KWIK VE500-PRO®

PRODUCT DESCRIPTION

KWIK VE500-PRO® *Vinylester Chemical Anchor*

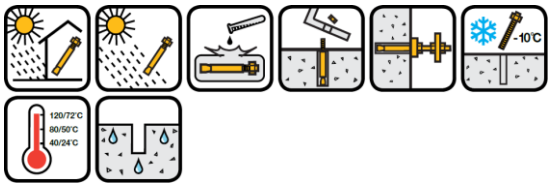
The **VE500-PRO** is a two-component vinylester adhesive anchoring system. The system includes injection adhesive in plastic cartridges, mixing nozzles, dispensing tools and hole cleaning equipment. The **VE500-PRO** is a versatile anchoring system designed for various applications as for bonding steel elements to cracked and uncracked concrete or masonry, as well as for post-installing reinforcement bars. The adhesive is suitable for a wide range ambient temperatures.



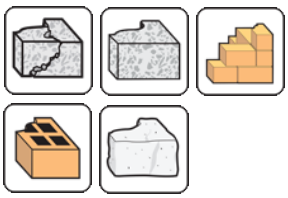


KWIK VE500-PRO
VINYLESTER CHEMICAL

GENERAL APPLICATIONS AND USES



BASE MATERIALS



FEATURES AND BENEFITS

- Designed for use with threaded rod, internal threaded sleeve or rebar
- Consistent performance in uncracked and cracked concrete of variable strength.
- Wide range of steel element diameter and embedment depth.
- Flexible fixture thicknesses.
- Simple installation
- Versatile low odor formula with quick curing time.
- Wide range of base material and ambient temperatures.
- Cartridge design allows multiple uses using extra mixing nozzles.

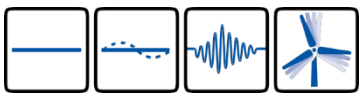

Threaded Rod


Internal Threaded Sleeve


Reinforcement Bar

APPROVALS AND LISTINGS

LOADING CONDITIONS



Carbon Steel 5.8
Carbon Steel 8.8
Stainless Steel A4
Stainless Steel HCR
Rebar fy = 400 to 600 Mpa

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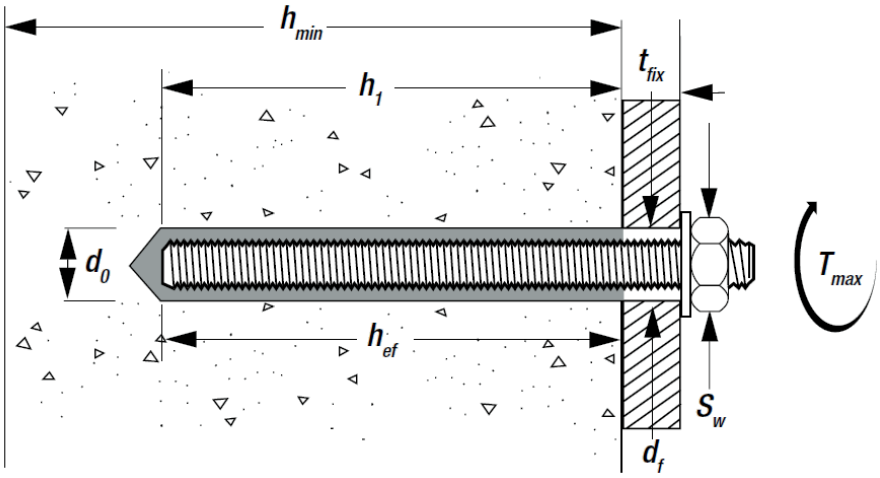
INSTALLATION PARAMETERS – THREADED RODS

