HALFEN HTU-S CAST-IN CHANNEL FOR FIXING PROFILED SHEET METAL

The benefits at a glance

The Halfen HTU-S Cast-in channel is ideal for fixing all types of profiled sheets – easy and simple with self-drilling screws. Suitable for both shear loads and tension loads.

Thanks to the innovative channel design with its corrugated sides and filler, the new generation of Halfen HTU Cast-in channel is installed entirely in the required concrete cover. This avoids any problem with the required reinforcement.

Halfen HTU-S 60 Cast-in channel for fixing profiled sheet metal

Halfen HTU-S 100 Cast-in channel for fixing profiled sheet metal

Safe and reliable

- innovative geometry and corrugated edging ensure reliable anchorage
- polystyrene filler prevents the self-drilling screw from hitting concrete
- building authority approved
- the type stamp on the channel back ensures identification after installation

Efficient and economical

- simple installation in the required concrete cover
- one channel type irrespective of the reinforcement layout
- simple installation in the precast plant

Fixing of trapezoidal sheet metal roof element

Façade fixed using Halfen HTU Cast-in channels (Cologne Bonn Airport)

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HALFEN HTU-S CAST-IN CHANNELS
General/Product Range

The Halfen Cast-in channel for fixing trapezoidal sheet metal has a U-shaped cross-section with the sides angled outwards. The corrugated sides of the channel provide a positive-lock with the concrete.

Both HTU-S Channel types (60 and 100mm) allow various bolt fixing and layout options. Halfen HTU-S Cast-in channels are building authority approved.
Approval: DIBt no. Z-21.4-2096

Fixing trapezoidal sheet metal using self-drilling screws

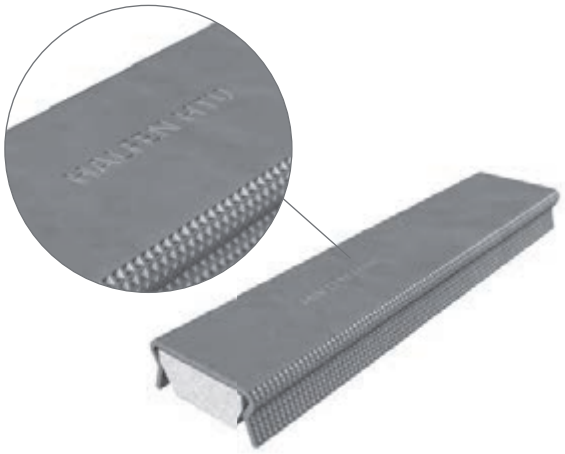
Area of application	Fixing of trapezoidal sheeting or wall-cladding elements using building authority or ETA approved self-drilling screws. Installed flush with the surface of precast concrete elements; concrete strength C25/30 up to C50/60, cracked or non-cracked.
Materials/corrosion protection	HTU Channel made of zinc-plated steel may be installed in environments of C1 to C3 corrosion category acc. to EN ISO 12944-2:2018-04.

Available lengths:
HTU-Channels are available in 3000 or 6000 mm lengths.

Order example HTU-S Channel, width 60 mm :

HTU 60/25/2,5-S **6000**

length [mm]
product name



Identification
Original Halfen Cast-in channels for fixing trapezoidal sheet metal can be identified by the stamp on the back of the channel displaying the brand name and the product description `Halfen HTU´.

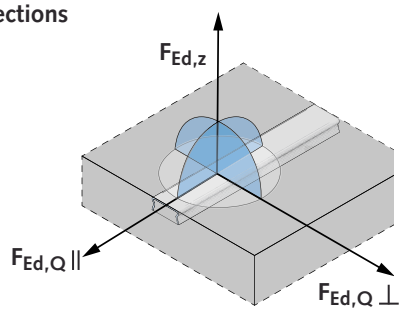
Detailed installation instructions for the self anchoring Halfen HTU-S Channel can be found at:
www.halfen.com ► Brochures ► Installation Instructions ► Fixing systems

