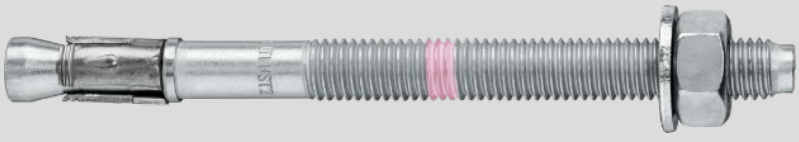
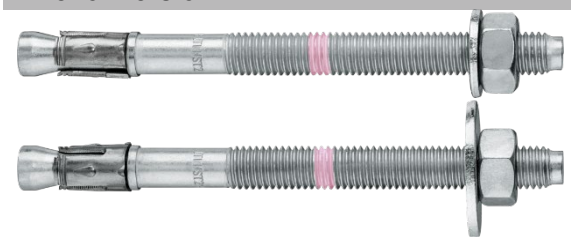
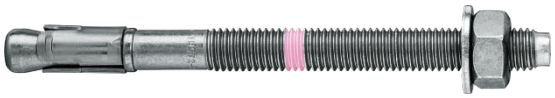
HST2 V3 Expansion anchor

Product Technical Datasheet
Steel-to-concrete
Design according to ACI Standard
Update: Jun 25



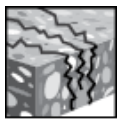
HST2 V3 Expansion anchor

High-performance expansion anchor

Anchor version		Benefits
	HST2 V3 (BW) (M8-M16)	- High-capacity anchor with ability for use in reduced member thickness, small spacing and edge distances - Suitable for uncracked and cracked concrete - Reliable and robust anchor for structural seismic design - Faster and approved installation with non-cleaning ventilation method - Product and length identification mark facilitates quality control and inspection
	HST2-F V3 (M8-M16)	
	HST2-R V3 (M8-M16)	

Base material

Concrete (uncracked)



Concrete (cracked)

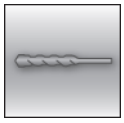
Load conditions

Static/ quasi-static

Seismic

Fire Resistance (ETA)

Drilling, cleaning, setting



Hammer drilled holes (including with no cleaning)

Other information

PROFIS Engineering software

Uniform Evaluation Service

Linked Approvals/Certificates and Instructions for use

Approvals/certificates

Approval no	Application / loading condition	Authority / Laboratory	Date of issue	Date of expiry
UES ER-918	Static and quasi-static / Seismic	IAPMO UES, USA	07-01-2025	31-01-2026
ETA-21/0480	Static and quasi-static / Seismic / Fire	CSTB, Marne-la-Vallée	31-10-2024	-

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
HST2 V3	HST2 V3 M8	HST2 V3 M10	HST2 V3 M12	HST2 V3 M16
HST2-F V3	HST2-F V3 M8	HST2-F V3 M10	HST2-F V3 M12	HST2-F V3 M16
HST2-R V3	HST2-R V3 M8	HST2-R V3 M10	HST2-R V3 M12	HST2-R V3 M16
Filling set	Filling Set			