	Notation		M8	M10	M12	M16	M20	M24	M27	M30
Anchor Diameter	d	mm	8	10	12	16	20	24	27	30
Nominal drill bit dia.	d_0	mm	10	12	14	18	24	28	32	35
Diameter of hole clearance in fixture	d_f	mm	9	12	14	18	22	26	30	33
Dia. of steel brush	d_b	mm	12	14	16	20	26	30	34	37
Minimum embedment & drill hole depth	$h_{ef,min}$	mm	60	60	70	80	90	96	108	120
Maximum embedment & drill hole depth	$h_{ef,max}$	mm	160	200	240	320	400	480	540	600
Minimum thickness of member	h_{min}	mm	h_{ef} + 30mm ≥100mm			h_{ef} + 2 x d_0				
Minimum spacing	s_{min}	mm	40	50	60	80	100	120	135	150
Minimum edge dist.	c_{min}	mm	40	50	60	80	100	120	135	150
Thickness of fixture	t_{fix}	mm	0mm ≤ t_{fix} ≤ 1500mm							
Maximum torque	T_{max}	Nm	10	20	40	80	120	160	180	200
Torque wrench size	S_w	mm	13	17	19	24	30	36	41	46



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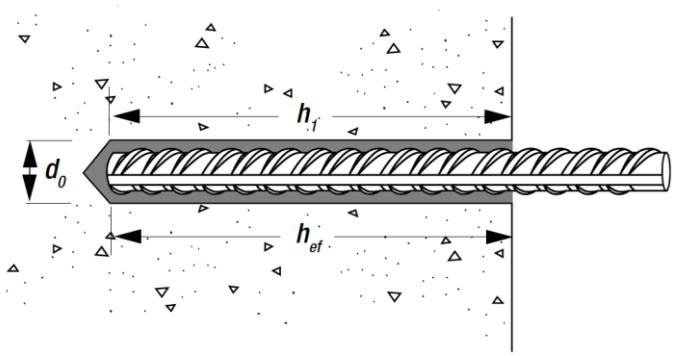
INSTALLATION PARAMETERS – REINFORCEMENT BARS

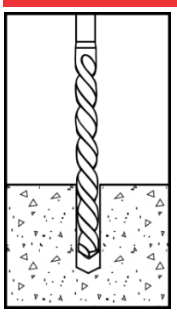
Rebar Size	mm		Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25	Ø 32
Nominal drill hole dia.	d_0	mm	12	14	16	20	24	32	37
Dia. of steel brush	d_b	mm	14	16	18	22	26	34	40
Effective anchorage depth (10xØ) – Min.	$h_{ef,min}$	mm	80	100	120	160	200	250	320
Effective anchorage depth (20xØ) – Max.	$h_{ef,max}$	mm	160	200	240	320	400	500	640
Minimum thickness of member	h_{min}	mm	h_{ef} + 30mm ≥100mm		h_{ef} + 2 x d_0				
Minimum spacing	s_{min}	mm	40	50	60	80	100	125	160
Minimum edge distance	c_{min}	mm	40	50	60	80	100	125	160



Concrete temperature	Working time	Min. curing time#
≥ + 10°C	15 min	80 min
≥ + 20°C	6 min	45 min
≥ + 30°C	4 min	25 min
≥ + 35°C	2 min	20 min
≥ + 40°C	1.5 min	15 min

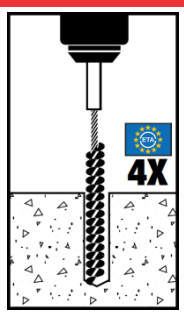
 # Time for dry concrete, double curing time for wet concrete.

INSTALLATION INSTRUCTIONS



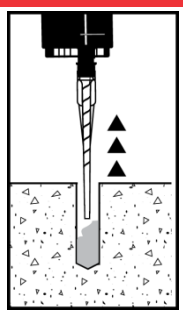
Using the proper drill bit size, drill a hole into the base material to a required depth.

Blow the hole clean using a hand pump or compressed air 4 times minimum.

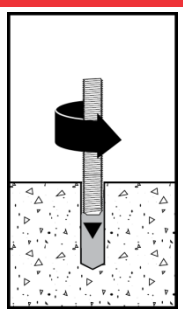


Brush the hole with the proper wire brush 4 times minimum

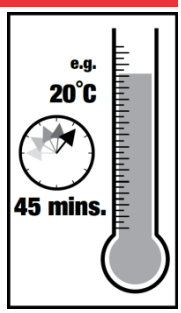
Blow the hole clean using a hand pump or compressed air 4 times minimum.



After dispensing a minimum of 3 strokes, fill the hole up to approximately 2/3 with adhesive.



