HST4 Expansion anchor

Product Technical Datasheet
Steel to Concrete
Metal deck
Update:July 25

HST4 Wedge expansion anchor

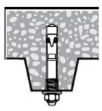
High-performance expansion anchor

Anchor version		Benefits
	HST4 (M8-M16)	– Tested performance in Metal composite deck systems (e.g. Comflor) – Supporting multiple embedment depths enabling value engineered solutions – High pullout performance for medium and heavy-duty connections – No cleaning required with the proper installation steps – Ideal for multi-service supports in MEP applications – Seismic resistance assessed according to C1 conditions
	HST4-R (M8-M16)	

Base material

Concrete (uncracked)

Concrete (cracked)



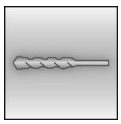
Concrete over metal deck

Load conditions

Static / quasi-static

Seismic assessment according to C1

Drilling, cleaning, setting



Hammer drilled holes

Other information

Hilti Technical data

Instructions for use

The instructions for use can be viewed using the link in the instructions for use table or the QR code/link in the Hilti webpage table.

Instructions for use (IFU)

Anchor size	M8	M10	M12	M16
HST4	IFU HST4-M8	IFU HST4- M10	IFU HST4- M12	IFU HST4- M16
HST4-R	IFU HST4-R M8	IFU HST4-R M10	IFU HST4-R M12	IFU HST4-R M16
Filling set	Filling Set			

HST4	HST4-R

Static and quasi-static loading based on Hilti technical data. Design according to EN 1992-4

All data in this section applies to:

- Correct setting (see Instructions for use (IFU))
- Hammer drilled holes
- For a single anchor
- No edge distance and spacing influence (see setting detail tables with characteristic distances). Only one anchor can be used in the lower flute at a time with the min. spacing between anchors along the length of the flute to be at least s = 3 h_{ef}. This datasheet does not give information for the design of fasteners in a group.
- Minimum base material thickness (see setting detail table)
- Embedment depth, as specified in the table of this section
- Concrete from C30/37 without steel fiber for higher compressive strengths
- Recommended loads: With overall partial safety factor for action γ = 1,4.

  Note: Embedment depths h_{ef}<40 mm are applicable only for fastening of static redundant non-structural systems as addressed in EN 1992-4, Clause 7.3 and CEN/TR 17079. For other types of fastenings please increase the embedment depth

For anchoring into the upper flute, either use table below conservatively or refer to ETA-21/0878. In this case the minimum required slab thickness h_{min} must be larger than the deck thickness $h_{min,deck}$.

Design resistance - ComFlor® 80 and 60

Anchor size			**M8**		**M10**		**M12**		**M16**	
Effective anchorage depth	h_{ef}	[mm]	30 [1)]	45	30 [1)]	60	40	70	65	85
Uncracked concrete										
Tension	HST4 / HST4-R	N_{Rd} [kN]	5,7	9,1	8,2	14,5	9,2	13,7	13,0	19,5
Shear	HST4 / HST4-R	V_{Rd} [kN]	7,1	12,0	6,2	19,4	12,2	17,1	15,9	20,8
Cracked concrete										
Tension	HST4 / HST4-R	N_{Rd} [kN]	4,0	6,4	6,2	10,9	6,5	9,6	9,1	13,6
Shear	HST4 / HST4-R	V_{Rd} [kN]	7,1	12,0	6,2	19,4	12,2	17,1	15,9	20,8

Design resistance - ComFlor® SR

Anchor size			**M8**		**M10**		**M12**		**M16**	
Effective anchorage depth	h_{ef}	[mm]	30 [1)]	45	30 [1)]	60	40	70	65	85
Uncracked concrete										
Tension	HST4 / HST4-R	N_{Rd} [kN]	6,4	10,5	6,9	15,4	7,9	14,1	17,0	22,1
Shear	HST4 / HST4-R	V_{Rd} [kN]	7,1	12,0	17,4	19,4	24,7	24,7	38,9	38,9
Cracked concrete										
Tension	HST4 / HST4-R	N_{Rd} [kN]	4,4	7,4	5,2	11,6	5,6	9,9	11,9	15,5
Shear	HST4 / HST4-R	V_{Rd} [kN]	7,1	12,0	17,4	19,4	24,7	24,7	38,9	38,9

