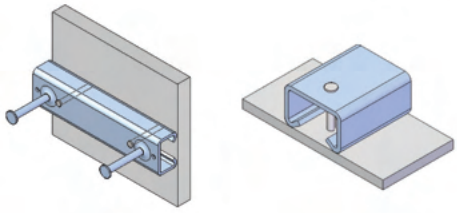
• Fixing onto wood form work using nails.



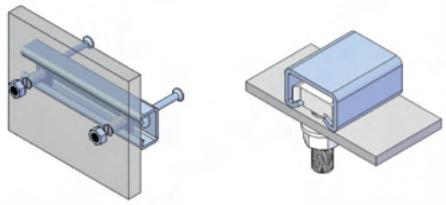
• Fixing onto wood form work using staples.



• Fixing onto steel form work using pop rivets.

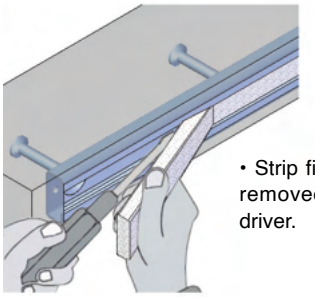


• Fixing onto steel form work using T bolts.



Removing The Strip Filler

Anchor channels are supplied with strip fillers within the open slot of the channels to prevent concrete ingress. This strip filler is removed as shown after the concrete is cured.

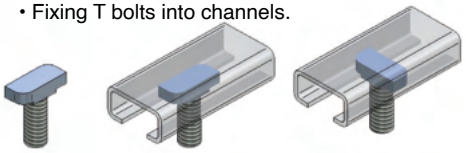


• Strip filler can easily be removed using a screw driver.

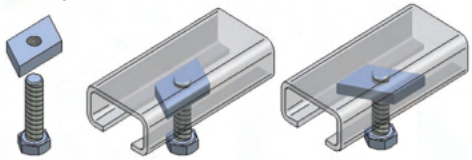
Connections To Channels

Fixtures are attached on to the anchor channels with T head bolts and lock nuts. There are suitable types for each Anchor channel section.

• Fixing T bolts into channels.

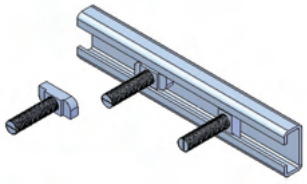


• Fixing lock nuts into channels.



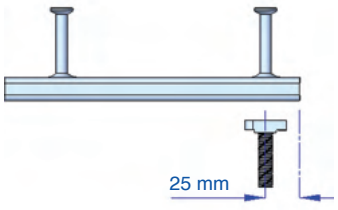
Adjustability

T bolts are suitable to be inserted at the desired point along the length of the channel. Fixing is done by turning the T bolt 90 degrees clockwise and by tightening the nut. The correct torque values must be applied when tightening the nuts. T bolts must not be located beyond the last stud which is 25 mm from the end of the channel.



• Suitable T bolts can be inserted at desired point and adjusted easily along the length of the channel.

• To ensure correct installation of the T bolt the notch at the end of the shank must be checked.

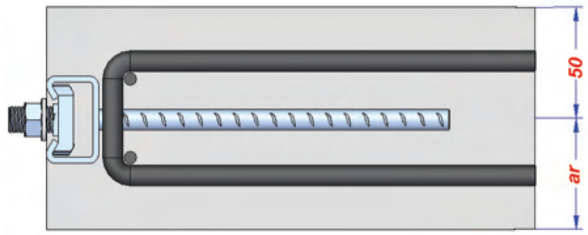


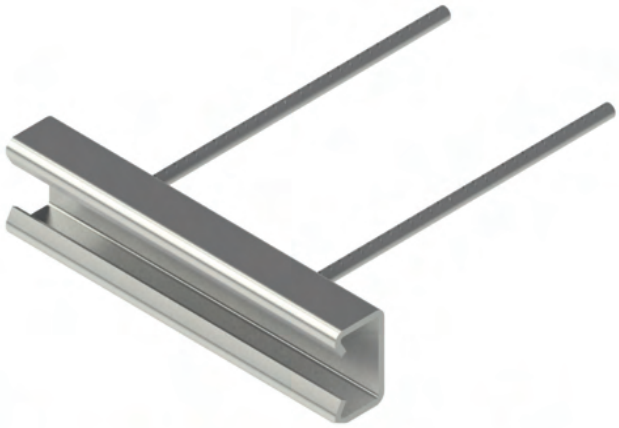
• T bolts must not be positioned beyond the last stud on the channel.

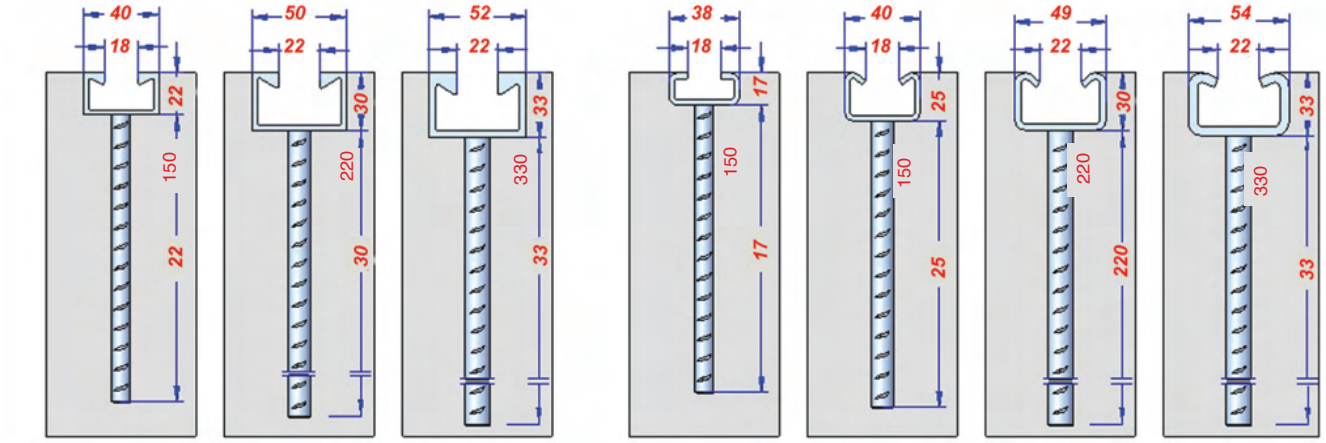
Special Types of Anchor Channels

Anchor Channels With Reinforcement Studs

Anchors can be manufactured out of reinforcement studs for special applications, particularly fixings in the edge of thin slabs. These channels have higher pull out and combined loads. Due to these qualities these channels are preferred for use in the fixing of curtain walls on to reinforced concrete beams.

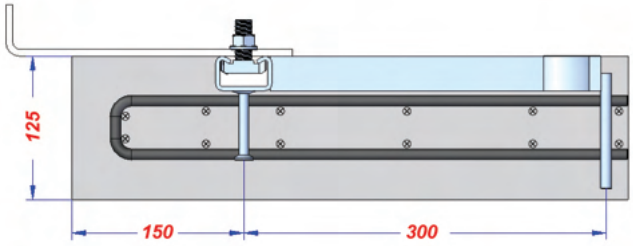


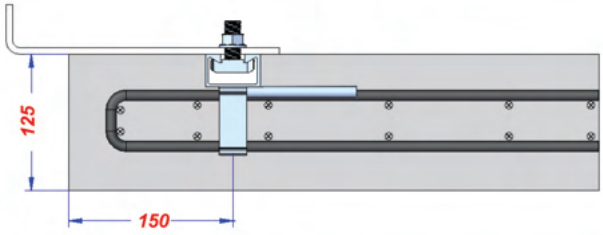




Channels With Special Fabricated Elements

Special anchor channel manufacturing can be done according to the requirements of the project. Local testing as well as in house testing can me completed to safe check the load capacities of the special anchor channels.



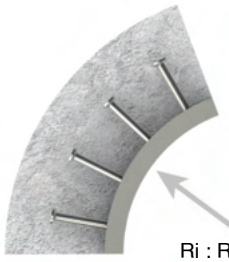


Special Types of Anchor Channels

Curved Anchor Channels

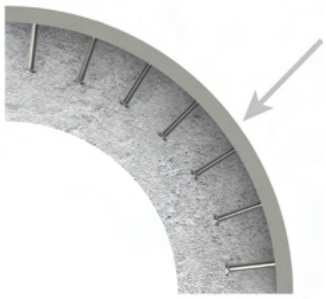
Channels can be easily curved to an internal or external radius (lips inward or lips outward). Curves on elevations, such as brick arch details, which require special care, can be accommodated with these types of channels.

Inside Channel slot



Ri : Radius of inner channel

Outside channel slot



Ra : Radius of outer channel

Application :

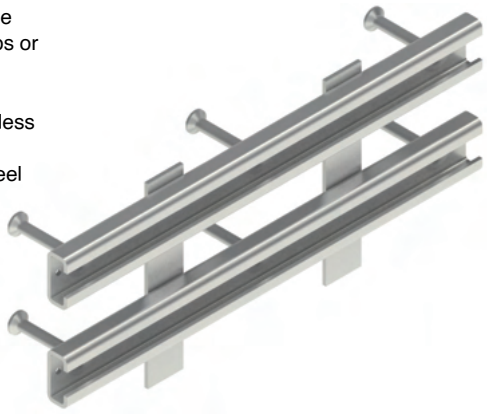
- M & E works in Tunnels
- Installation on curved walls
- Connections to prefabricated pipes

Min. Radius	Channel Types								
	28/15	38/17	41/22	40/25	40/22	49/30	50/30	54/33	52/34
Inner channel - Ri	0.5 m	0.5 m	1.5 m	1 m	0.7 m	0.8 m	0.8 m	4 m	0.8 m
Outer channel - Ra	1.0 m	1.5 m	4 m	3 m	2 m	8 m	4 m	0.8 m	4 m

Channel Pair - Special Fabricated Unit

Where double or multiple fixings are required at known centres, channels can be welded to spacer straps, as shown below. The straps keep the channels parallel and accurately spaced along their length.

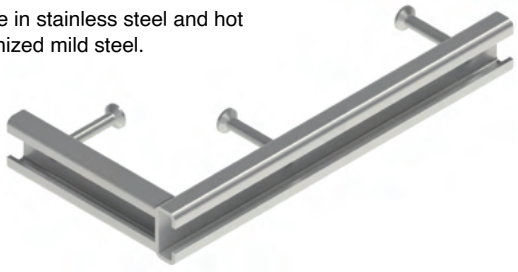
- Spacers are made either by steel strips or reinforced steel.
- Available in stainless steel and hot dip galvanized mild steel



Corner Fabricated Unit

Channels can be easily fabricated to suit corners, see below. (Smaller channels may be folded; larger channels are welded.)

- Standard leg dimensions are 125 mm by 250 mm. Other sizes can be produced upon request.
- Available in stainless steel and hot dip galvanized mild steel.



Channels With Strap Strip

If a narrow beam has a central reinforcement bar, anchors can be made to pass each side of the bar. This might occur where fixings for mechanical services are required in waffle slabs.

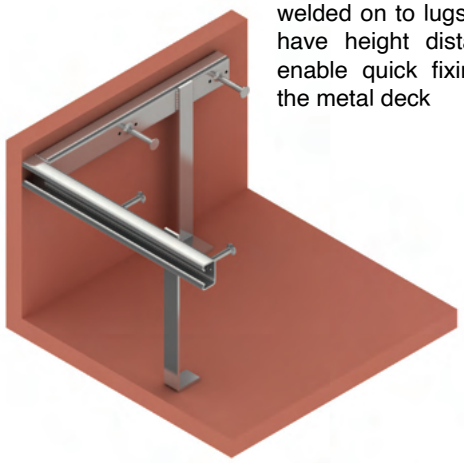
Channels With Wing Strip

Wing anchors are available for low profile details, e.g. where a channel is located in the concrete casing of a steel beam. The channel load capacity is reduced.