HALFEN HTU-S CAST-IN CHANNELS

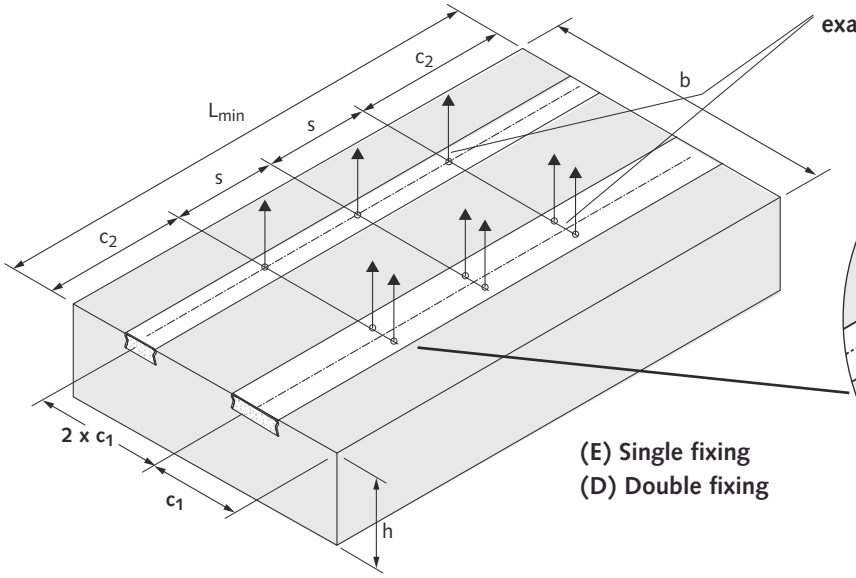
Dimensioning

Anchorages must to be planned in accordance with engineering standards. Verification of direct local force transmission from the channel into the concrete has been provided if the approved values are complied with. Connecting accessories must be verified separately. Technical design must comply with building authority approval no. Z-21.4-2096.

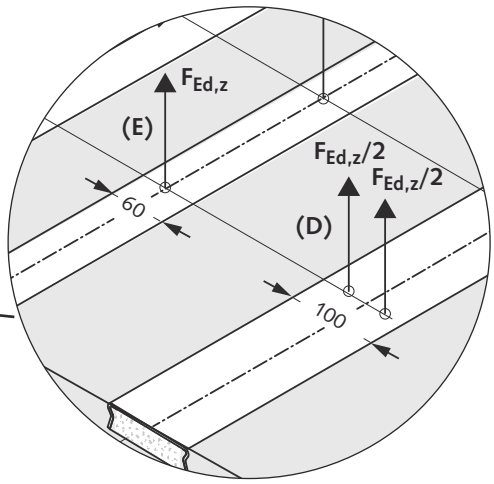
Load directions



Constructive boundary conditions

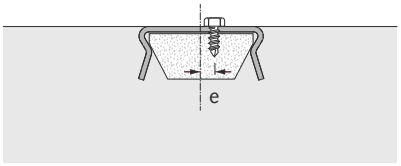


Load application point $F_{Ed,z}$ examples

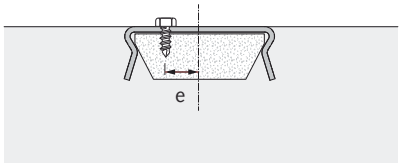


(E) Single fixing
(D) Double fixing

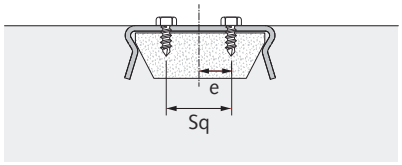
HTU-S 60 ($e_{max} \leq b_{HTU}/6$)



HTU-S 100 (E) ($e_{max} \leq b_{HTU}/6$)



HTU-S 100 (D) (50 mm ≤ Sq ≤ 70 mm)



Minimum element dimensions, bolt spacings and load resistances for concrete strength class C30/37 to C50/60 ①③

Channel	L_{min}	(E) Single (D) Double fixing	b_{min}	h_{min} ④	$C_{1,min}$ ④	$C_{2,min}$	s_{min}	F_{Rd} ①②③
	[mm]		[mm]	[mm]	[mm]	[mm]	[mm]	[kN]
HTU 60/25/2,5-S	150	E	2 x c_1	200	90	75	150	3,6
	250	E				125	250	4,9
	310	E				155	310	5,7
HTU 100/25/3-S	150	E	2 x c_1	200	120	75	150	2,4
		D						4,2
	250	E				125	250	3,5
		D						6,0
	310	E				155	310	4,2
		D						7,1

① Resistance F_{Rd} applies for all load directions. The permanent load of $F_{Ed,z}$ must be limited to 0.15 · F_{Rd}.
② For concrete strength class C25/30 the resistances must be reduced with factor 0.91.
③ For concrete strength class > C30/37 the resistance F_{Rd} may be increased by Ψc acc. to (annex 5, table 1 and annex 6, table 2)
④ For HTU 60/25/2,5-S lower values are allowed. See approval annex 5, table 1.