Link to Hilti Webpage

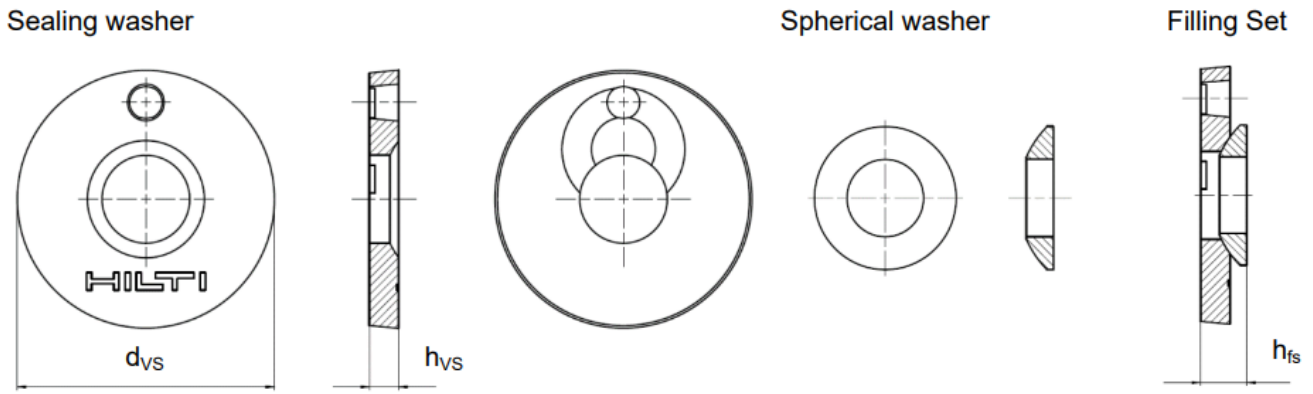
HST2 V3	HST2-F V3	HST2-R V3	HST2 V3 BW

Fastener special dimensions

Hilti filling set with Injection mortar Hilti HIT-HY

Dimensions filling washer

Anchor size			M8	M10	M12	M16
Diameter	d_{vs}	[mm]	38	42	44	52
Height filling washer	h_{vs}	[mm]	5	5	5	6
Height filling washer and spherical washer	h_{fs}	[mm]	8	9	10	11



Design information based on ER-918 and evaluation according to ACI 355.2 and ICC-ES AC193. Design according to ACI 318 Chapter 17. ($f_{c,cycl}$ = 3,000 psi = 20.7 MPa)

Data source

Technical data in this section is based on evaluation report ER-918 by IAPMO UES according to ACI 355.2 and ICC-ES AC193, except for the Seismic filling set.

The technical data in this document is also applicable for the Seismic filling set and has been evaluated by Hilti for designs in accordance with ACI 318 chapter 17. Published technical data is not contained in an external evaluation report (i.e. ICC-ES or IAPMO-UES) or other approval at this time and can be used as Hilti Technical Data only.

Design information is based on a single anchor that is far enough from the edge so that no reductions due to the influence of the concrete edge are present. For specific design cases refer to PROFIS Engineering.

NP = Not Permitted

Design parameter				**Nominal anchor diameter (mm)**			
				M8	**M10**	**M12**	**M16**
Anchor O.D.		**d_a**	**mm**	**8**	**10**	**12**	**16**
Effective min. embedment		h_{ef}	[mm]	45	60	70	85
Tension (lesser of concrete breakout/pullout or steel failure) - ϕN_n							
Design strength in tension (cracked concrete)	HST2 V3 HST2-F V3	ϕN_n	[kN]	5.1	6.8	7.8	16.5
	HST2-R V3			1.8	6.8	11.5	16.5
Design strength in tension (uncracked concrete)	HST2 V3 HST2-F V3	ϕN_n	[kN]	6.0	9.5	13.9	22.3
	HST2-R V3			5.6	7.8	17.3	23.2
Design strength in tension, seismic	HST2 V3 HST2-F V3	ϕN_n	[kN]	NP	5.1	5.8	12.1
	HST2-R V3			NP	4.0	7.6	11.6
Shear (lesser of concrete pryout or steel failure) - ϕV_n							
Design strength in shear (cracked concrete)	HST2 V3 HST2-F V3	ϕV_n	[kN]	5.5	10.5	16.3	27.4
	HST2-R V3			6.8	10.5	23.3	35.4
Design strength in shear (uncracked concrete)	HST2 V3 HST2-F V3	ϕV_n	[kN]	5.5	10.6	16.3	27.4
	HST2-R V3			9.6	14.8	23.3	39.8
Design strength in shear, seismic	HST2 V3 HST2-F V3	ϕV_n	[kN]	NP	7.3	12.9	22.0
	HST2-R V3			NP	8.8	15.5	19.4

Tensile design information based on ER-918 and evaluation according to ACI 355.2 and ICC-ES AC193. Design according to ACI 318 Chapter 17.