Push the steel element into the hole while turning slightly.



to cure for the time specified for the actual concrete temperature.

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TENSION LOAD CAPACITIES – PARAMETERS FOR CALCULATION OF DESIGN STRENGTH

DESIGN INFORMATION — **According to EOTA TR 029**

	Notation	Unit	VE500-PRO – THREADED ROD							
			M8	M10	M12	M16	M20	M24	M27	M30
Steel Failure										
Carbon Steel										
Characteristic resistance, strength class 5.8	$N_{Rk,s}$	KN	18	29	42	78	122	176	230	280
Characteristic resistance, strength class 8.8	$N_{Rk,s}$	KN	29	46	67	125	196	282	368	449
Partial safety factor	γ_{Ms} [1)]	-	1.50							
A4 and HCR steel										
Characteristic resistance, strength class 50	$N_{Rk,s}$	KN	-	-	-	-	-	-	230	281
Characteristic resistance, strength class 70	$N_{Rk,s}$	KN	26	41	59	110	171	247	-	-
Partial safety factor	γ_{Ms} [1)]	-	1.87						2.86	
Combined pullout and concrete failure										
Characteristic resistance in cracked concrete, dry and wet concrete										
Temperature Range: 40°C / 24°C	$\tau_{Rk,cr}$	N/mm²	-	-	5.5	5.5	5.5	5.5	6.5	6.5
Temperature Range: 80°C / 50°C	$\tau_{Rk,cr}$	N/mm²	-	-	4.0	4.0	4.0	4.0	4.5	4.5
Temperature Range: 120°C / 72°C	$\tau_{Rk,cr}$	N/mm²	-	-	3.0	3.0	3.0	3.0	3.5	3.5
Partial safety factor	$\gamma_{Mc} = \gamma_{Mp}$ [1)]	-	-	-	1.8[3)]					
Characteristic resistance in uncracked concrete, dry and wet concrete										
Temperature Range: 40°C / 24°C	$\tau_{Rk,uncr}$	N/mm²	11.0	13.0	13.0	13.0	13.0	12.0	11.0	9.5
Temperature Range: 80°C / 50°C	$\tau_{Rk,uncr}$	N/mm²	8.0	9.5	9.5	9.5	9.5	9.0	8.0	7.0
Temperature Range: 120°C / 72°C	$\tau_{Rk,uncr}$	N/mm²	5.5	6.5	6.5	6.5	6.5	6.0	5.5	5.0
Partial safety factor	$\gamma_{Mc} = \gamma_{Mp}$ [1)]	-	1.5[2)]	1.8[3)]						
Increasing factor for concrete strength										
C30/37	ψ_c	-	1.04							
C40/50	ψ_c	-	1.08							
C50/60	ψ_c	-	1.10							
Seismic reduction factor	$\alpha_{N,sies}$	-	-	-	0.68	0.68	0.68	0.69	0.69	0.69

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TENSION LOAD CAPACITIES – PARAMETERS FOR CALCULATION OF DESIGN STRENGTH

DESIGN INFORMATION — **According to EOTA TR 029**

	Notation	Unit	VE500-PRO – THREADED ROD							
			M8	M10	M12	M16	M20	M24	M27	M30
Concrete Failure										
Concrete cone failure										
characteristic spacing	$s_{cr,N}$	mm	3.0 x h_{ef}							
characteristic edge distance	$c_{cr,N}$	mm	1.5 x h_{ef}							
Partial safety factor for cracked concrete	γ_{Mc} [1]	-	-	-	1.8 [3]					
Partial safety factor for uncracked concrete	γ_{Mc} [1]	-	1.5 [2]	1.8 [3]						
Splitting failure										
characteristic spacing	$s_{cr,sp}$	mm	2.0 x $c_{cr,sp}$							
characteristic edge distance	$c_{cr,sp}$	mm	5.0 x h_{ef} – 2.0 x h but ≥ 1.0 x h_{ef} and ≤ 2.4 x h_{ef}							
Partial safety factor for cracked concrete	γ_{Msp} [1]	-	-	-	1.8 [3]					
Partial safety factor for uncracked concrete	γ_{Msp} [1]	-	1.5 [2]	1.8 [3]						
Increasing factor for concrete strength										
C30/37	ψ_c	-	1.04							
C40/50	ψ_c	-	1.08							
C50/60	ψ_c	-	1.10							