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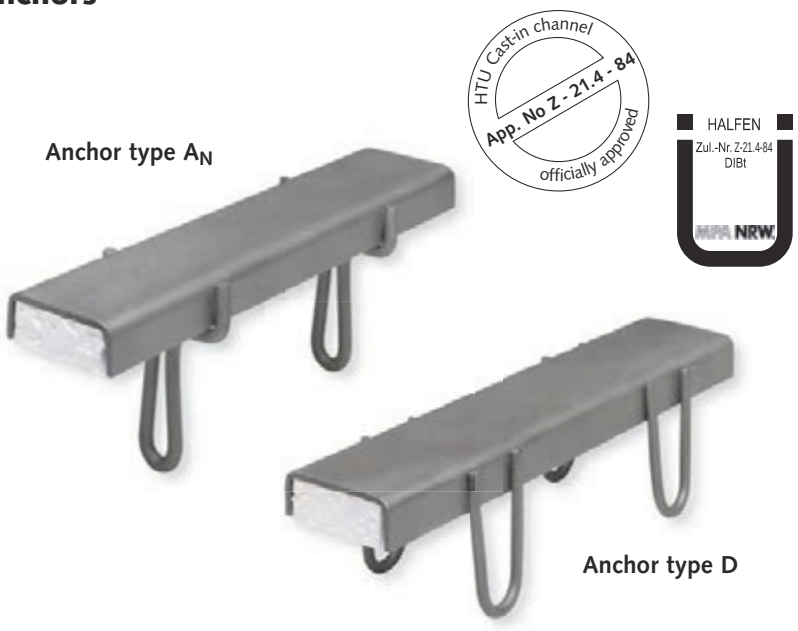
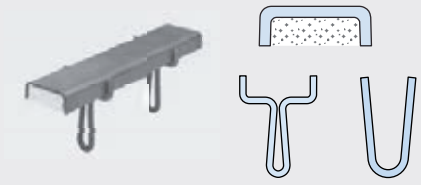
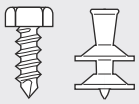
HALFEN HTU CAST-IN CHANNELS
C-shaped Channels with Welded Anchors

The Halfen Trapezoidal sheet metal installation channels were developed in cooperation with the Association for the light-weight steel construction industry (IFBS Industrieverband für Bausysteme im Stahlleichtbau).
Made as a C-shaped channel in hot-dip galvanized steel with at least two welded anchors, and approved by the German Institute of Building Technology (DIBt Deutsches Institut für Bautechnik).
Approval: DIBt no. Z-21.4-84

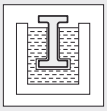


Halfen HTU Cast-in channels, steel hot-dip galvanized

		Steel		
		Material	Standard	Zinc coating
	Channel profiles	1.0038	EN 10 025-2	FV: ≥ 50 µm
	Anchor A_N, D			
	Fixing	Fixing of trapezoidal sheet metal or wall-cladding elements using building authority or ETA approved self-drilling screws or metal deck fasteners. Installed flush with the surface of precast concrete elements.		

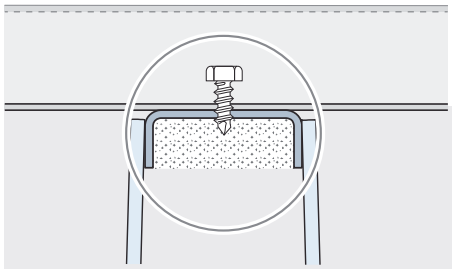
Vertical Halfen HTU Cast-in channels for fixing façade panels