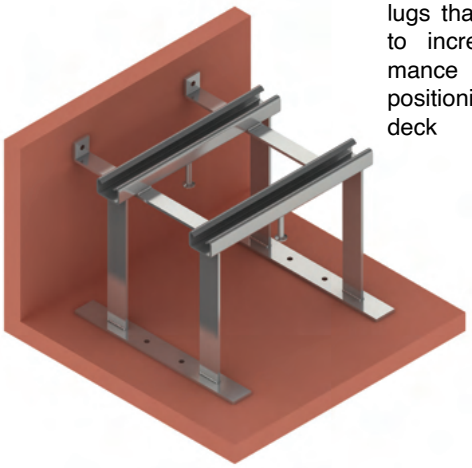
Anchor Channels for Metal Deck Connections

The use of concrete cast on metal decking is being used more commonly in the building industry. Fixing of exterior facades such as curtain-walls, masonry walls, precast panels etc, are often required to be connected close to the edge of the metal deck. The metal deck anchor channels have good performance in thin slabs and in perimeter locations. The special designed assemblies made on the back of the channels provide strong bond with the concrete, when they are located within the reinforcement cage. Loads applied on the channel spreads over a longer area around the length of the slab edge. The labour required for through deck fixing can be significantly reduced. The channels are easily placed before pouring the concrete, with the channel studs or lugs of any suitable length to clear the ribs in the metal deck. Channels for metal decks are usually produced in hot dip galvanized mild steel. However, stainless steel grade 1.4301 and 1.4401 are also available upon request.

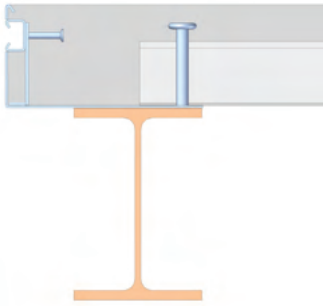
Special assembly made for connections on to edge of the slab. Channels are welded on to lugs that can have height distances to enable quick fixing on to the metal deck



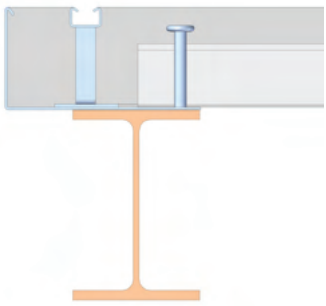
Special assembly made for connection on to top of the slab. Assembly on skis with lugs that can be arranged to increase load performance and provide easy positioning on the metal deck



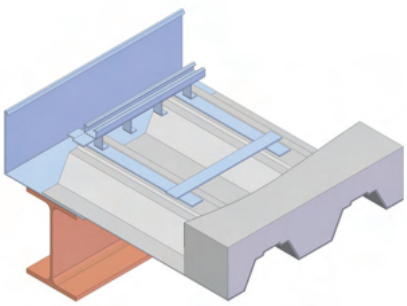
Connections made on the edge of the slab



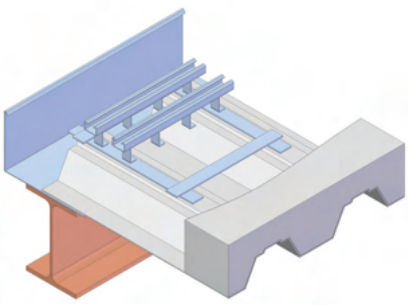
Connections made on top of the slab



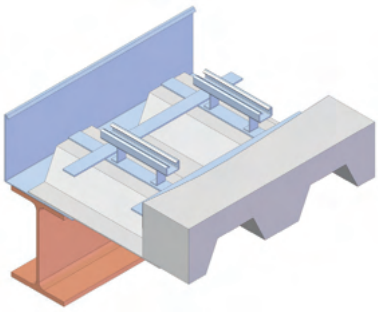
Single Channel on skis assembly



Channel pair on skis assembly



Channel pair assembly with toothed channels

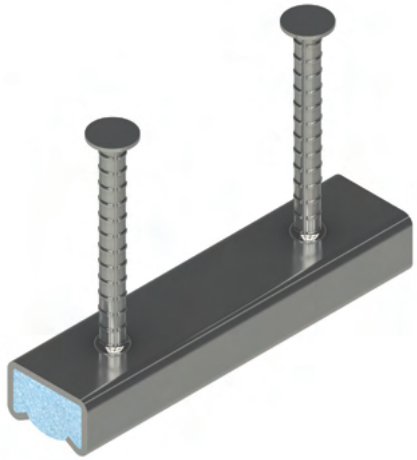


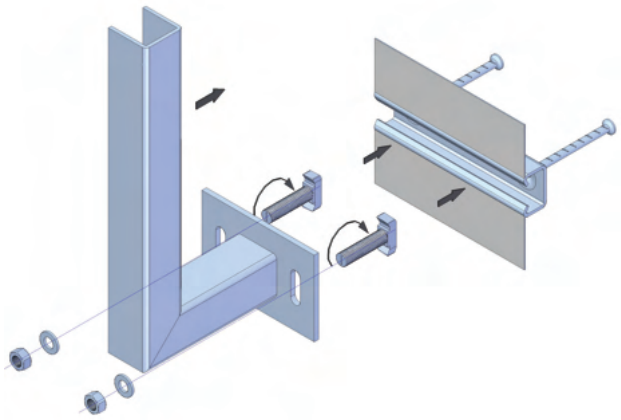
Anchor Channels for Balustrades

HMPR-BL anchor channels are the cold rolled channels with welded rebar in place of the studs. The HMPR-BL channels are used for fixing balustrades and hand rails on to the front faces of decks and balcony slabs. The rebars with stamped heads guarantee safe loading when fixing on thin slabs. The welded rebars are made our of ST500 build steel with ribs.

Advantages

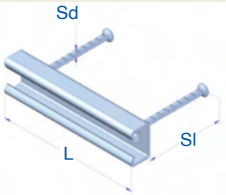
- Fully adjustable
- Reduces the construction time
- Permits adjustment and replacement of attached structures
- Can be used even on thin front faces of less than 100 mm
- T Head bolts are used instead of welding or anchor bolts



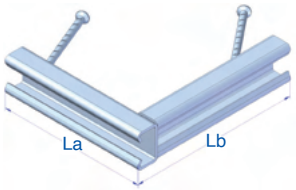


Technical Details

(Type 40/25, 49/30 & 54/33)



(Type 38/17)



Product Code	Length L (mm)	Stud Diameter Sd (mm)	Stud Length Sl (mm)	T Head Bolt Size
HMPR-BL-38/17	100	10	201	M12x50 & M16x60
	150			
	200			
HMPR-BL-40/25	100	10	90	M12x50 & M16x60
	150			
	200			
HMPR-BL-49/30	100	12	110	M12x50 & M16x60
	150			
	200			
HMPR-BL-54/33	100	14	200	M12x50 & M16x60
	150			
	200			

Product Code	Length La/Lb (mm)	Stud Diameter Sd (mm)	Stud Length Sl (mm)	T Head Bolt Size
HMPR-BL-38/17	170 / 170	12	201	M12x50 & M16x60
HMPR-BL-40/25	170 / 170	14	90	M12x50 & M16x60
HMPR-BL-49/30	170 / 170	14	150	M12x50 & M16x60
HMPR-BL-54/33	170 / 170	14	250	M12x50 & M16x60

Product Code

HMPR-BL - 38/17 - 100

- Length
- Section
- Type

Material:

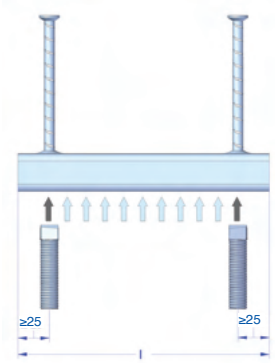
A2: Stainless steel 1.4301,

A4 Stainless steel 1.4401,

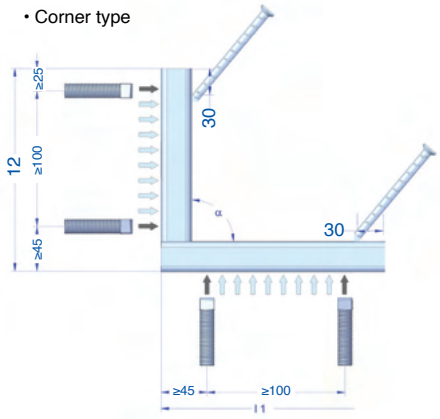
HDG hot dip galvanized mild steel 1.0038 (S235JR)

(Studs are always out of steel BST 500S)

• Standard type



• Corner type



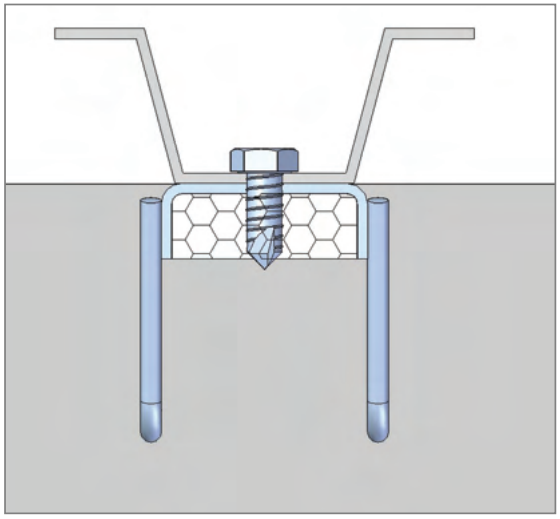
Anchor Channels for Profiled Metal Sheeting - Introduction

HAZ-TU Anchor channels for profiled metal sheeting installation on reinforced concrete beams and columns are available in 3 and 6 mm thicknesses and 60/22 sections.

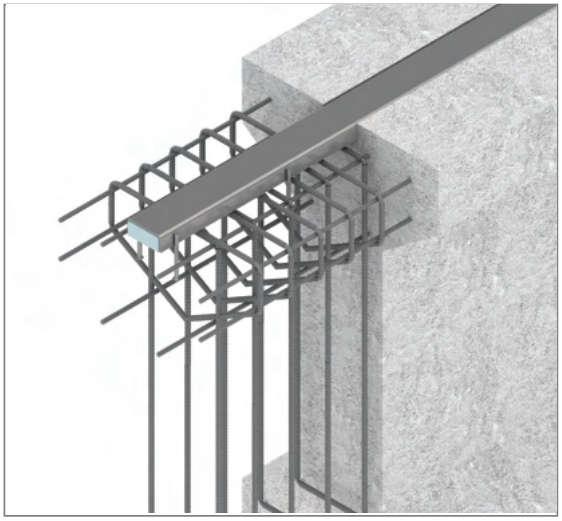
Fixing is done with self drilling screws or shot fired nails. Channels allow fast and economical installation as this system eliminates the difficult and time consuming anchor fixing into concrete.

Channels are inserted onto the surface of the concrete component flush to the surface and in the correct alignment. The end joints between channels should be minimum 20 mm. Fixing to the channels is made with either self drilling screws 6.3x22 or shot fired nails 4.5x24.

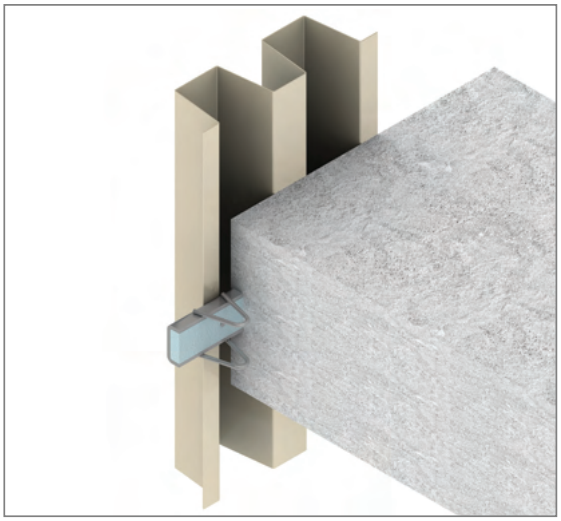
Channels are available in two standard types in 3 metre length with foam filling. Available materials are stainless steel grade 1.4301 (AISI 304) & 1.4401 (AISI 316) and hot dip galvanized mild steel.



