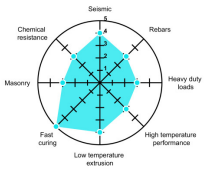
Technical data sheet

KEM HR

Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

KEM HR is a universal hybrid vinylester anchoring adhesive for structural fixings in seismic areas. The fast curing formula provides high performances when anchoring threaded rods and rebar in cracked and uncracked concrete and masonry.
Working temperature: from -40 up to +80°C short period and from -40 up to +50°C long period.



Features

Material

Hybrid vinylester

Applications

Applications

- Steel constructions
- Wood to concrete fixings
- Industrial construction
- Steel and metal construction (railings, brackets, etc.)
- Anchorages for gates and machines
- Post-installed rebar connections

Suitable for

- Threaded rods and rebar in cracked and uncracked concrete
- Threaded rods in masonry
- **Suitable base materials:**
  Concrete
  Solid brick
  Honeycomb
  Cell like clay brick
  Light weight honeycomb brick
  Hollow dense aggregate block
  Hollow light aggregate block
  Aerated concrete (partially suitable)
  Solid stone1)
  Wood
  1) For application on natural stone or marble, carry out test and wait 24/48 hours for any reactions

For installation instructions and information please refer to Technical Documents.

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

SIMPSON Strong-Tie

Technical Data

KEM HR

References	Name	DB nr. [mm]	NOBB nr.	Color of resin	Content	Sanitary text languages	Storage months	Packaging qty	Pcs./pallet
955030BH00000	KEM HR 955	-	-	Blue-to-Grey	300	EN, FR, NL, DE, CS, PL	18	12	1152
954040BH00000	KEM HR 954	-	-	Blue-to-Grey	420	EN, FR, DK, SV, CS, PL	18	12	840

Characteristic resistance - Tension - NRk [kN] - Carbon Steel 5.8

References	embedment depth	Characteristic resistance – Carbon steel 5.8	
		Tension - N_{Rk}	
	hef	Cracked concrete	Non-cracked concrete
		C20/25	C20/25
KEM HR + M8	80	9.1	17.1
KEM HR + M10	90	12.7	22.6
KEM HR + M12	110	18.7	33.2
KEM HR + M16	125	28.3	50.3
KEM HR + M20	170	-	85.5
KEM HR + M24	210	-	126.7

Characteristic resistance - Shear - VRk [kN]

References	embedment depth	Characteristic resistance	
		Shear - VRk	
	hef	Static and quasi-static loads	
		Carbon steel 5.8	Stainless steel A4 70
KEM HR + M8	80	11	13
KEM HR + M10	90	17.4	20
KEM HR + M12	110	25.3	30
KEM HR + M16	125	47.1	55
KEM HR + M20	170	73.5	85.8
KEM HR + M24	210	105.9	123.6

Design resistance - Tension - NRd [kN] – Carbon steel 5.8

References	embedment depth	Design resistance – Carbon steel 5.8	
		Tension - N_{Rd}	
	hef	Cracked concrete	Non-cracked concrete
		C20/25	C20/25
KEM HR + M8	80	5	9.5
KEM HR + M10	90	7.1	12.6
KEM HR + M12	110	10.4	18.4
KEM HR + M16	125	15.7	27.9
KEM HR + M20	170	-	47.5
KEM HR + M24	210	-	70.4

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

Design resistance - Shear - VRd [kN]

References	embedment depth	Design resistance	
	hef	Shear - V_{Rd}	
		Static and quasi-static loads	
		Carbon steel 5.8	Stainless steel A4 70
KEM HR + M8	80	8.8	8.2
KEM HR + M10	90	13.9	13
KEM HR + M12	110	20.2	18.9
KEM HR + M16	125	37.7	35.2
KEM HR + M20	170	58.8	55
KEM HR + M24	210	84.7	79.2