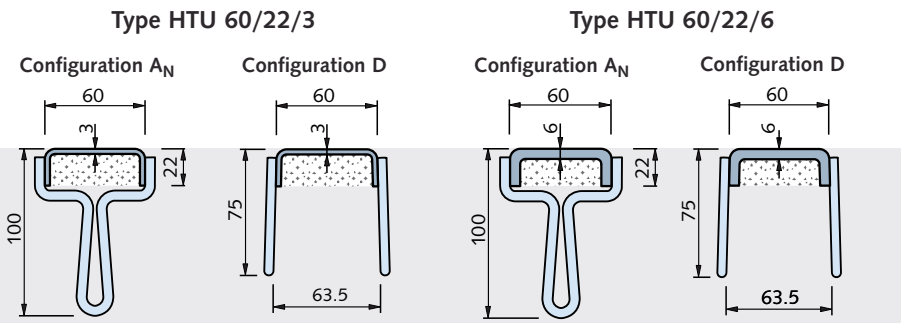
Hot-dip galvanized FV:
Dipped in a galvanising bath at a temperature of approximately 460°C. This method is used primarily for open-profile channels.



HALFEN HTU CAST-IN CHANNELS
C-shaped Channels with Welded Anchors

Product range





Profile cross-section A	2.81 cm²		4.94 cm²	
Moment of inertia I_y / Moment of resistance w_y	1.13 cm⁴ / 0.71 cm³		1.84 cm⁴ / 1.27 cm³	
Profile weight including anchors	2.49 kg/m	2.50 kg/m	4.25 kg/m	4.26 kg/m

Ordering example:

HTU 60/22/3 - D2 - FV - 3000 - Sf

- type / profile
- anchor configuration
- material / finish
- length [mm]
- polystyrene strip filler

■ **FV** = Steel S235JR, hot-dip galvanized

HTU 60/22/3 ■ = hot-dip galvanized	Number of anchors
HTU 60/22/3 - AN2 - FV - 3000 - Sf	8
HTU 60/22/3 - D2 - FV - 3000 - Sf	8
HTU 60/22/3 - AN3 - FV - 3000 - Sf	20
HTU 60/22/3 - D3 - FV - 3000 - Sf	20

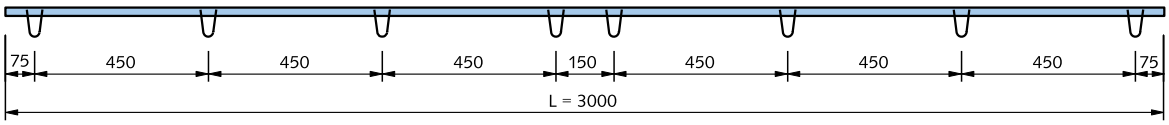
HTU 60/22/6 ■ = hot-dip galvanized	Number of anchors
HTU 60/22/6 - A_N2 - FV - 3000 - Sf	8
HTU 60/22/6 - D2 - FV - 3000 - Sf	8
HTU 60/22/6 - A_N3 - FV - 3000 - Sf	20
HTU 60/22/6 - D3 - FV - 3000 - Sf	20

Connecting element example HTU 3 mm material steel ETA 10/0200:
Self-drilling screws 6.3x19
e.g. JT2-6-6,3-19-xE16 with sealing disc.
Connecting element is exposed to weather:
JT3-6-6.3x25-E16 (Wall) or JZ3-6-6.3x25-E22 (Roof)

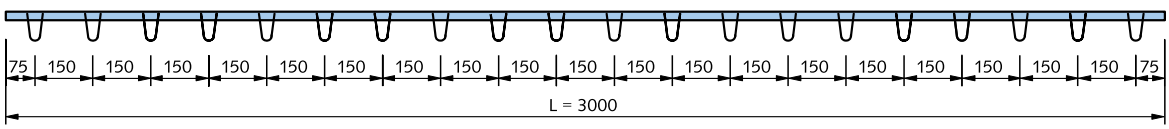
Connecting element example HTU 6 mm material steel ETA 10/0200:
Self-drilling screws 6.3x22
e.g. JT2-6-6,3-x22-V16 with sealing disc or cartridge fired nails.
Connecting element is exposed to weather: see screw, or nail approval.