Additional information:

a) Strength reduction factor for steel in tension:
The HST2 V3 anchor is considered a ductile steel element, except for the M8 HST2 V3 and HST2-F V3.

b) Strength reduction factor for concrete failure and pullout in tension for Condition A and B:
For use with the load combinations of ACI 318 section 5.3. Condition B applies where supplementary reinforcement in conformance with ACI 318 section 17.5.3 is not provided, or where pullout or pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the resistance modification factors associated with Condition A may be used.

c) Modification factor for anchor resistance, tension, uncracked concrete:
For all design cases, $\psi_{c,N}$ = 1.0. The appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked (k_{uncr}) concrete must be used.

d) Pullout strength uncracked, cracked and seismic:
For all design cases, $\psi_{c,P}$ = 1.0. Tabular value for pullout strength is for a concrete compressive strength of 17.2 MPa. Pullout strength for concrete compressive strength greater than 17.2 MPa may be increased by multiplying the tabular pullout strength by $(f'_c / 17.2)^n$ where n is given as n_{uncr} for uncracked concrete and n_{cr} for cracked concrete and provided below. NA (not applicable) denotes that pullout strength does not need to be considered for design.

For specific design cases refer to PROFIS Engineering.

NP = Not Permitted

Design parameter				Nominal anchor diameter (mm)			
				M8	M10	M12	M16
Anchor O.D.		d_a	[mm]	**8**	**10**	**12**	**16**
Effective min. embedment		h_{ef}	[mm]	45	60	70	85
Strength reduction factor for steel in tension [a]	HST2 V3 HST2-F V3	$\phi_{sa,N}$	-	0.65	0.75		
	HST2-R V3			0.75			
Nominal steel strength in tension	HST2 V3 HST2-F V3	N_{sa}	[kN]	16.5	28.0	41.4	82.6
	HST2-R V3			18.2	31.1	43.9	78.5
Anchor category	HST2 V3 HST2-F V3	-	-	1	2	2	1
	HST2-R V3			3	3	1	1
Strength reduction factor for concrete breakout failure in tension, Condition A [b]	HST2 V3 HST2-F V3	$\phi_{c,N}$	-	0.75	0.65	0.65	0.75
	HST2-R V3			0.55	0.55	0.75	0.75
Strength reduction factor for concrete breakout failure in tension, Condition B [b]	HST2 V3 HST2-F V3	$\phi_{c,N}$	-	0.65	0.55	0.55	0.65
	HST2-R V3			0.45	0.45	0.65	0.65
Strength reduction factor for pullout failure in tension, Condition A and B [b]	HST2 V3 HST2-F V3	$\phi_{p,N}$	-	0.65	0.55	0.55	0.65
	HST2-R V3			0.45	0.45	0.65	0.65