[1)] Please refer “Requirements for redundant fastening“ section

Recommended loads- ComFlor® 80 and 60

Anchor size				**M8**		**M10**		**M12**		**M16**	
Effective anchorage depth		h_{ef}	[mm]	30 [1)]	45	30 [1)]	60	40	70	65	85
Uncracked concrete											
Tension	HST4 / HST4-R	N_{rec}	[kN]	[1)]	6.5	[1)]	10.3	6.6	9.8	9.3	13.9
Shear	HST4 / HST4-R	V_{rec}	[kN]	[1)]	8.6	[1)]	13.8	8.7	12.2	11.3	14.9
Cracked concrete											
Tension	HST4 / HST4-R	N_{rec}	[kN]	[1)]	4.5	[1)]	7.8	4.6	6.9	6.5	9.7
Shear	HST4 / HST4-R	V_{rec}	[kN]	[1)]	8.6	[1)]	13.8	8.7	12.2	11.3	14.9

Recommended loads- ComFlor® SR

Anchor size				**M8**		**M10**		**M12**		**M16**	
Effective anchorage depth		h_{ef}	[mm]	30 [1)]	45	30 [1)]	60	40	70	65	85
Uncracked concrete											
Tension	HST4 / HST4-R	N_{rec}	[kN]	[1)]	7.5	[1)]	11.0	5.7	10.0	12.1	15.8
Shear	HST4 / HST4-R	V_{rec}	[kN]	[1)]	8.6	[1)]	13.8	17.7	17.7	27.8	27.8
Cracked concrete											
Tension	HST4 / HST4-R	N_{rec}	[kN]	[1)]	5.3	[1)]	8.3	4.0	7.0	8.5	11.1
Shear	HST4 / HST4-R	V_{rec}	[kN]	[1)]	8.6	[1)]	13.8	17.7	17.7	27.8	27.8

[1)] Please refer “Requirements for redundant fastening“ section

Requirements for redundant fastening

The definition of redundant fastening is given in EN 1992-4 and CEN/TR 17079. In Absence of a definition by a Member State the following parameters must be considered.		
Minimum number of fixing points	**Minimum number of anchors per fixing point**	**Maximum design load of action F_{Sd} per fixing point**
3	1	2 kN
4	1	3 kN

The value for maximum design load of actions per fastening point F_{Sd} is valid in general that means all fastening points are considered in the design of the redundant structural system. F_{Sd} can be a tension, shear or inclined load.

Seismic loading based on Hilti technical data. Design according to EN 1992-4

All data in this section applies to:
- Correct setting (see Instructions for use (IFU))
- For a single anchor
- Hammer drilled holes
- No edge distance and spacing influence (see setting detail tables with characteristic distances). Only one anchor can be used in the lower flute at a time with the min.spacing between anchors along the length of the flute to be at least s = 3 h_{ef}. This datasheet does not give information for the design of fasteners in a group
- Minimum base material thickness (see setting detail table)
- Embedment depth, as specified in the table of this section
- Concrete from C30/37 without steel fibre
- α_{gap} = 1,0 (using Hilti filling set) and α_{gap} = 0,5 (without using Hilti filling set) accordingly

Note: Embedment depths h_{ef}<40 mm are applicable only for fastening of static redundant non-structural systems as addressed in EN 1992-4, Clause 7.3 and CEN/TR 17079. For other types of fastenings please increase the embedment depth

For anchoring into the upper flute, either use table below conservatively or refer to ETA-21/0878. In this case the minimum required slab thickness h_{min} must be larger than the deck thickness $h_{min,deck}$.