Permissible resistance - Tension - N [kN] – Carbon steel 5.8

References	embedment depth	Permissible resistance – Carbon steel 5.8	
	hef	Tension - N	
		Cracked concrete	Non-cracked concrete
		C20/25	C20/25
KEM HR + M8	80	3.6	6.8
KEM HR + M10	90	5.1	9
KEM HR + M12	110	7.4	13.2
KEM HR + M16	125	11.2	20
KEM HR + M20	170	-	33.9
KEM HR + M24	210	-	50.3

Permissible resistance - Shear - V [kN]

References	embedment depth	Permissible resistance	
	hef	Shear - V	
		Static and quasi-static loads	
		Carbon steel 5.8	Stainless steel A4 70
KEM HR + M8	80	6.3	5.9
KEM HR + M10	90	9.9	9.3
KEM HR + M12	110	14.4	13.5
KEM HR + M16	125	26.9	25.2
KEM HR + M20	170	42	39.3
KEM HR + M24	210	60.5	56.6

Characteristic resistance seismic C1 - Tension - NRk,eq,c1 [kN] – Carbon steel 5.8

References	embedment depth	Characteristic resistance
	hef	Seismic C1
		Tension - $N_{Rk,eq,C1}$
		C20/25
KEM HR + M8	80	4.6
KEM HR + M10	90	6.4
KEM HR + M12	110	9.5
KEM HR + M16	125	13.8

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

Characteristic resistance seismic C1 - Shear - with seismic washer - VRk,eq,c1 [kN]

References	embedment depth	Characteristic resistance with seismic washer (α_{gap} = 1,0)		
	hef	Seismic C1		
		Shear - $V_{rk,eq,C1}$		
		Carbon steel 5.8	Carbon steel 8.8	Stainless steel A4 70
KEM HR + M8	80	9.3	9.3	9.3
KEM HR + M10	90	12.7	12.7	12.7
KEM HR + M12	110	19.1	19.1	19.1
KEM HR + M16	125	27.7	27.7	27.7

Characteristic resistance seismic C1 - Shear - without seismic washer - VRk,eq,c1 [kN]

References	embedment depth	Characteristic resistance without seismic washer (α_{gap} = 0,5)		
	hef	Seismic C1		
		Shear - $V_{rk,eq,C1}$		
		Carbon steel 5.8	Carbon steel 8.8	Stainless steel A4 70
KEM HR + M8	80	4.7	4.7	4.7
KEM HR + M10	90	6.4	6.4	6.4
KEM HR + M12	110	9.6	9.6	9.6
KEM HR + M16	125	13.9	13.9	13.9

Design resistance seismic C1 - Tension - NRd,eq,c1 [kN] – Carbon steel 5.8

References	embedment depth	Design resistance
	hef	Seismic C1
		Tension - $N_{Rd,eq,C1}$
		C20/25
KEM HR + M8	80	2.6
KEM HR + M10	90	3.5
KEM HR + M12	110	5.3
KEM HR + M16	125	7.7

Design resistance seismic C1 - Shear - with seismic washer - VRd,eq,c1 [kN]

References	embedment depth	Design resistance with seismic washer (α_{gap} = 1,0)		
	hef	Seismic C1		
		Shear - $V_{rd,eq,C1}$		
		Carbon steel 5.8	Carbon steel 8.8	Stainless steel A4 70
KEM HR + M8	80	5.2	5.2	5.2
KEM HR + M10	90	7.2	7.2	7.2
KEM HR + M12	110	10.8	10.8	10.8
KEM HR + M16	125	15.7	15.7	15.7

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

Design resistance seismic C1 - Shear - without seismic washer - VRd,eq,c1 [kN]

References	embedment depth	Design resistance without seismic washer (α_{gap} = 0,5)		
	hef	Seismic C1		
		Shear - $V_{rd,eq,C1}$		
		Carbon steel 5.8	Carbon steel 8.8	Stainless steel A4 70
KEM HR + M8	80	2.6	2.6	2.6
KEM HR + M10	90	3.6	3.6	3.6
KEM HR + M12	110	5.4	5.4	5.4
KEM HR + M16	125	7.9	7.9	7.9