Continued from the previous table

Design parameter				Nominal anchor diameter (mm)			
				M8	M10	M12	M16
Anchor O.D.		d_a	[mm]	8	10	12	16
Effectiveness factor for uncracked concrete	HST2 V3 HST2-F V3	k_{uncr}	-	10.0	10.0	10.0	10.0
	HST2-R V3						
Effectiveness factor for cracked concrete	HST2 V3 HST2-F V3	k_{cr}	-	7.1	7.1	7.1	7.1
	HST2-R V3						
Modification factor for anchor resistance, tension, uncracked concrete [c)]	HST2 V3 HST2-F V3	$\psi_{c,N}$	-	1.0			
	HST2-R V3						
Critical edge distance	HST2 V3 HST2-F V3	c_{ac}	[mm]	100	130	160	250
	HST2-R V3			180	240	180	210
Pullout strength in uncracked concrete [d)]	HST2 V3 HST2-F V3	$N_{p,uncr}$	[kN]	8.4	15.7	23.3	31.9
	HST2-R V3			11.3	15.9	NA	NA
Pullout strength in cracked concrete [d)]	HST2 V3 HST2-F V3	$N_{p,cr}$	[kN]	7.1	11.5	13.0	NA
	HST2-R V3			4.1	NA	16.1	NA
Pullout strength in cracked concrete, seismic [d)]	HST2 V3 HST2-F V3	$N_{p,eq}$	[kN]	NP	11.5	12.9	22.6
	HST2-R V3			NP	11.3	14.2	21.7
Normalization factor, uncracked concrete	HST2 V3 HST2-F V3	n_{uncr}	-	0.50	0.49	0.45	0.40
	HST2-R V3			0.50	0.50	0.29	0.50
Normalization factor, cracked concrete and seismic	HST2 V3 HST2-F V3	n_{cr}	-	0.50	0.38	0.50	0.50
	HST2-R V3			0.00	0.31	0.50	0.49

Shear design information based on ER-918 and evaluation according to ACI 355.2 and ICC-ES AC193. Design according to ACI 318 Chapter 17

Additional information:

a) Strength reduction factor for steel in shear:
The HST2 V3 anchor is considered a ductile steel element, except for the M8 HST2 V3 and HST2-F V3.

b) Strength reduction factor for concrete breakout failure and pryout failure in shear, Condition A and B:
For use with the load combinations of ACI 318 section 5.3. Condition B applies where supplementary reinforcement in conformance with ACI 318 section 17.5.3 is not provided, or where pullout or pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the resistance modification factors associated with Condition A may be used.

For specific design cases refer to PROFIS Engineering.