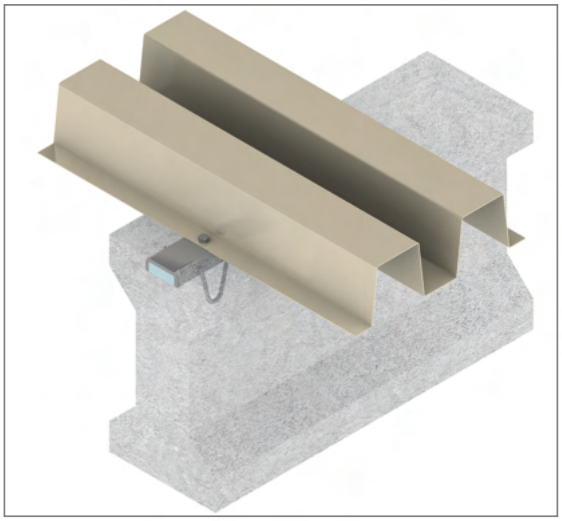
• Fixing metal profiled sheets on to HAZ-TU anchor channels using self tabbing screws



• HAZ-TU anchor channels are casted in to concrete components

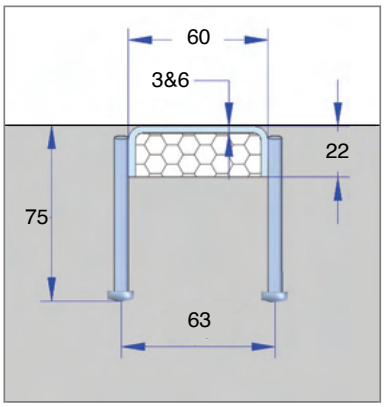


• Cladding material attached at the EDGE of the component

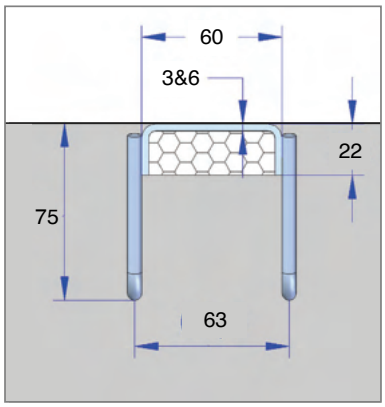


• Cladding material attached at the TOP of the component

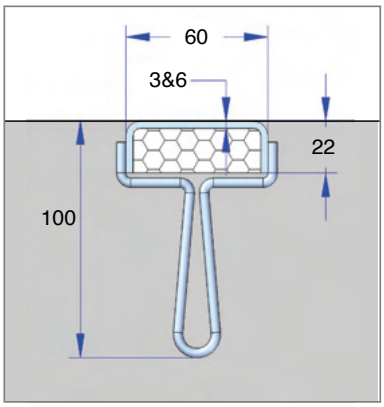
Anchor Channels for Profiled Metal Sheets - Product Details



HAZ-TU-C

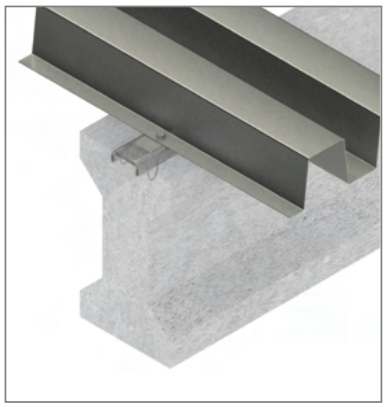


HAZ-TU-B



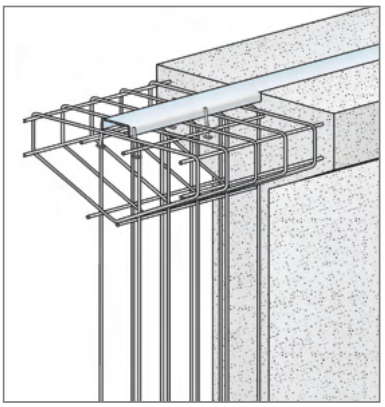
HAZ-TU-A

HAZ-TU Cast in channels for profiles metal sheet installations are supplied in either 3 or 6 mm thicknesses. A foam filler is inserted in the open slot of the channel for preventing inflow of wet concrete during casting. There are studs welded on to the channel for strong connections on to the concrete. There are three different stud versions which offer different results for loads and minimum edge spacings. Channels are supplied in Stainless steel and hot dip galvanized mild steel.

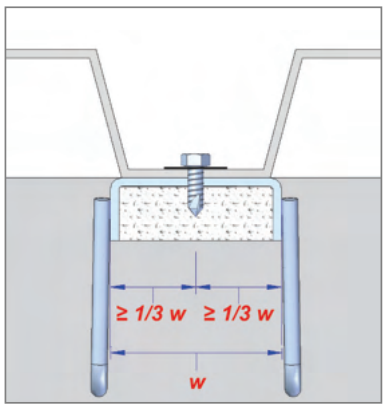


• The installation of profiled metal sheets on to prefabricated concrete components with embedded HPTR channels enables easy and economical fixing.

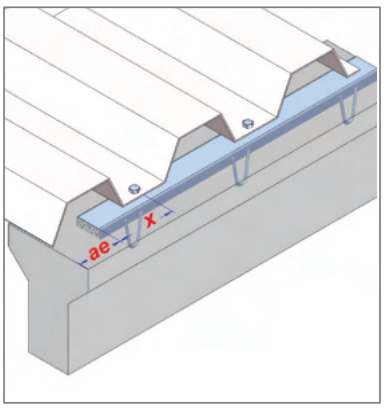
• Fixing is done with self drilling screws on to the HPTR cast in channels, without the need of pre-drilled holes. Power screw driver with 1500 rpm is required for fixing.



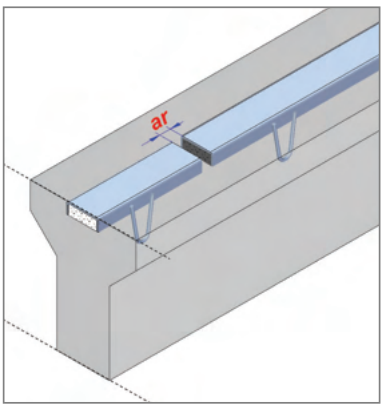
• HPTR channels are cast flush to the surface. The concrete surface should be trowelled smooth enabling the metal sheets to be positioned directly over the channels.



• Drilling positioning should be made in the middle of the channels, leaving a minimum distance 1/3 of the width from the side of the channel.



• The minimum edge spacing (ae) should be no less then 20 mm. The distance (x) between the channel end the screw position should be no less than 25 mm.



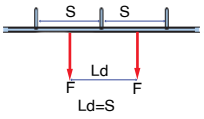
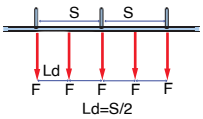
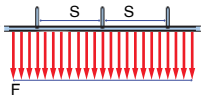
• The minimum spacing (ar) between channels should be 20 mm.

Anchor Channels for Profiled Sheets - Technical Details

HAZ-TU-C

HAZ-TU-B

HAZ-TU-A

Product Code	Technical Details							Tensile - Max Design Load Bearing Capacity F_{ED} kN		
	Length	Channel Thickness	Section	Execution	No Of Studs	Stud Spacing	Stud Edge Distance	 Ld=S	 Ld=S/2	
								Single Loads	Pair Loads	Evenly distibuted load
HAZ-TU 60/22/3-C2	3000	3	60/22	C2	16	450	75	4.6	3.5	15.5
HAZ-TU 60/22/3-C3				C3	40	150		7.0		46.6
HAZ-TU 60/22/6-C2	3000	6	60/22	C2	16	450	75	7.0	3.5	15.5
HAZ-TU 60/22/6-C3				C3	40	150				46.6
HAZ-TU 60/22/3-B2	3000	3	60/22	B2	16	450	75	4.6	3.5	15.5
HAZ-TU 60/22/3-B3				B3	40	150		7.0		46.6
HAZ-TU 60/22/6-B2	3000	6	60/22	B2	16	450	75	7.0	3.5	15.5
HAZ-TU 60/22/6-B3				B3	40	150				46.6
HAZ-TU 60/22/3-A2	3000	3	60/22	A2	8	450	75	4.6	3.5	15.5
HAZ-TU 60/22/3-A3				A3	20	150		7.0		46.6
HAZ-TU 60/22/6-A2	3000	6	60/22	A2	8	450	75	7.0	3.5	15.5
HAZ-TU 60/22/6-A3				A3	20	150				46.6

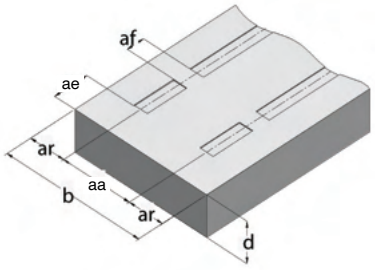
- Values are for concrete strength class C20/25
- Self drilled screws must be capable to support the indicated loads
- Set screws should be positioned in the central third of the channels width and no closer than 25 mm to channels end

Product Code

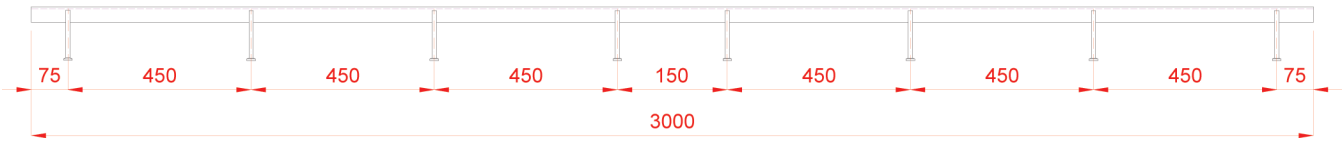
HAZ-TU-60/22/3-C2-3000

- Length
- Execution
- Size
- Type

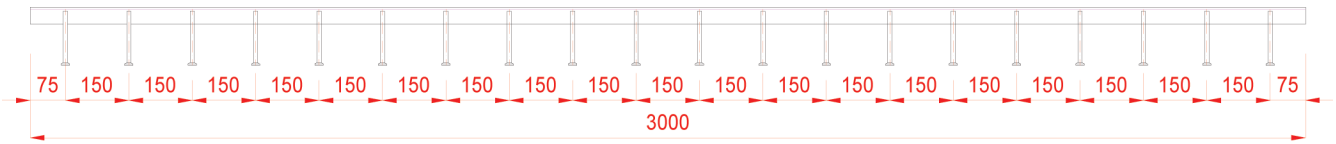
	Edge Distances (mm)					
	a	ar	ae	af	d	b
Type HAZ-TU C	200	120	20	20	240	68
Type HAZ-TU B	200	100	20	20	200	75
Type HAZ-TU A	200	100	20	20	200	100



Execution 2 : Can be cut into two pieces at the centre. Edge spacing must be minimum 75 mm.