Permissible resistance seismic C1 - Tension - Neq,c1 [kN] – Carbon steel 5.8

References	embedment depth	Permissible resistance
	hef	Seismic C1
		Tension - $N_{eq,C1}$
		C20/25
KEM HR + M8	80	1.8
KEM HR + M10	90	2.5
KEM HR + M12	110	3.8
KEM HR + M16	125	5.5

Permissible resistance seismic C1 - Shear - with seismic washer - Veq,c1 [kN]

References	embedment depth	Permissible resistance with seismic washer (α_{gap} = 1,0)		
	hef	Seismic C1		
		Shear - $V_{eq,C1}$		
		Carbon steel 5.8	Carbon steel 8.8	Stainless steel A4 70
KEM HR + M8	80	3.7	3.7	3.7
KEM HR + M10	90	5.2	5.2	5.2
KEM HR + M12	110	7.7	7.7	7.7
KEM HR + M16	125	11.2	11.2	11.2

Permissible resistance seismic C1 - Shear - without seismic washer - Veq,c1 [kN]

References	embedment depth	Permissible resistance without seismic washer (α_{gap} = 0,5)		
	hef	Seismic C1		
		Shear - $V_{eq,C1}$		
		Carbon steel 5.8	Carbon steel 8.8	Stainless steel A4 70
KEM HR + M8	80	1.9	1.9	1.9
KEM HR + M10	90	2.6	2.6	2.6
KEM HR + M12	110	3.9	3.9	3.9
KEM HR + M16	125	5.6	5.6	5.6

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

Characteristic resistance seismic C2 - Tension - NRk,eq,c2 [kN] – Carbon steel 8.8 /stainless steel 70

References	embedment depth	Characteristic resistance
	hef	Seismic C2
		Tension - $N_{Rk,eq,C2}$
		C20/25
KEM HR + M12	110	3.1
KEM HR + M16	125	6

Characteristic resistance seismic C2 - Shear - with seismic washer - VRk,eq,c2 [kN]

References	embedment depth	Characteristic resistance with seismic washer (α_{gap} = 1,0)	
	hef	Seismic C2	
		Shear - $V_{rk,eq,C2}$	
		Carbon steel 8.8	Stainless steel A4 70
KEM HR + M12	110	6.2	6.2
KEM HR + M16	125	11.9	11.9

Characteristic resistance seismic C2 - Shear - without seismic washer - VRk,eq,c2 [kN]

References	embedment depth	Characteristic resistance without seismic washer (α_{gap} = 0,5)	
	hef	Seismic C2	
		Shear - $V_{rk,eq,C2}$	
		Carbon steel 8.8	Stainless steel A4 70
KEM HR + M12	110	3.1	3.1
KEM HR + M16	125	6	6

Design resistance seismic C2 - Tension - NRd,eq,c2 [kN] – Carbon steel 8.8 /stainless steel 70

References	embedment depth	Design resistance
	hef	Seismic C2
		Tension - $N_{Rd,eq,C2}$
		C20/25
KEM HR + M12	110	1.7
KEM HR + M16	125	3.3

Design resistance seismic C2 - Shear - with seismic washer - VRd,eq,c2 [kN]

References	embedment depth	Design resistance with seismic washer (α_{gap} = 1,0)	
	hef	Seismic C2	
		Shear - $V_{rd,eq,C2}$	
		Carbon steel 8.8	Stainless steel A4 70
KEM HR + M12	110	3.5	3.5
KEM HR + M16	125	6.8	6.8

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

Design resistance seismic C2 - Shear - without seismic washer - VRd,eq,c2 [kN]