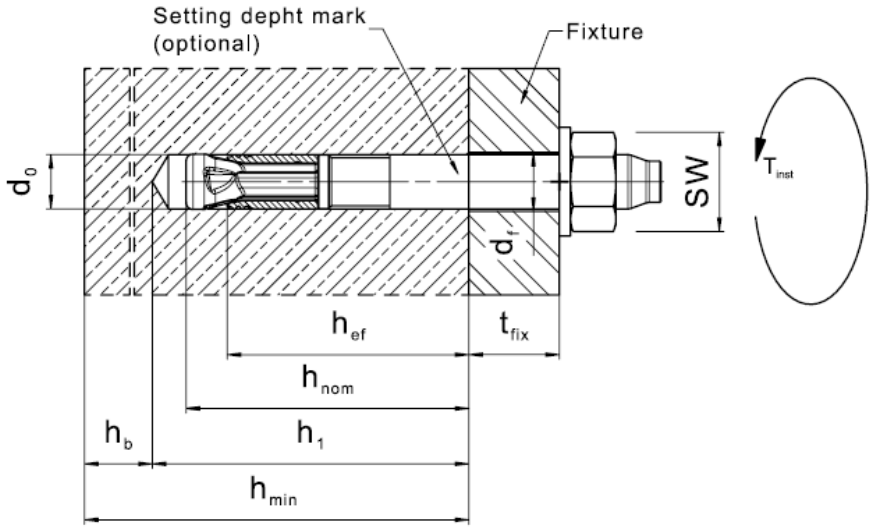
NP = Not Permitted

Design parameter				Nominal anchor diameter (mm)			
				M8	M10	M12	M16
Anchor O.D.		d_a	[mm]	8	10	12	16
Effective min. embedment		h_{ef}	[mm]	45	60	70	85
Shear, steel failure modes							
Strength reduction factor for steel in shear [a]	HST2 V3 HST2-F V3	$\phi_{sa,V}$	-	0.60	0.65		
	HST2-R V3			0.65			
Nominal steel strength in shear	HST2 V3 HST2-F V3	V_{sa}	[kN]	9.1	16.3	25.0	42.1
	HST2-R V3			15.2	24.7	35.9	61.2
Nominal steel strength in shear, seismic	HST2 V3 HST2-F V3	$V_{sa,eq}$	[kN]	NP	11.3	19.8	33.8
	HST2-R V3			NP	13.6	23.9	29.8
Shear, concrete failure modes							
Strength reduction factor for concrete breakout failure in shear, Condition A [b]	HST2 V3 HST2-F V3 HST2-R V3	$\phi_{c,V}$	-	0.75			
Strength reduction factor for concrete breakout failure in shear, Condition B [b]	HST2 V3 HST2-F V3 HST2-R V3	$\phi_{c,V}$	-	0.70			
Strength reduction factor for pryout failure in shear, Condition A and B [b]	HST2 V3 HST2-F V3 HST2-R V3	$\phi_{p,V}$	-	0.70			
Load bearing length of anchor in shear	HST2 V3 HST2-F V3 HST2-R V3	ℓ_e	[mm]	45	60	70	85
Effectiveness factor for pryout	HST2 V3 HST2-F V3 HST2-R V3	k_{cp}	-	1.0	1.0	2.0	2.0

Setting information

Setting details

Anchor size				M8	M10	M12	M16
Nominal diameter of drill bit		d_o	[mm]	8	10	12	16
Maximum diameter of clearance hole in the fixture		d_f	[mm]	9	12	14	18
Torque moment	HST2 V3	T_{inst}	Nm	15	25	40	80
	HST2-F V3			25	40	50	110
	HST2-R V3			20	45	60	110
Effective anchorage depth		h_{ef}	[mm]	45	60	70	85
Nominal embedment depth	HST2 V3 HST2-F V3	h_{nom}	[mm]	55	70	83	98
	HST2-R V3			53	69	80	98
Minimum hole depth in concrete for non-cleaned hole	HST2 V3 HST2-F V3	$h_{1, NC}$	[mm]	75	90	103	118
	HST2-R V3			73	89	100	118
Concrete thickness below bore hole	HST2 V3 HST2-F V3	$h_{b,NC}$	[mm]	30	30	37	42
	HST2-R V3			32	31	40	42
Minimum concrete thickness for non-cleaned hole		$h_{min, NC}$	[mm]	105	120	140	160
Minimum hole depth in concrete for cleaned hole	HST2 V3 HST2-F V3	$h_{1, C}$	[mm]	60	75	91	106
	HST2-R V3			58	74	88	106
Concrete thickness below bore hole	HST2 V3 HST2-F V3	$h_{b,C}$	[mm]	40	45	49	54
	HST2-R V3			42	46	52	54
Minimum concrete thickness for cleaned hole		$h_{min, C}$	[mm]	100	120	140	160



Minimum spacing s_{min}, edge distance c_{min} and concrete thickness for HST2 (-F, -R) V3

Setting details

Anchor size		Symbol	Units	M8	M10	M12	M16
Effective minimum embedment		$h_{ef,min}$	[mm]	45	60	70	85
Non-cleaned hole							
Minimum concrete thickness		$h_{min, NC}$	[mm]	105	120	140	160
Minimum edge distance	HST2 V3 HST2-F V3	c_{min}	[mm]	75	75	80	100
		for s ≥	[mm]	100	125	200	200
Minimum anchor spacing	HST2 V3 HST2-F V3	s_{min}	[mm]	100	55	85	125
		for c >	[mm]	75	90	120	175
Minimum edge distance	HST2-R V3	c_{min}	[mm]	100	80	80	85
		for s ≥	[mm]	100	140	160	160
Minimum anchor spacing	HST2-R V3	s_{min}	[mm]	100	120	60	70
		for c >	[mm]	100	170	120	110
Cleaned hole							
Minimum concrete thickness		$h_{min, C}$	[mm]	100	120	140	160
Minimum edge distance	HST2 V3 HST2-F V3	c_{min}	[mm]	75	75	80	100
		for s ≥	[mm]	100	125	200	200
Minimum anchor spacing	HST2 V3 HST2-F V3	s_{min}	[mm]	100	55	85	125
		for c >	[mm]	75	90	120	175
Minimum edge distance	HST2-R V3	c_{min}	[mm]	100	80	80	85
		for s ≥	[mm]	100	140	160	160
Minimum anchor spacing	HST2-R V3	s_{min}	[mm]	100	120	60	70
		for c >	[mm]	100	170	120	110

Linear interpolation for c_{min} and s_{min} is permitted. Figure below illustrates the interpolation method.