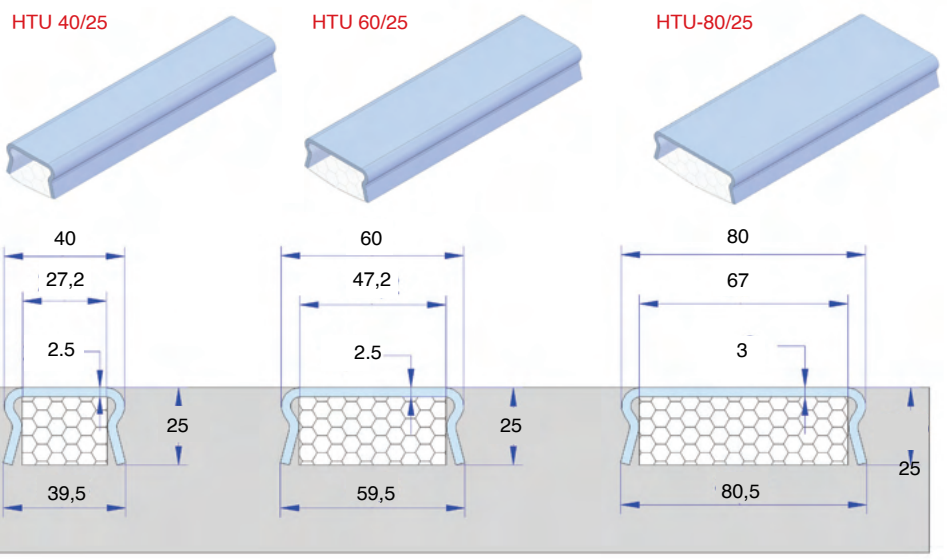


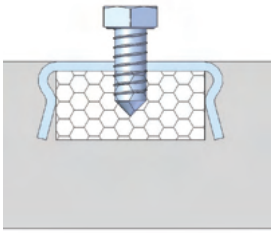
Execution 3 : Can be cut into multiple pieces at the centre of two studs. Minimum edge space must be 75 mm.

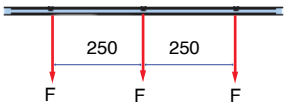


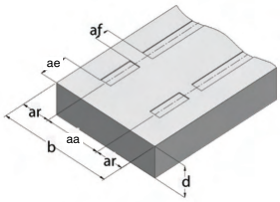
Self Locking Cast-in Channels - Product Details

HAZ TU type cast in channels are self locking channels for connections that are light weight. These channels are ideal for attachments of rails, metal cladding, window & door frames on to concrete substrate. Channels are available in pre-galvanzied steel and hot dip galvanized steel.









Product Code	Technical Details									
	Dimensions			Loadings		Edge Spacings				
	Length (mm)	Thickness (mm)	Section (mm)	Safe load (kN)	Load Spacing (mm)	aa (mm)	ar (mm)	ae (mm)	af (mm)	d (mm)
HAZ-TU-40/25	3000	2.5	40/25	1.3	250	140	70	20	20	25
HAZ-TU-60/25	3000	2,5	60/25			160	80	20	20	25
HAZ-TU-80/25	3000	3.0	80/25			180	90	20	20	25.5

- Values are for concrete strength class C20/25
- Self drilled screws must be capable to support the indicated loads
- Load indicated is suitable for tensile, shear and resultant load

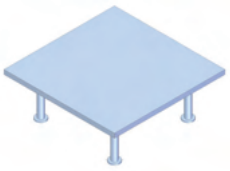
HPLS Anchor Plates - Product Details

HPLS Anchor plates is a product that offers solutions for attaching steel components to concrete substrates. anchor plates are cast in to the concrete with a flush surface. Corresponding steel or stainless steel elements are welded to the surface of the anchor plates. These elements are supplied in stainless steel and steel.

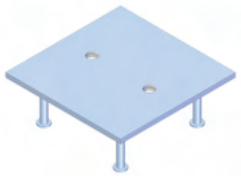
The allowable loads for the anchor plates for tensile, shear and bending moments are verified on project basis according to the required design criteria.

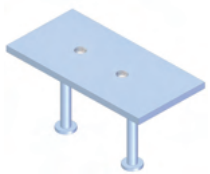
Product Details			
Plate Sizes	Plate Thicknesses	Stud Diameters	Stud Lengths
70/100, 100/140, 160/160,	4, 6, 8, 10, 12	6	50
		8	50
		10	75
		12	100
		16	125

Anchor plates with 4 & 2 studs with flush surface suitable for welding

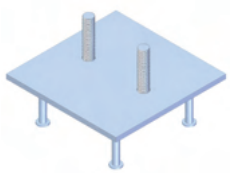


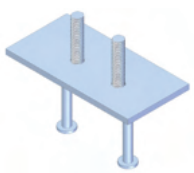
Anchor plates with 4 & 2 studs with tabbed holes suitable for attachments with screws





Anchor plates with 4 & 2 studs with welded threaded bars for attachments with hex nuts





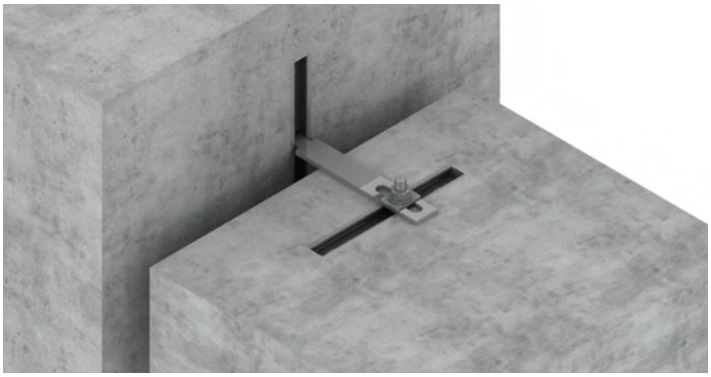
Wall Ties - Introduction & Product Details

The HWT Wall ties provide secure and easy connections between concrete components, where anchor channels are embedded.

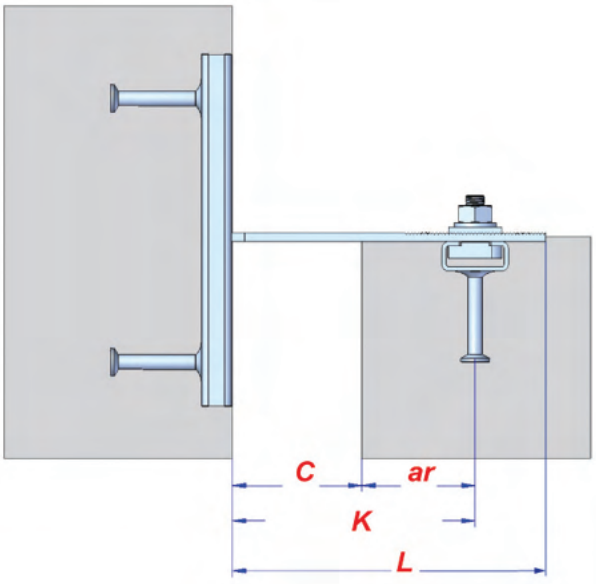
Serrated wall ties and compatible serrated washers enable safe transmittal of tensile loads.

Wall ties are used with cast in channels and T head bolts to achieve three dimensional adjustability for restraining attachments of prefabricated concrete components.

Wall ties are available in stainless steel EN 1.4301 & EN 1.4401 and hot dip galvanized EN 1.0038 grade steel.



HWT - Wall Tie



Product Code	Projec-tion -+ 20 (K mm)	Cavity -+ 20 (C mm)	Length (L mm)	Tensile Load all.F (kN)	Edge Distance (ar mm)	Slotted Hole (mm)
HWT - 28-50	50	0	90	3.5	50	11x55
HWT - 28-75	75	25	115			
HWT - 28-100	100	50	140			
HWT - 28-125	125	75	165			
HWT - 28-150	150	100	190			
HWT - 28-175	175	125	215			
HWT - 28-200	200	150	240			

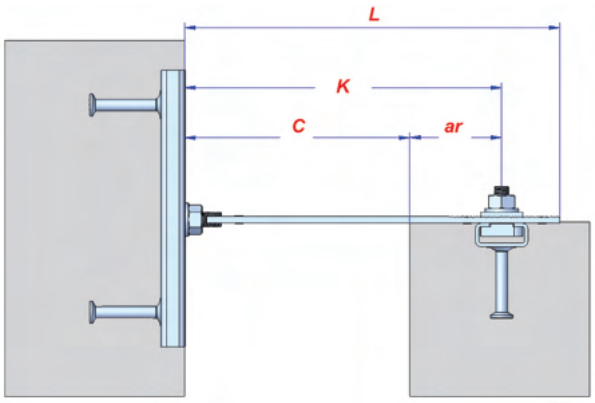
•To be used with HMPR-28/15 channels and HTB-28/15-M10x40 T Bolts.

HWT - 38-75	75	0	115	7.0	75	13x55
HWT - 38-100	100	25	140			
HWT - 38-125	125	50	165			
HWT - 38-150	150	75	190			
HWT - 38-175	175	100	215			
HWT - 38-200	200	125	240			

•To be used with HMPR-38/17 channels and HTB-38/17-M12x50 T Bolts.

Wall Ties - Product Details

HWT-B Wall Tie



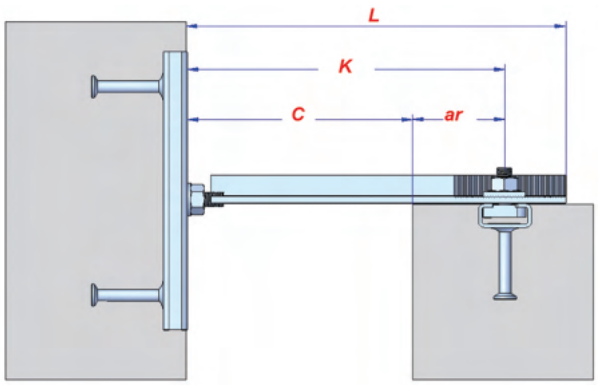
Product Code	Projec-tion -+ 20 (K mm)	Cavity -+ 20 (C mm)	Length (L mm)	Tensile Load F (kN)	Edge Distance (ar mm)	Slotted Hole (mm)
HWT-B-28-75	75	25	115	3.5	50	11x55
HWT-B-28-100	100	50	140			
HWT-B-28-125	125	75	165			
HWT-B-28-150	150	100	190			
HWT-B-28-175	175	125	215			

•To be used with HMPR-28/15 channels and HTB-28 M10x40 T Bolts.

HWT-B-38-100	100	25	145	7.0	75	13x55
HWT-B-38-125	125	50	165			
HWT-B-38-150	150	75	195			
HWT-B-38-175	175	100	220			

•To be used with HMPR-38/17 channels and HTB-38 M12x50 T Bolts.

HWT-U Wall Tie



Product Code	Projec-tion -+ 20 (K mm)	Cavity -+ 20 (C mm)	Length (L mm)	Tensile Load all. F(kN)	Edge Distance (ar mm)	Slotted Hole (mm)
HWT-U-38-200	200	125	245	7.0	75	13X60
HWT-U-38-225	225	150	270			
HWT-U-38-250	250	175	295			

•To be used with HMPR-38/17 channels and HTB-38 M12x50 T Bolts

HWT-U-49-200	200	50	245	12.0	150	17X60
HWT-U-49-225	225	75	270			
HWT-U-49-250	250	100	295			
HWT-U-49-275	275	125	320			
HWT-U-49-300	300	150	345			

•To be used with HMPR-49/30 channels and HTB-49 M16x60 T Bolts.

Wall Ties for Masonry & Brick Tie Channel Introduction

HWT-M Wall ties are used for restraining connections of masonry and brick facing claddings on to the backing wall. Connections to substrate can be made either with cast in channels or surface fixed framing channels.

HWT-M type wall ties are designed for restraint attachments of both masonry wall facades and masonry walls to load bearing walls. The sliding capability of the ties along the length of the channels decreases the risk of the masonry cracking due to structure movements.

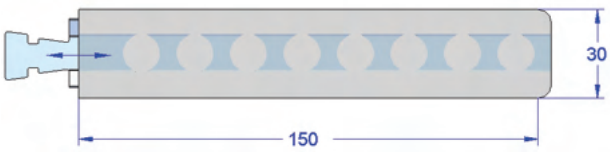
The wall ties are inserted on the channel at desired points and are positioned by turning the ties 90 degrees clockwise. The perforated holes in the wall ties allow mortar filling to improve bonding.

Wall ties for masonry are available in stainless steel 1.4301 (AISI 304) & 1.4401 (AISI 316).