References	embedment depth	Design resistance without seismic washer (α_{gap} = 0,5)	
	hef	Seismic C2	
		Shear - $V_{rd,eq,C2}$	
		Carbon steel 8.8	Stainless steel A4 70
KEM HR + M12	110	1.8	1.8
KEM HR + M16	125	3.4	3.4

Permissible resistance seismic C2 - Tension - Neq,c2 [kN] – Carbon steel 8.8 /stainless steel 70

References	embedment depth	Permissible resistance
	hef	Seismic C2
		Tension - $N_{eq,C2}$
		C20/25
KEM HR + M12	110	1.2
KEM HR + M16	125	2.4

Permissible resistance seismic C2 - Shear - with seismic washer - Veq,c2 [kN]

References	embedment depth	Permissible resistance with seismic washer (α_{gap} = 1,0)	
	hef	Seismic C2	
		Shear - $V_{eq,C2}$	
		Carbon steel 8.8	Stainless steel A4 70
KEM HR + M12	110	2.5	2.5
KEM HR + M16	125	4.8	4.8

Permissible resistance seismic C2 - Shear - without seismic washer - Veq,c2 [kN]

References	embedment depth	Permissible resistance without seismic washer (α_{gap} = 0,5)	
	hef	Seismic C2	
		Shear - $V_{eq,C2}$	
		Carbon steel 8.8	Stainless steel A4 70
KEM HR + M12	110	1.3	1.3
KEM HR + M16	125	2.4	2.4

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

Masonry - Clay solid brick - fbk ≥ 28 MPa - ρ ≥ 1,6 kg/dm3 EN 771-1

References	permissible tension and shearloads [kN] for a single anchor without effects of distances and spacings						
	embedment depth hef	drill hole d_0	Clay solid brick - fbk ≥ 28 MPa - ρ ≥ 1,6 kg/dm^3 EN 771-1		edge distance Ccr = Cmin	spacing Scr = Smin	max torque Tinst max
			Tension - N	Shear - V			
KEM HR + M8	80	10	0.9	1.6	120	240	6
KEM HR + M10	90	12	0.9	1.9	135	270	10
KEM HR + M12	100	14	0.7	2.6	150	300	10
KEM HR + M16	100	18	1.3	2.6	150	300	10

1kN ≈ 100 kgf
(1) Single anchor without influence from anchor spacing and edge distances
(2) Design method according to EOTA TR054
(3) The recommended loads N and V derive from the characteristic loads on the ETA certification and are inclusive of the partial safety factors γf=1.4 and γm proportional to each diameter
(4) Values valid for temperature 24°C on the long term and up to 40°C on the short term. For higher temperatures see the certification ETA
(5) For all other conditions, more detailed information or different types of masonry please refer to ETA certification

Masonry - Clay hollow brick double UNI - fbk ≥ 20 MPa - ρ ≥ 0,9 kg/dm3 EN 771-1

References	permissible tension and shearloads [kN] for a single anchor without effects of distances and spacings [mm]							
	Clay hollow brick double UNI - fbk ≥ 20 MPa - ρ ≥ 0,9 kg/dm^3 EN 771-1					edge distance Ccr = Cmin	spacing Scr = Smin	max torque Tinst max
	min embedment depth hef	Stud diameter	drill hole d_0	Tension - N	Shear - V			
KEM HR + BRP Ø12	50	M6 - M8	12	0.4	0.9	100	250	2
KEM HR + BRP Ø15	85	M8 - M10	16	0.4	0.9	100	250	2
KEM HR + BRP Ø20	85	M12 - M16	22	0.4	0.9	120	250	2

1kN ≈ 100 kgf
(1) Single anchor without influence from anchor spacing and edge distances
(2) Design method according to EOTA TR054
(3) The recommended loads N and V derive from the characteristic loads on the ETA certification and are inclusive of the partial safety factors γf=1.4 and γm proportional to each diameter
(4) Values valid for temperature 24°C on the long term and up to 40°C on the short term. For higher temperatures see the certification ETA
(5) M6 stud not included in ETA certification
(6) For all other conditions, more detailed information or different types of masonry please refer to ETA certification