Design resistance in case of seismic performance category C1- ComFlor® 80 and 60

Anchor size		**M8**		**M10**		**M12**		**M16**	
Effective anchorage depth	h_{ef} [mm]	30 [2]	45	30 [2]	60	40	70	65	85
with and without Hilti filling set									
Tension	HST4 / HST4-R $N_{Rd,C1}$ [kN]	[2]	5,7	[2]	10,4	6,1	9,0	8,9	13,4
with Hilti filling set (α_{gap} = 1,0)									
Shear	HST4 / HST4-R $V_{Rd,C1}$ [kN]	[2]	9,9	[2]	17,2	8,4	15,2	10,5	16,6
without Hilti filling set (α_{gap} = 0,5)									
Shear	HST4 / HST4-R $V_{Rd,C1}$ [kN]	[2]	4,9	[2]	8,6	4,2	7,6	5,2	8,3

Design resistance in case of seismic performance category C1- ComFlor® SR

Anchor size		**M8**		**M10**		**M12**		**M16**	
Effective anchorage depth	h_{ef} [mm]	30 [2]	45	30 [2]	60	40	70	65	85
with and without Hilti filling set									
Tension	HST4 / HST4-R $N_{Rd,C1}$ [kN]	[2]	6,6	[2]	11,0	5,2	9,3	11,7	15,2
with Hilti filling set (α_{gap} = 1,0)									
Shear	HST4 / HST4-R $V_{Rd,C1}$ [kN]	[2]	9,9	[2]	17,2	17,2	21,9	25,6	30,9
without Hilti filling set (α_{gap} = 0,5)									
Shear	HST4 / HST4-R $V_{Rd,C1}$ [kN]	[2]	4,9	[2]	8,6	8,6	10,9	12,8	15,4

[2] Embedment depths with h_{ef}<40 mm are not covered in the design of EN1992-4 for static or seismic actions

Setting information

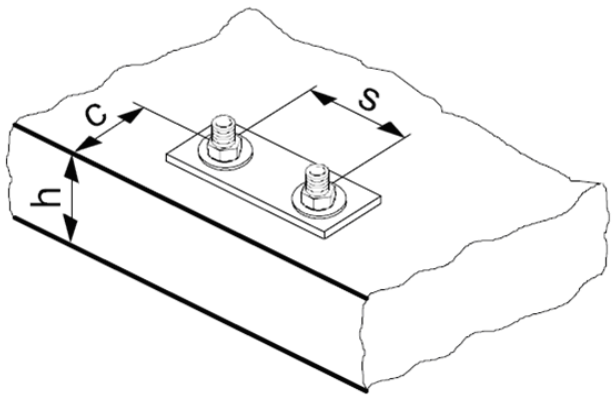
Setting details

ComFlor® 80 and 60 and ComFlor® SR

Type			**HST4 (-R)**							
Anchor size			**M8**		**M10**		**M12**		**M16**	
Nominal embedment depth	h_{nom}	[mm]	36	51	38	68	49	79	77	97
Effective embedment depth	h_{ef}	[mm]	30	45	30	60	40	70	65	85
Nominal diameter of drill bit	d_0	[mm]	8		10		12		16	
Depth of drill hole for cleaned or uncleaned hole overhead	h_{1min}	[mm]	56	71	58	88	69	99	97	117
Instalation torque	T_{inst}	[NM]	20		40		60		120	
Minimum base material thickness	h_{min}	[mm]	80	80	80	99	100	115	120	137
Minimum concrete thickness over upper flute	$h_{min,deck}$	[mm]	70							
Minimum distances ComFlor® 80 and 60										
Spacing	s_{min}	[mm]	35	40	50	65	35	40	50	65
Edge distance	c_{min}	[mm]	40	45	55	65	40	45	55	65
Minimum distance to edge of lower flute	$c_{min,deck}$	[mm]	40	45	55	60	40	45	55	60
Minimum distances ComFlor® SR										
Spacing	s_{min}	[mm]	35	40	50	65	35	40	50	65
Edge distance	c_{min}	[mm]	40	45	55	65	40	45	55	65
Minimum distance to edge of lower flute	$c_{min,deck}$	[mm]	55[1)]	55[1)]	55[1)]	60	55[1)]	55[1)]	55[1)]	60
Characteristics distances - installation from the top side (concrete side), $h_{min,deck}$ to be ≥ h_{min}										
Spacing for splitting failure	$s_{cr,sp}$	[mm]	114	168	140	210	168	244	246	336
Edge distance for splitting	$c_{cr,sp}$	[mm]	57	84	70	105	84	122	123	168
Spacing for concrete cone failure	$s_{cr,N}$	[mm]	90	135	90	180	120	210	195	255
Edge distance for concrete cone failure	$c_{cr,N}$	[mm]	45	68	45	90	60	105	98	128