MAS-25/15 Brick tie channels are cold rolled pre-galvanized channels that have punched lugs on the back of the channels. This channel provides the same loading performance as the 28/15 and is an economic option for use in restraining brick walls on to concrete.

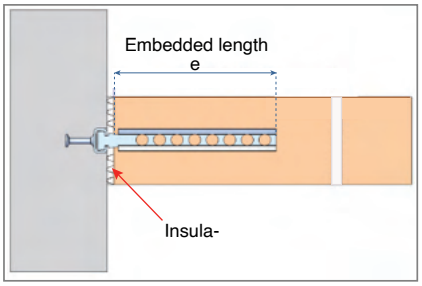
Lugs are punched out every 250 mm and the channels are supplied with a strip filler.

A debonding sleeve is used as a cover for the wall ties. This enables the wall tie to accomodate longitudinal movement in the direction of the tie. This is ideal when installing long masonry walls to concrete walls or when tying in large span infill walls to floor slabs. Debonding sleeves allow room for movement and prevents any cracking of the masonry walls.

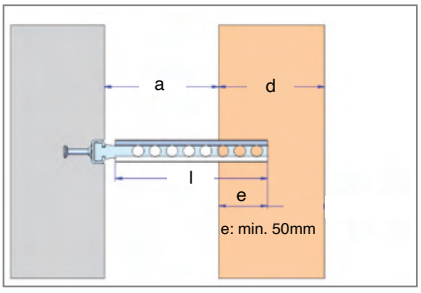


HWT-M Wall Tie

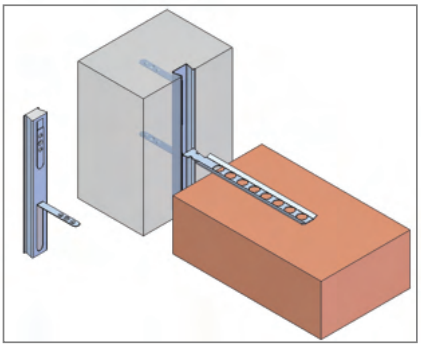
• Wall ties can be used on masonry facade cladding. A minimum embedded length of 50 mm should be applied. The embedded length (e) is determined by correctly setting the length of the wall tie (L) and the masonry block width (d).



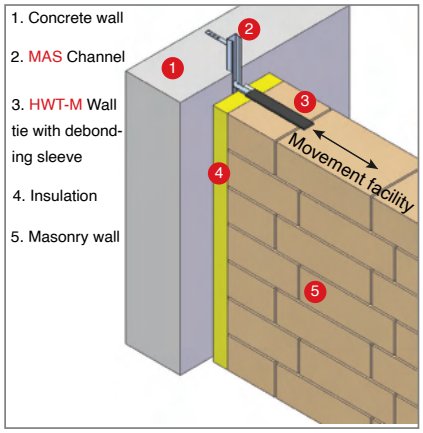
• Wall ties can be used for masonry wall connections fixed to load bearing walls. Embedding length (e) is achieved with the length of the wall tie.



MAS-25/15 Brick Tie Channel

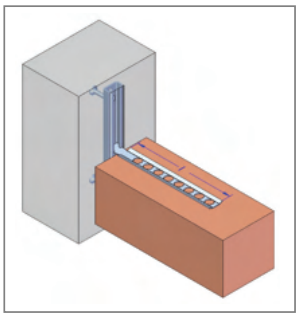


• Lugs are prepunched on the back of the channel at 250 mm centres. The lugs are easily bent out on site prior to the casting of concrete.

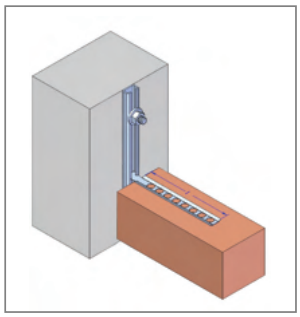


• Wall ties are easily inserted into the debonding sleeves before installation is made.

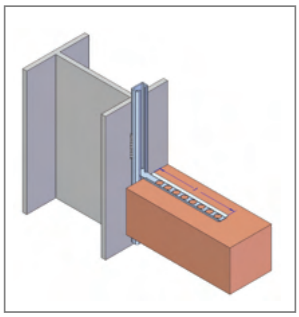
Wall Ties for Masonry - Product Details



• HWT wall ties can be used with cast in channels type 28/15 and 38/17.



• Connections on to surface fixed HMP channels type 28/15 and 38/17 can also be made.



• HMP channels can be welded on to structural steel to allow wall tie connections.

HWT-MS - Wall Tie

Product Code	Length (mm)	Thick-ness (mm)	Width (mm)	Channel Type	Tensile Load (Kn)	Compre-ssion Load (Kn)
HWT-MS 28 -125	125	1.25	25	28/15	2.5	1.4
HWT-MS 28 -185	185	1.25	25			
HWT-MS 28 -245	245	1.25	25			

HWT-MV - Wall Tie

Product Code	Length (mm)	Thick-ness (mm)	Width (mm)	Channel Type	Tensile Load (kN)	Compre-ssion Load (Kn)
HWT-MV 28 - 85	85	2	26	28/15	3.2	2.7
HWT-MV 28 -120	120	2	26			
HWT-MV 28 -180	180	2	26			
HWT-MV 38 - 85	85	2	30	38/17	3.2	2.7
HWT-MV 38 -120	120	2	30			
HWT-MV 38 -180	180	2	30			

HWT-ML - Wall Tie

Product Code	Length (mm)	Thick-ness (mm)	Width (mm)	Channel Type	Tensile Load (kN)	Compre-ssion Load (Kn)
HWT-ML 28 - 85	85	3	25	28/15	3.2	2.7
HWT-ML 28 -120	120	3	25			
HWT-ML 28 -180	180	3	25			
HWT-ML 38 - 85	85	3	30	38/17	3.2	2.7
HWT-ML 38 - 120	120	3	30			
HWT-ML 38 - 180	180	3	30			

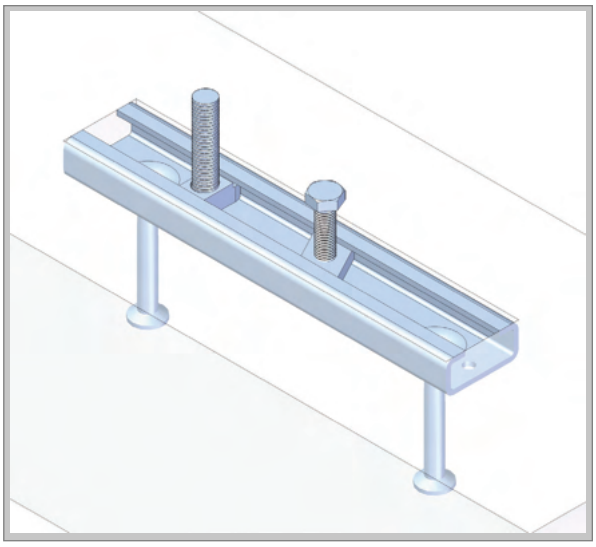
HWT-MT - Wall Tie

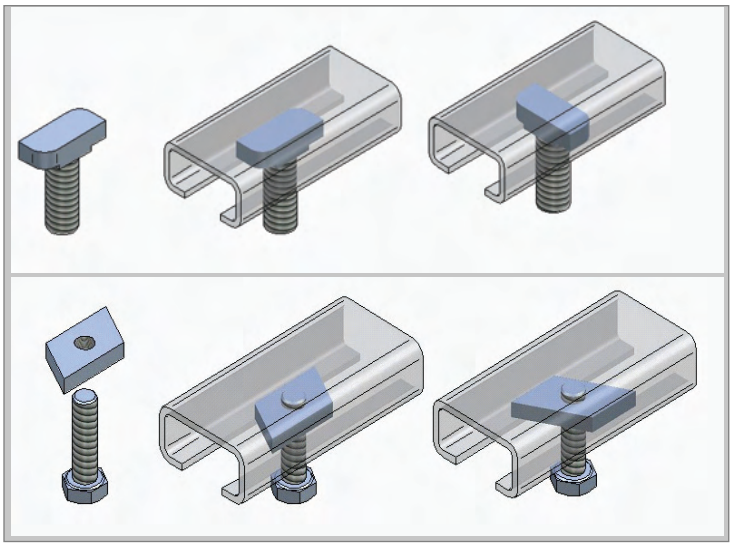
Product Code	Length (mm)	Thick-ness (mm)	Width (mm)	Channel Type	Tensile Load (kN)	Compre-ssion Load (Kn)
HWT-MT 28 - 85	85	3	25	18/15	3.2	2.7
HWT-MT 28 -120	120	3	25			
HWT-MT 28 -180	180	3	25			
HWT-MT 38 - 85	85	3	30	38/17	3.2	2.7
HWT-MT 38 -120	120	3	30			
HWT-MT 38 -180	180	3	30			

T Bolts & Lock Nuts - Introduction

HTB T bolts & HMLN lock nuts are used for attachments in to cast in channels which are designed for a perfect fit into the section of the channels. Insertion is made and after a 90 degree turn clockwise the connection is enabled. Correct torque values must be applied in order to achieve secure connections.

T bolts and lock nuts are available in stainless steel 1.4401 and hot dip galvanised steel strength class 4.6 & 8.8.





Fixing Instructions

1.) After pouring of cement, the concrete wall should be left to dry

2.) After concrete has dried out, the filler in the channel should be taken out using a suitable tool

3.) The filler can be pulled out along the length of the channel simply by hand

4.) No left overs should be within the channel slot. Any residue should be scrapped out

5.) Suitable T head bolts should be inserted into place by placing the narrow side of the head in the slot

6.) Locking in place will be done when turning 90 degrees. Notch on the shank must be set vertically

7.) T head bolts can be adjusted along the length of the channel to be in the desired position

8.) When the connection has been made recommended torque must be used in order to

T Bolts & Lock Nuts - Technical Details

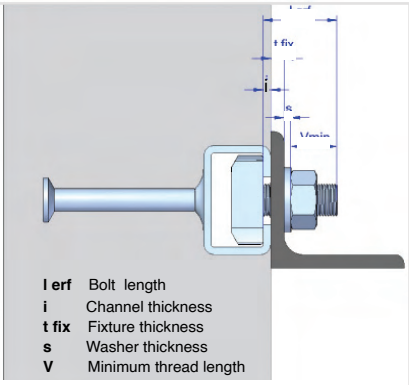
T Head Bolt Metric Size	Loading Table for T Head Bolts (kN)													Max Torque Loads (Nm)			
	Grade	4.6 Class Steel			8.8 Class Steel			Stainless Steel 1.4401/A4-50			Stainless Steel 1.4401/A4-70			4.6 Class Steel	8.8 Class Steel	1.4401 / A4-50	1.4401 / A4-70
	Loads	Tensile & Shear	Bending Moment	Longitudi-nal Load	Tensile & Shear	Bending Moment	Longitudi-nal Load	Tensile & Shear	Bending Moment	Longitudi-nal Load	Tensile & Shear	Bending Moment	Longitudi-nal Load				
M6	all.F	2.2	2.0	0.10	-	-	-	2.2	1.8	0.1	3.0	3.8	0.1	3	-	3	4
	F_{Rd}	3.1	2.8	0.14	-	-	-	3.1	2.5	0.1	4.2	5.3	0.2				
M8	all.F	4.0	5.0	0.20	-	-	-	4.0	4.4	0.2	5.5	9.4	0.3	8	-	8	10
	F_{Rd}	5.6	7.0	0.28	-	-	-	5.6	6.2	0.3	7.7	13.2	0.4				
M10	all.F	6.4	10.0	0.30	13.3	24.9	1.1	6.4	8.7	0.3	8.7	18.7	0.4	15	48	15	20
	F_{Rd}	9.0	14.0	0.42	18.6	34.9	1.5	9.0	12.2	0.4	12.2	26.2	0.6				
M12	all.F	9.3	17.5	0.50	19.4	43.7	1.6	9.3	15.3	0.5	12.6	32.8	0.7	25	70	25	35
	F_{Rd}	13.0	24.5	0.70	27.2	61.2	2.2	13.0	21.4	0.7	17.6	45.9	1.0				
M16	all.F	17.3	44.4	0.90	36.1	110.0	3.0	17.3	38.8	0.9	23.6	83.3	1.2	60	200	60	80
	F_{Rd}	24.2	62.2	1.26	50.5	154.0	4.2	24.2	54.3	1.3	33.0	116.6	1.7				
M20	all.F	27.0	86.5	1.40	56.4	216.4	4.7	27.0	75.7	1.4	36.8	162.3	1.9	120	400	120	160
	F_{Rd}	37.8	121.1	1.96	79.0	303.0	6.6	37.8	106.0	2.0	51.5	227.2	2.6				
M24	all.F	38.8	149.9	2.00	81.2	-	-	38.8	130.9	2.0	-	-	-	200	680	200	-
	F_{Rd}	54.3	209.9	2.80	113.7	-	-	54.3	183.3	2.8	-	-	-				
M30	all.F	61.7	299.9	3.20	129.0	-	-	61.7	262.4	3.2	-	-	-	400	1.400	400	-
	F_{Rd}	86.4	419.9	4.48	180.6	-	-	86.4	367.4	4.5	-	-	-				