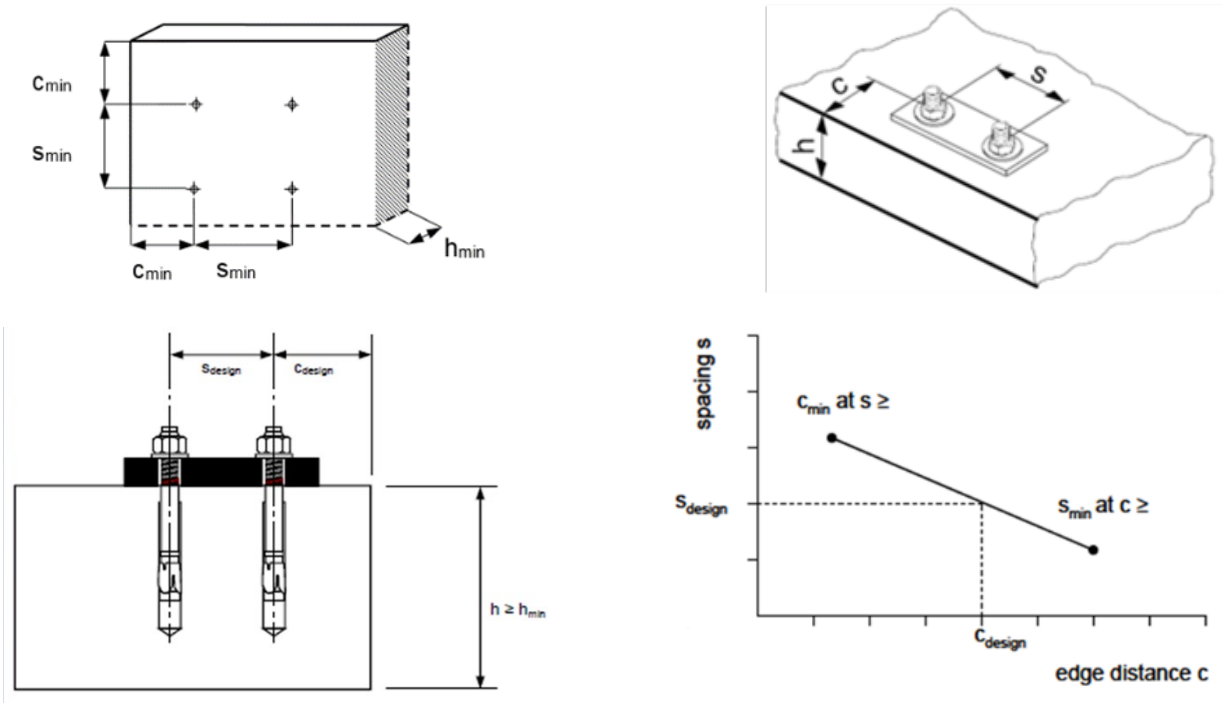


Fig : Interpolation of Minimum edge distance and anchor spacing

Drilling and Installation equipment

For detailed setting information on installation see instructions (IFU) for use given with the product.

Rotary Hammers (Corded and Cordless)		TE 2 - TE 70
Other tools		Torque Impact wrench with AT module - SIW 6AT-22 & SI-AT-22 - SIW 4AT-22 & SI-AT-22
		Hammer drill bit TE-CX, TE-YX, TE-C, TE-Y
		Setting Tool HS-SC
		Blow out pump