Anchor spacing:

Type D2 or A_N2



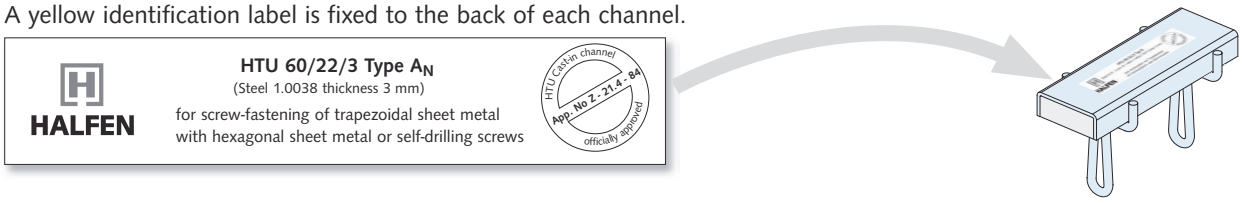
Type D3 or A_N3



Dimensions in [mm]

Identification HTU

A yellow identification label is fixed to the back of each channel.



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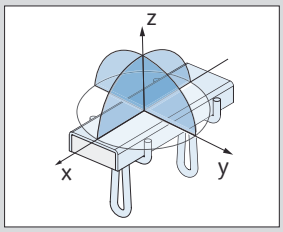
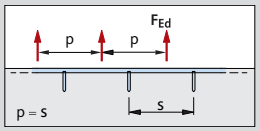
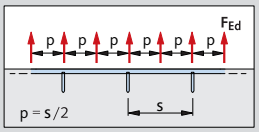
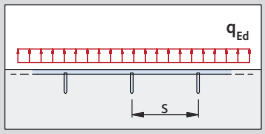
HALFEN HTU CAST-IN CHANNELS
C-shaped Channels with Welded Anchors

Table 1 Maximum design load-carriyng capacity F_{Ed}







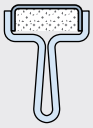


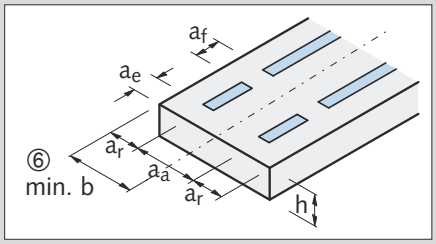
Profile HTU	Anchor spacing s [mm]	max. F_{Ed} [kN]		max. F_{Ed} [kN]		max. evenly distributed load q_{Ed} [kN/m]
60 / 22 / 3	450	p = s	4.6	$p = s/2$	3.5	15.5
	150		7.0		3.5	46.6
60 / 22 / 6	450		7.0		3.5	15.5
	150		7.0		3.5	46.6

$$F_{Ed} = \sqrt{N_{Ed}^2 + F_{xEd}^2 + F_{yEd}^2} < F_{Rd}$$

Concrete ≥ C20/25

Table 2 Minimum distance when exploiting maximum load as in table 1

Profile		Minimum interaxial spacing and edge distance					
HTU	60/22/3 60/22/6	a_a ① [mm]	a_r ② [mm]	a_e ③ [mm]	a_f ④ [mm]	h ⑤ [mm]	b ⑥ [mm]
	Type A_N	200	100	20	20	100 + nom c	200
	Type D	200	100	20	20	75 + nom c	200



① If the (trapezoidal sheet metal) channels are placed so that the anchors of adjacent channels are offset by at least 200 mm, the axial spacing a_a may be reduced to 80 mm.

② If not exploiting the maximum load capacity F_{Ed}, see table above, the edge distance a_r may be reduced. This applies only for central tensile stress N_{Ed}.

$$a_{r\ red.} = \frac{\text{actual } N_{Ed}}{\text{max. } F_{Ed}} \times a_r \geq 50\,\text{mm}$$

actual N_{Ed} = design rating of actual load
max. F_{Ed} = maximum load as in the table above

The edge distances must not be reduced if transverse stress (V_{xEd} , V_{yEd}) is present.

③ With full exploitation of maximum load F_{Ed} as in the table above, the last anchor must be at least 100 mm from the component edge.

④ When fully exploiting maximum load capacity F_{Ed}, see table above, the "last anchors" of adjacent channels must be at least 150 mm apart.

⑤ Depends on the anchor's size and the required concrete cover.

⑥ Minimum width of building component for a one channel layout.