Loading Table For Locknuts (kN)																			
Lock Nut Type		HMLN-28			HMLN-38			HMLN-41				HMLN-40			HMLN-50			HMLN-72		
		M6	M8	M10	M8	M10	M12	M6	M8	M10	M12	M8	M10	M12	M10	M12	M16	M12	M16	M20
Safe Load	all.F	1.9	2.8	3.0	4.0	4.1	5.7	4.0	4.0	6.4	9.3	4.0	6.4	9.3	6.4	9.3	9.3	9.3	17.3	22.0
	F_{Rd}	2.7	3.9	4.2	5.6	5.7	8.0	5.6	5.6	9.0	13.0	5.6	9.0	13.0	9.0	13.0	13.0	13.0	24.2	30.8

• The length of the T bolt must be determined using the formula below

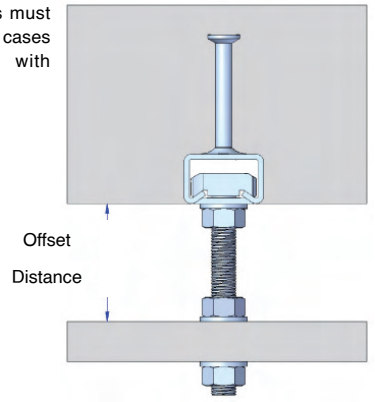
(L erf =tfix + i + s + v)

Dimensions V min	
Metric	Vmin (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

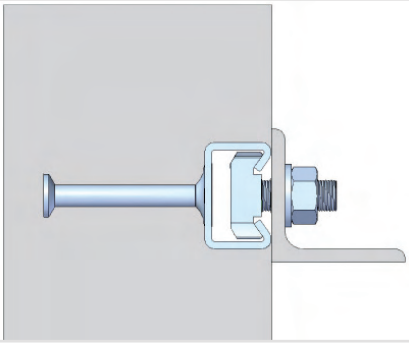


l erf Bolt length
i Channel thickness
t fix Fixture thickness
s Washer thickness
V Minimum thread length

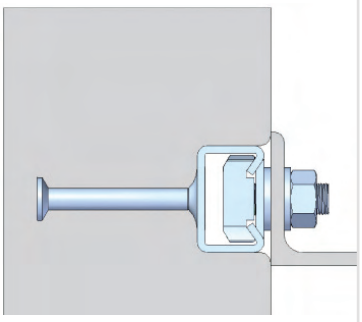
• Square washers must always be used in cases of installations with spacings.



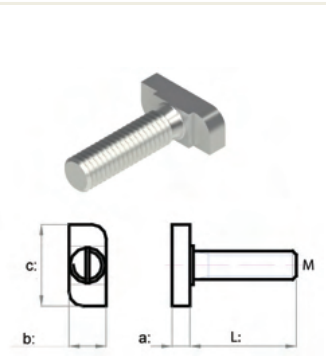
• Installations must always be made flush to the surface. Contact must be established between the fixture and the cast in channel.



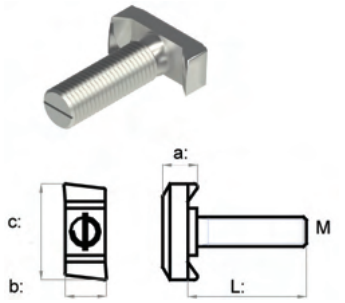
• In cases of non flush surfaces, a square washer and a shim must be used to enable secure transfer of loads on to the channels.



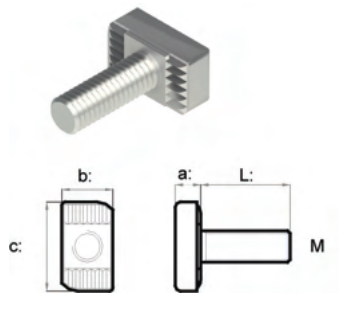
T Head Bolts - Product Details

Product Code	Technical Details							
	Bolt Size mm	Metric M (mm)	Length L (mm)	Head Thick. a (mm)	Head Width b (mm)	Head Length c (mm)	Suitable for Channels	Product Drawing
HTB-28-8/30	M8x30	8	30	4.0	10.50	23.0	HMPR-28/15	
HTB-28-8/50	M8x50	8	50					
HTB-28-10/40	M10x40	10	40					
HTB-28-10/60	M10x60	10	60					
HTB-38-10/40	M10x40	10	40	7.0	13.00	30.5	HMPR-38/17	
HTB-38-10/50	M10x50	10	50					
HTB-38-10/70	M10x70	10	70					
HTB-38-12/50	M12x50	12	50					
HTB-38-12/60	M12x60	12	60					
HTB-38-12/80	M12x80	12	80					
HTB-38-16/60	M16x60	16	60					
HTB-38-16/80	M16x80	16	80					
HTB-38-16/100	M16x100	16	100					

• HTB T bolts are stamped with HAZ or HS trademark

Product Code	Technical Details							
	Bolt Size mm	Metric M (mm)	Length L (mm)	Head thick. a (mm)	Head Width b (mm)	Head Length c (mm)	Suitable for Channels	Product Drawing
HTB-40-10/50	M10x50	10	50	12.0	14.00	34.0	HMPR-40/25, HMPR-H-40/22	
HTB-40-10/70	M10x70	10	70					
HTB-40-12/50	M12x50	12	50					
HTB-40-12/60	M12x60	12	60					
HTB-40-12/80	M12x80	12	80					
HTB-40-16/60	M16x60	16	60					
HTB-40-16/80	M16x80	16	80					
HTB-40-16/100	M16x100	16	100					
HTB-50-12/50	M12x50	12	50	13.0	17.50	42.0	HMPR-49/30, HMPR-54/33, HMPR-H-50/30, HMPR-H-52/34	
HTB-50-12/60	M12x60	12	60					
HTB-50-12/80	M12x80	12	80					
HTB-50-16/60	M16x60	16	60					
HTB-50-16/80	M16x80	16	80					
HTB-50-16/100	M16x100	16	100					
HTB-50-20/80	M20x80	20	80					
HTB-50-20/100	M20x100	20	100					
HTB-72-20/60	M20x60	20	60	17.0	22.00	58.0	HMPR-72/49	
HTB-72-20/80	M20x80	20	80					
HTB-72-20/100	M20x100	20	100					
HTB-72-24/80	M24x80	24	80					
HTB-72-24/100	M24x100	24	100					

• HTB T bolts are stamped with HAZ or HS trademark

Product Code	Technical Details							
	Bolt Size mm	Metric M (mm)	Length L (mm)	Head Thick. a (mm)	Head Width b (mm)	Head Length c (mm)	Suitable for Channels	Product Drawing
HTB-41-12/50	M12x50	12	50	10.0	20.00	34.0	HMPR-S-41/22	
HTB-41-16/60	M16x60	16	60					

• HTB T bolts are stamped with HAZ or HS trademark

Product Code

HTB - 28 - 8 / 30

- Metric / Length
- Channel type
- Type

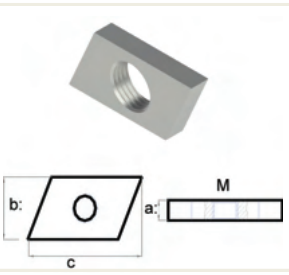
• Material:

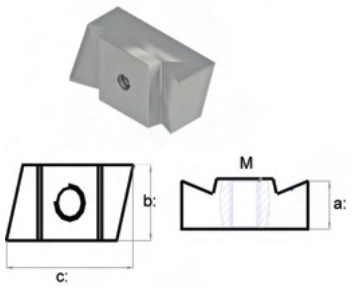
A4 Stainless steel 1.4401,

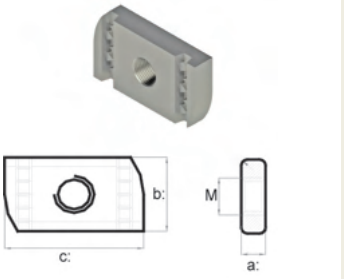
HDG 4.6 hot dip galvanized steel strenght class 4.6

HDG 8.8 hot dip galvanized steel strenght class 8.8

Lock Nuts - Product Details

Product Code	Technical Details					Product Drawing
	Metric Size M (mm)	Head Thick. a (mm)	Head Width b (mm)	Head Length c (mm)	Suitable for Channels	
HMLN-28-6	6	4.0	13.00	24.5	HMPR-28/15	
HMLN-28-8	8					
HMLN-28-10	10					
HMLN-38-10	10	6.0	17.50	31.5	HMPR-38/17	
HMLN-38-12	12					
HMLN-38-16	16					

Product Code	Technical Details					Product Drawing
	Metric Size M (mm)	Head Thick. a (mm)	Head Width b (mm)	Head Length c (mm)	Suitable for Channels	
HMLN-40-10	10	10.8	17.00	34.5	HMPR-40/25, HMPR-H-40/22	
HMLN-40-12	12					
HMLN-40-16	16					
HMLN-50-10	10	11.7	21.0	43.5	HMPR-49/30, HMPR-54/33, HMPR-H-50/30, HMPR-H-52/34	
HMLN-50-12	12					
HMLN-50-16	16					
HMLN-72-12	12	22.0	31.00	62.0	HMPR-72/49	
HMLN-72-16	16					
HMLN-72-20	20					

Product code	Technical details					Product drawing
	Bolt size mm	Head thick. a (mm)	Head Width b (mm)	Head Length c (mm)	Suitable for channels	
HMLN-41-6	6	6.0	20.00	34.0	HMPR-S-41/22	
HMLN-41-8	8	8.0				
HMLN-41-10	10	10.0				
HMLN-41-12	12	12.0				

Product Code	Technical Details					Product Drawing
	Bolt Size mm	Head Thick. a (mm)	Head Width b (mm)	Head Length c (mm)	Suitable for Channels	
HMLN-S-41-6	6	6.0	20.00	34.0	HMPR-S-41/22	
HMLN-S-41-8	8	8.0				
HMLN-S-41-10	10	10.0				
HMLN-S-41-12	12	12.0				

Product Code

HMLN - 28 - 6

- Metric
- Channel type
- Type

- Material:

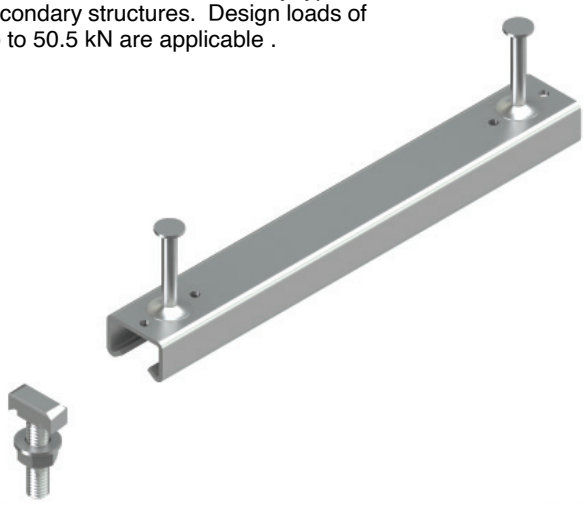
A4 Stainless steel W 1.4401,

HDG hot dip galvanized steel

Anchor Channels - Application Examples

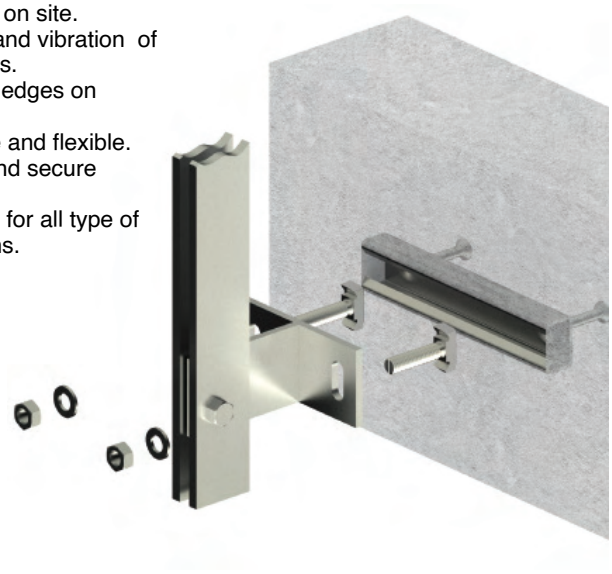
HMPR Anchor channels with studs and corresponding T head bolts are used for strong connections in to concrete without the use of drilling.

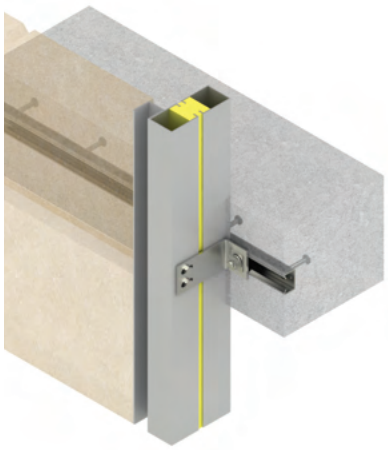
Suitable for connections of any type of secondary structures. Design loads of up to 50.5 kN are applicable .



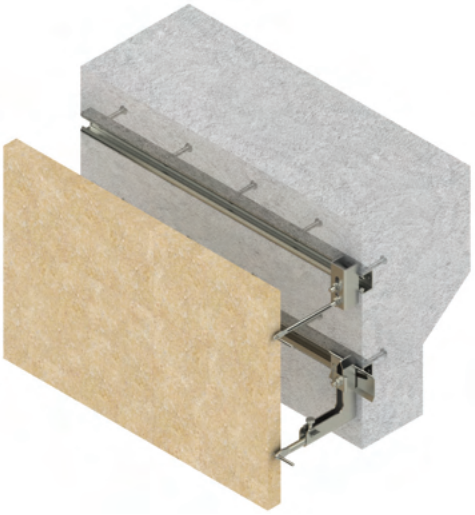
Advantages:

- Quick and easy fixing.
- No drilling on site.
- No noise and vibration of power tools.
- Safe near edges on concrete.
- Adjustable and flexible.
- Durable and secure fixing.
- Applicable for all type of installations.





• Installation of curtain walls



• Installation of natural stone panels

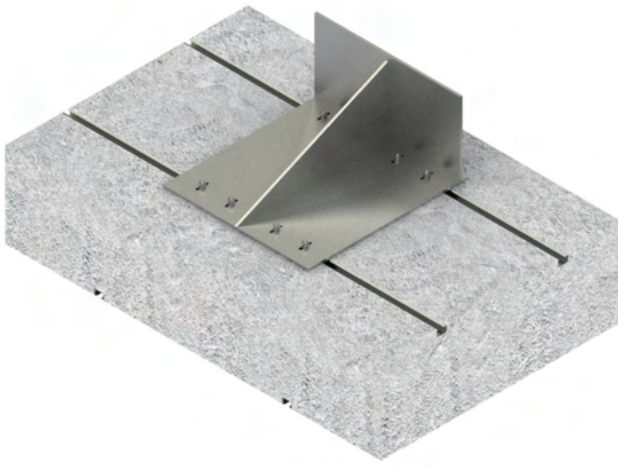
• Installation of masonry walls

• Installation of precast concrete panels

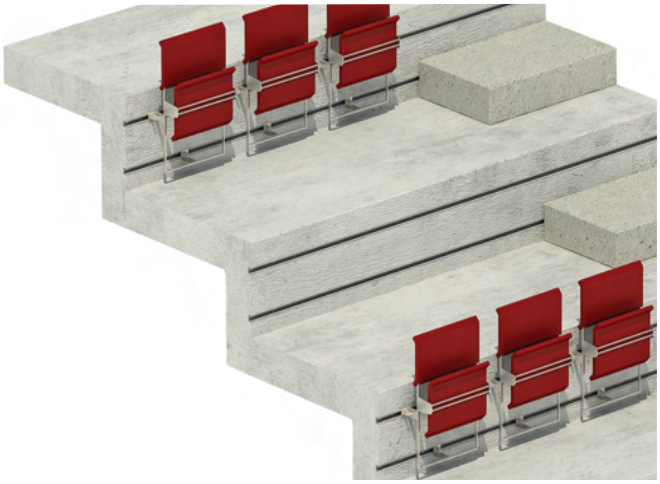
• Connection of concrete beams

• Installation of pipe systems

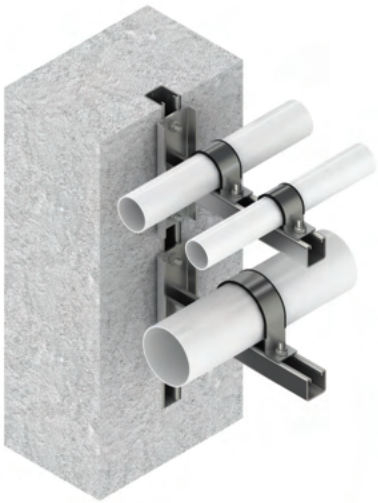
Anchor Channels - Application Examples



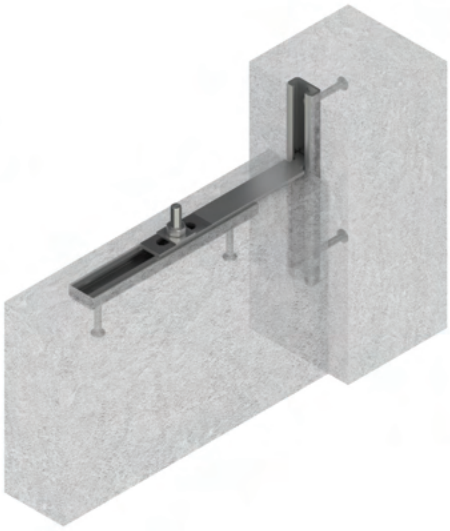
• Installation of base components



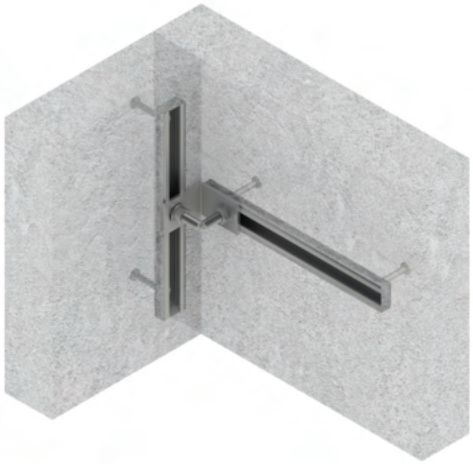
• Installation of stadium seats



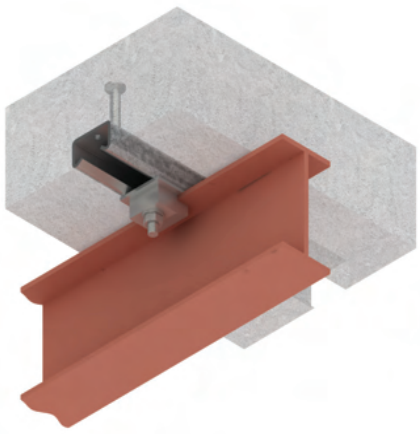
• Installation of pipe systems



• Wall connections

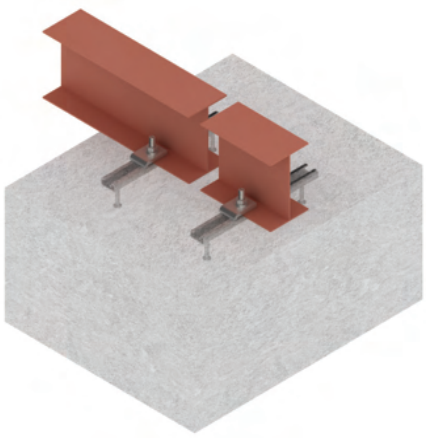


• Wall connections



• Upper beam connection

• Base connection



• Lower beam connection

HFB Facade Brackets

Curtain wall cladding methods are used more frequently for the external wall envelopes of modern buildings. Curtain wall technology is the most advanced type of facade construction which are preferred because of its aesthetics and functionality.

This type of cladding also offers high thermal and load performance and can be installed faster and easier than any other conventional type of claddings.

HAZ Metal designs and manufactures facade brackets for the installation of curtain wall panels on to the structure.

HFB facade support brackets are used to fix longitudinal and transverse curtain wall systems. The brackets transfer the acting loads in to the structure. These brackets can be designed to adapt to any type of application with accordance to the design criteria.

HFB facade brackets are designed and dimensioned to with stand high horizontal and vertical loads. The facade brackets are available in two main categories.

The first category of facade brackets are the ones that can be fixed on the edge of the slabs. This way the tensile loads from wind are transferred in to the end of the floor slab.

The second category of facade brackets are the ones that are fixed on the top of the slab. This way the horizontal loads from wind and the vertical loads from dead load and the resultant loads are transferred in to the top of the floor slab.

The facade brackets offer increased advantages when used with HMPR anchor channels. Fast and easy connections are made due to the high adjustability features of the HMPR anchor channels. Verified load values adds extra confidence to the designers and contractors.

Advantages

• Simple and fast installation due to the adjustability of the system in all directions.

• Smaller edge distances make it possible to fix close to the edge or front end of the floor slabs.

• High load performance both for horizontal and vertical loads. Up to 32 kN loads possible.

• Can be specially designed and dimensioned to suit various type of fixing applications.

• Manufactured from Stainless Steel or Hot dip galvanized mild steel.

• High rise buildings with curtain wall facade applications

• Curtain wall fixing at the edge of floor slab

• Curtain wall fixing at the edge of floor slab

HFB Facade Support Brackets - Product Range

HFB-LH Facade Support Bracket

Application details

•Bracket for installing curtain wall at top of slabs.

• Quick and Easy Installation with hang on method.

• + / - 10 mm vertical adjustment through incorporated set screws on the bracket.

• Inward and outward adjustability through the slotted holes. Fixing is secured at desired point with serrated washers.

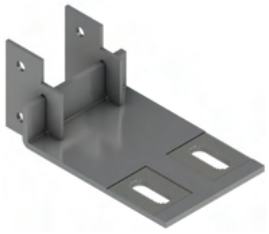
• Lateral adjustability made with on the cast in channel. Fixing is made with two T head bolts.