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

Masonry - Clay hollow brick - fbk ≥ 6 MPa - ρ ≥ 0,5 kg/dm3 EN 771-1

References	permissible tension and shearloads [kN] for a single anchor without effects of distances and spacings							
	Clay hollow brick - fbk ≥ 6 MPa - ρ ≥ 0,5 kg/dm^3 EN 771-1					edge distance Ccr = Cmin	spacing Scr = Smin	max torque Tinst max
	min embedment depth hef	Stud diameter	drill hole d_0	Tension - N	Shear - V			
KEM HR + BRP Ø12	50	M6 - M8	12	0.2	0.2	100	250	2
KEM HR + BRP Ø15	85	M8 - M10	16	0.2	0.2	100	250	2
KEM HR + BRP Ø20	85	M12 - M16	22	0.2	0.2	120	250	2

1kN ≈ 100 kgf
(1) Single anchor without influence from anchor spacing and edge distances
(2) Design method according to EOTA TR054
(3) The recommended loads N and V derive from the characteristic loads on the ETA certification and are inclusive of the partial safety factors γf=1.4 and γm proportional to each diameter
(4) Values valid for temperature 24°C on the long term and up to 40°C on the short term. For higher temperatures see the certification ETA
(5) M6 stud not included in ETA certification
(6) For all other conditions, more detailed information or different types of masonry please refer to ETA certification

Installation

Installation parameters - Concrete

References	embedment depth	Installation parameteres				
	hef	Ø drilling - d_0	drilling depth (zyl.) - $h_0 \geq$	Max. fixture hole Ø - df ≤	Wrench size DIN 934 (ISO 4032) - SW	Max installation torque - Tinst,max
KEM HR + M8	80	10	80	9	13	10
KEM HR + M10	90	12	90	12	17	20
KEM HR + M12	110	14	110	14	19	40
KEM HR + M16	125	18	125	18	24	80
KEM HR + M20	170	24	170	22	30	120
KEM HR + M24	210	28	210	26	36	160

Notes to the load charts of threaded rods on concrete:
1kN ≈ 100 kgf
(1) Single anchor without influence from anchor spacing and edge distances in concrete C20/25
(2) Design Method acc. to EN 1992-4:2018 (γc= 1,5; ψsus= 1)
(3) The design loads Nrd and Vrd derive from the characteristic loads on the ETA certification and are inclusive of the partial safety factors γm proportional to each diameter
(4) The recommended loads N and V derive from the characteristic loads on the ETA certification and are inclusive of the partial safety factors γf=1.4 and γm proportional to each diameter
(5) Values valid for temperature 24°C on the long term and up to 40° on the short term. For higher temperatures see the certification ETA
(6) Value of pure shear with distance from the edge C ≥ 10xhnom
(7) Seismic resistances include the factors αeq = 0,85 (single anchor under tension in the case of concrete cone failure)
(8) Seismic C2 tension resistances refer to threaded rods min class 8.8 for carbon steel or 70 for stainless steel
(9) For all other conditions and more detailed information please refer to Technical Sheet and ETA certifications

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Hybrid Vinylester Universal Anchoring Adhesive with Seismic Certification

Spacing, edge distance and member thickness - Concrete

References	Spacing, edge distance and member thickness				
	BFK embedment depths				
	Characteristic spacing - scr,N	min. spacing - smin	Characteristic edge distance - ccr,N	min. edge distance - cmin	Min. member thickness - hmin
KEM HR + M8	240	40	120	40	110
KEM HR + M10	270	50	135	50	120
KEM HR + M12	330	60	165	60	140
KEM HR + M16	380	80	190	80	161
KEM HR + M20	510	100	255	100	218
KEM HR + M24	630	120	315	120	266

Technical Notes