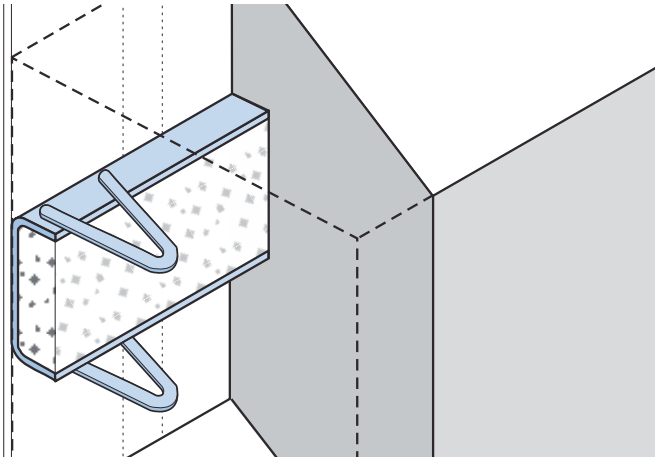
HALFEN HTU CAST-IN CHANNELS
C-shaped Channels with Welded Anchors

Installation

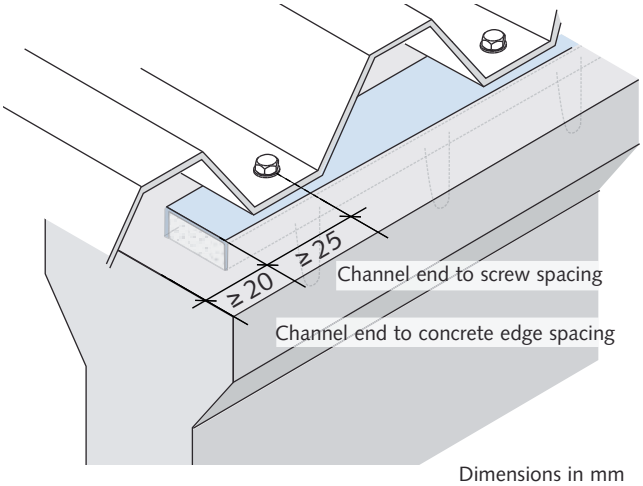
The ready-to-install HTU Channel is embedded flush with the final concrete surface. It is advisable to level the concrete surface and to apply a slight slope to the outer edge of the concrete. This is to ensure that the trapezoidal sheet metal rests only on the HTU Channel. According to German approval a heightened installation of up to 5 mm is also possible.

Alternatively, if the trapezoidal sheet metal manufacturer requires a minimal support width larger than 60 mm, this can be achieved through a flush channel installation and a flat concrete surface. Ensure that pre-stressed concrete trusses are properly aligned, centred and absolutely plane. Maintaining a 20 mm gap between individual channel ends is recommended.

Trapezoidal sheet metal fixing in wall applications

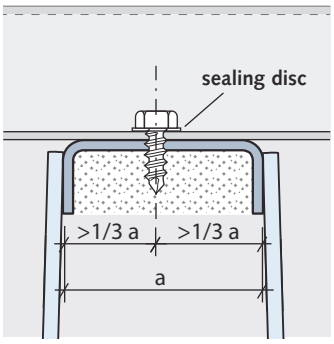


Trapezoidal sheet metal fixing in roof applications

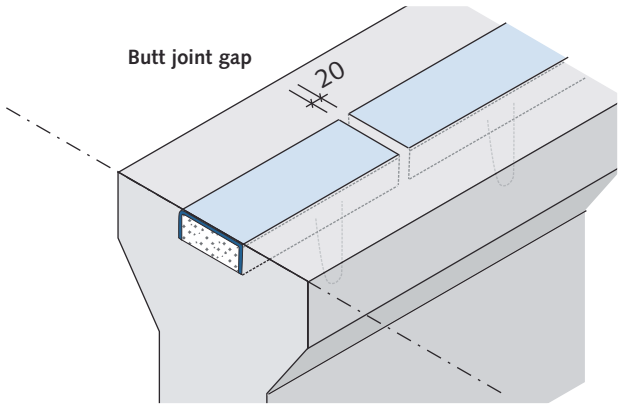


Dimensions in mm

Screw placement



Recommended butt joint gap between two channels



Assembly (with self-drilling screw)

- use a power-driver to fix the self-drilling screw; a pilot hole is not required. Even 4-fold overlapping at joints is not a problem with self-drilling screws
- the recommended engine speed and socket size must be observed; See product data sheet of the self-drilling screws
- suitable tools for various screws can be obtained from the screw supplier
- the trapezoidal sheet metal must be attached in the central third of the channel back; Screws must be positioned at a minimum distance of 25 mm from the channel ends

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