For spacing (edge distance) smaller than characteristic spacing (characteristic edge distance) the design loads have to be reduced.

[1)] limited by the steel sheet geometry, not a MIN value for the anchor



Installation position for HST4 (-R) anchors in metal decks:

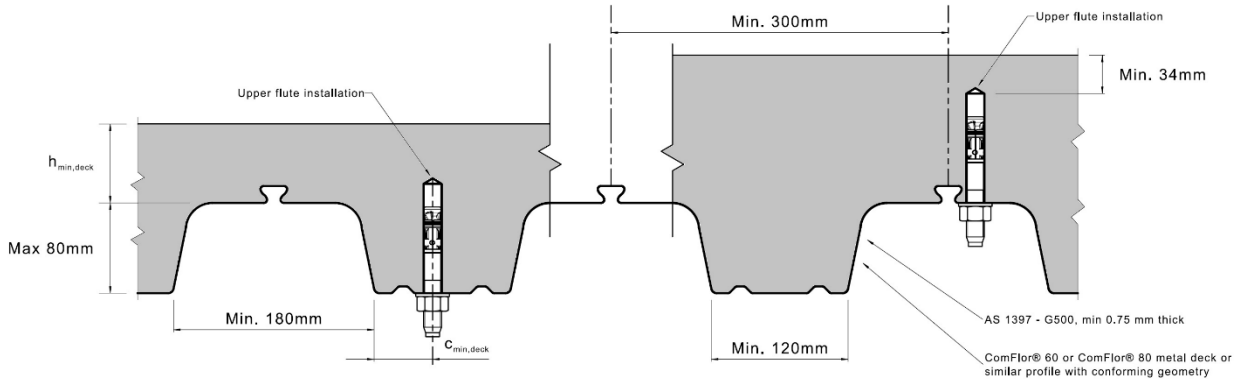


Figure 1: Setting diagram for ComFlor® 80 and 60

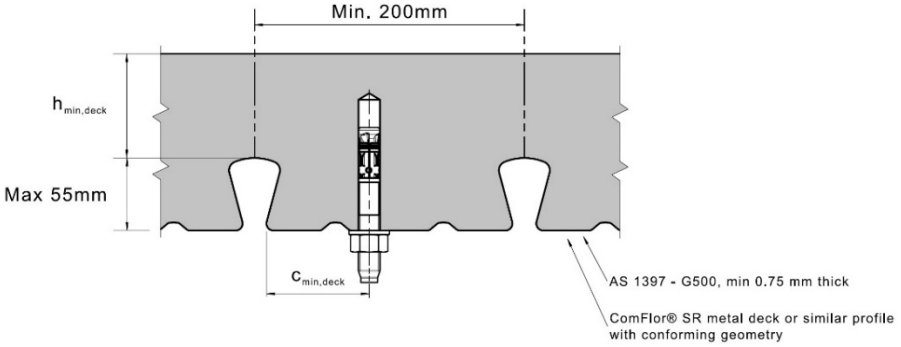


Figure 2: Setting diagram for ComFlor® SR

Drilling equipment

For detailed setting information on installation ,see instructions for use given with the product.

Rotary Hammers (Corded and Cordless)		TE 2 - TE 30
Other Tools		Hammer drill bit TE-CX, TE-C
		Blow out pump