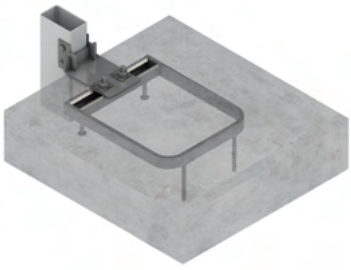
• Can be designed to take wind loads of up to 24 kN.

• Can be designed to take dead loads of up to 7 kN.

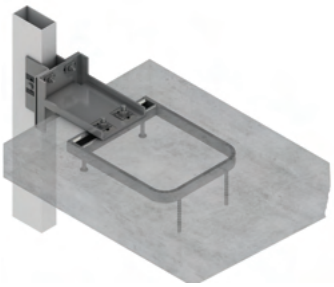
• Available in stainless steel and hot dip galvanized mild steel.

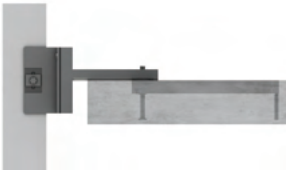
HFB-AP Facade Support Bracket





HFB-MT Facade Support Bracket





HFB-MLS Facade Support Bracket

Application details

•Brackets for installing curtain walls at edge of slabs.

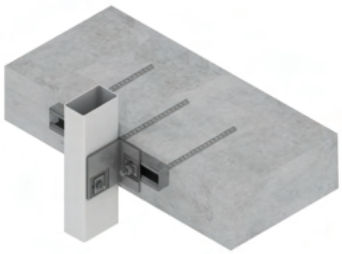
• Adjustability made through slotted holes. Position fixing is made with serrated washers.

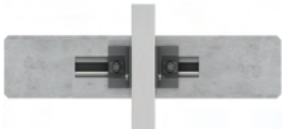
• Easy fixing with uncomplicated parts.

• Bespoke design can be made to resist varying dead loads and wind loads.

• Can be designed to take dead loads of up to 7 kN.

• Available in stainless steel and galvanized steel.





HFB-MLO Facade Support Bracket

Recess Box Anchor Channels

Unitised curtain systems are often installed at the top of the slab. This creates a problem in which the brackets used to install the curtain wall panels stand out above the finished floor level.

As a result, the usable area is reduced and aesthetics are compromised. The use of the HAZ-RBX Recess Box anchor channel provides a solution for this problem.

The HAZ -RBX Recess Box is supplied with the suitable anchor channel connected to it which creates a void in the concrete that allows the bracket to be installed below the finished floor level.

The HAZ-RBX channel is made out of galvanized steel or epoxy paint coated steel recess box, that is welded with an anchor channel. The type and size of the anchor channel is determined according to the design loads of the curtain wall application.

The box is filled with foam to avoid ingress of concrete in to the void. There are nail holes on the steel box to allow installation onto the formwork shuttering.

After the installation of the HAZ-RBX anchor channels on to the form work is completed, concrete is poured leaving the top of the box flush with the concrete pour.

Once the concrete is dried, the foam filler is pulled out and the void is exposed. The curtain wall support bracket is installed on to the anchor channels using T head bolts.

After the installation is finished and the support bracket is tightened, the void is filled with concrete or grout. The bracket is covered and the void is completely filled leaving a flush finished floor.

Features and benefits:

• The HAZ-BRX Recess box channel is manufac- tured with tight tolerances

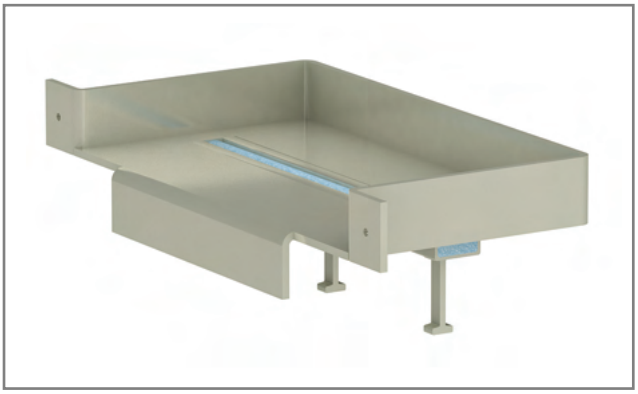
• Dimensions can be customized to application requirements

• Nail holes are available for fixing the box to wooden form work

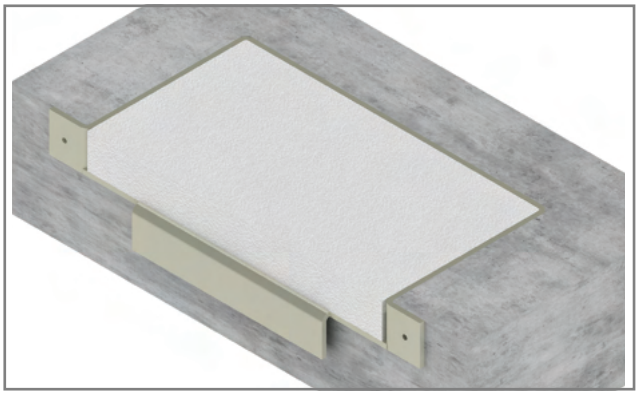
• Foam filler is provided with an exact fit to avoid concrete ingress

• Anchor channels are tack welded to the recess box

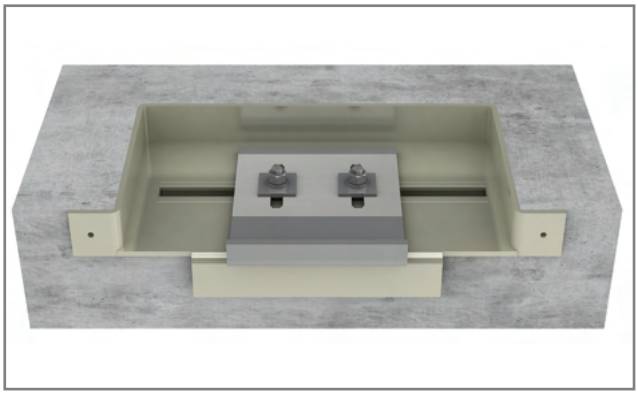
• Corrosion resistant epoxy paint coating or hot dip galvanizing made to the recess box



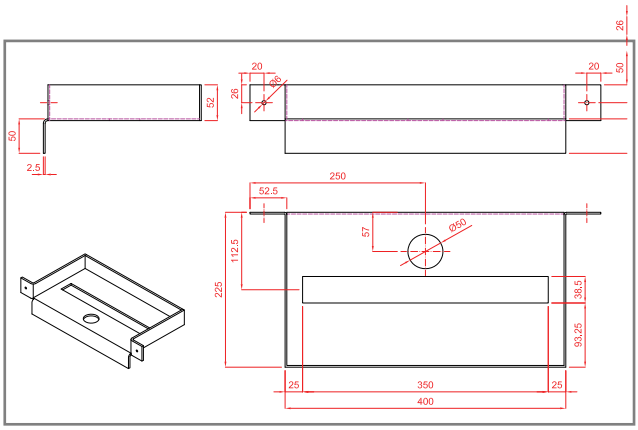
• HAZ-RBX Recess Box Anchor channels can be supplied with any type of anchor channels



• HAZ-RBX Recess Box Anchor channels are supplied with foam filling to avoid concrete recess in to the void



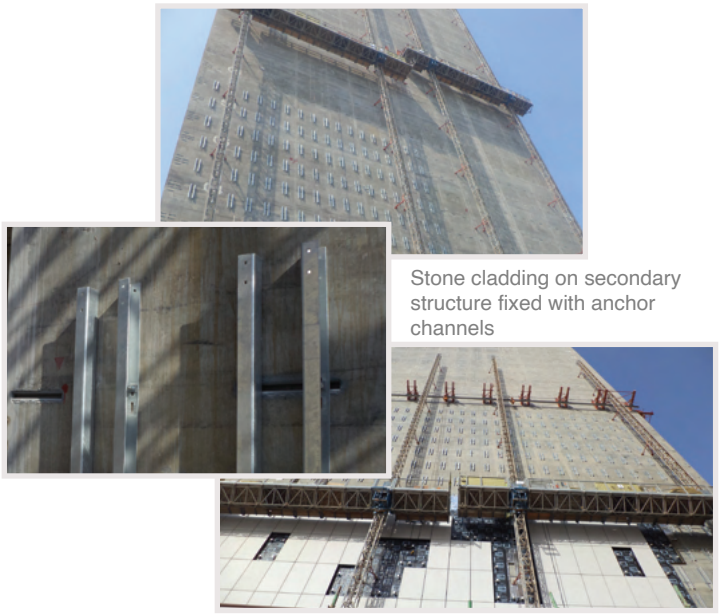
• HAZ-RBX Recess Box Anchor channels are used for curtain wall installation at the top of the slab



• HAZ-RBX Recess Box Anchor channels can be custom made. The above dimensions (mm) are for HMPR -CE- 49/30-350 type channel

Anchor Channels Application Pictures

Anchor channels can be used on all kinds of concrete connections. All types of facade applications can be executed using anchor channels. This is preferred due to its easy and fast installation features. Below are pictures taken from our anchor channel applications used in a wide range of construction applications.



Stone cladding on secondary structure fixed with anchor channels

Curtain wall cladding fixed with anchor channels on the edge of slab

Brick work support bracket fixed with anchor channels

Curtain wall cladding fixed with anchor channels on the top of slab

Various anchor channel applications used on areas such as, electric utility, water management and in tunnels

Stadium seating fixed with anchor channels

Project References

Infinity Tower, Brisbane

Adnoc HQ, Abu Dhabi

Renaissance Tower, Istanbul

The Ruby Tower, Mumbai

Telekom HQ, Ankara

Dolphin Tower, Ankara

Ciftci Towers, Istanbul

Emaar Square, Istanbul

Centre for Technology and Design, St Polten

Awly Building, Christchurch

Project References

Ang Mo Kio ITE Headquarters, Singapore

Hyundai Innovation Centre, Singapore

Conrad Hotel, Dubai

Ritz Carlton Hotel, Kuala Lumpur

Rasuna Tower, Jakarta

Orchard Emerald, Singapore

Dorsett Hotel, Singapore

Project References

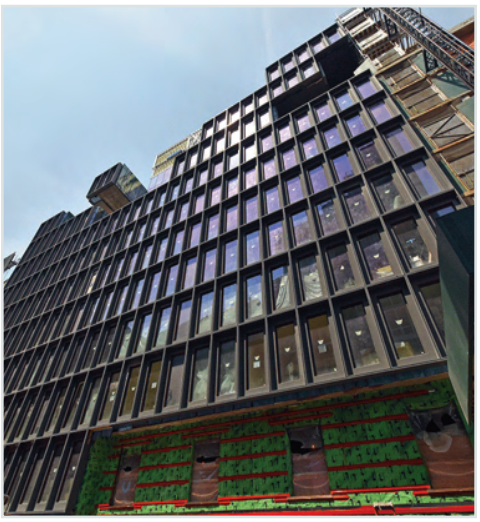
Sefton Towers, Liverpool

Media City, Manchester

Victoria Road, Woking

Gewa Tower, Fellbach

42 Trinity Place, New York



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Great Aim Centre, Zhuhai

160 Madison Avenue, New York

Since its beginning in 1993, HAZ Metal has proved its reliability by successfully completing challenging projects. HAZ Metal has established a reputation for being a reliable supplier of structural components for facade construction.

Prestigious and large scale projects around the world have been supplied with high quality fixing systems designed and manufactured by HAZ Metal.

Always at the forefront of fixing technology, HAZ METAL has established a wide product portfolio to complement its fixing systems targeted for the specialist external wall cladding market. Designing and engineering high integrity and quality products for facade applications made HAZ a worldwide known brand in the construction industry.

HAZ METAL combines the very latest international technology with its own research and development team to establish a technical excellence within the industry. HAZ METAL readily embraces the responsibility of a major producer and shares its expertise with problem solving solutions.

HAZ METAL

HAZ Metal is certified with integrated management systems by TUV SUD for ISO 9001 & OHSAS 18001

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