1) In absence of other national regulations
2) Partial safety factor γ_2 = 1.0 is included
3) Partial safety factor γ_2 = 1.2 is included

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SHEAR LOAD CAPACITIES – PARAMETERS FOR CALCULATION OF DESIGN STRENGTH

DESIGN INFORMATION — **According to EOTA TR 029**

	Notation	Unit	VE500-PRO – THREADED ROD							
			M8	M10	M12	M16	M20	M24	M27	M30
Steel Failure										
Steel failure without lever arm										
Carbon Steel										
Characteristic resistance, strength class 5.8	$V_{Rk,s}$	KN	9	15	21	39	61	88	115	140
Characteristic resistance, strength class 8.8	$V_{Rk,s}$	KN	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms} [1]	-	1.25							
A4 and HCR steel										
Characteristic resistance, strength class 50	$V_{Rk,s}$	KN	-	-	-	-	-	-	115	140
Characteristic resistance, strength class 70	$V_{Rk,s}$	KN	13	20	30	55	86	124	-	-
Partial safety factor	γ_{Ms} [1]	-	1.56						2.38	
Seismic reduction factor	$\alpha_{v,sies}$	-	-	0.70						
Steel failure with lever arm (bending)										
Carbon Steel										
Characteristic resistance, strength class 5.8	$M^0_{Rk,s}$	Nm	19	37	65	166	324	560	833	1123
Characteristic resistance, strength class 8.8	$M^0_{Rk,s}$	Nm	30	60	105	266	519	896	1333	1797
Partial safety factor	γ_{Ms} [1]	-	1.25							
A4 and HCR steel										
Characteristic resistance, strength class 50	$M^0_{Rk,s}$	Nm	-	-	-	-	-	-	832	1125
Characteristic resistance, strength class 70	$M^0_{Rk,s}$	Nm	26	52	92	232	454	784	-	-
Partial safety factor	γ_{Ms} [1]	-	1.56						2.38	
Concrete Failure										
Pry-out failure										
Factor in Equation (5.7) of TR 029	k	-	2.0							
Partial safety factor	γ_{Mcp} [1]	-	1.5[2]							
Edge failure										
Partial safety factor	γ_{Mc} [1]	-	1.5[2]							

1) In absence of other national regulations
2) Partial safety factor γ_2 = 1.0 is included

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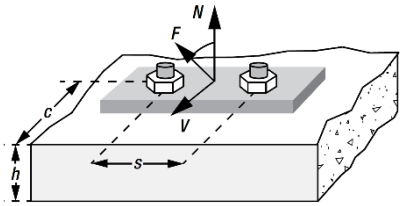
PRECALCULATED TENSION AND SHEAR CAPACITIES

According to EOTA TR 029

- The following tables are meant to give the designer aid in the preliminary design process. No responsibility is taken for the correctness of these data.
- The given values are valid for normal concrete C20/25 and static/quasi-static loads with the exact dimensional information given. For any other conditions, kindly get in touch with technical team of KWIK INDIA for specific designs calculations.
- The values in the table below are design level loads. This assumes a safety factor is included both on the loading and the resistance.
- For cracked concrete, splitting failure is not considered assuming that a reinforcement is present which limits the crack width to 0.3 mm.
- Precalculated design resistance capacities are given for threaded rods only, values for internal sleeves and reinforcement bars can be found in the relevant documents.
- For further details and background information please see the introduction of this manual.



Influence of steel grades				
Size	**Property**	**5.8**	**8.8**	**A4 / HCR**
M8	N_{Rd} [KN]	12.0	19.3	13.9
	V_{Rd} [KN]	7.2	12.0	8.3
M10	N_{Rd} [KN]	19.3	30.7	21.9
	V_{Rd} [KN]	12.0	18.4	12.8
M12	N_{Rd} [KN]	28.0	44.7	31.6
	V_{Rd} [KN]	16.8	27.2	19.2
M16	N_{Rd} [KN]	52.0	83.3	58.8
	V_{Rd} [KN]	31.2	50.4	35.3
M20	N_{Rd} [KN]	81.3	130.7	91.4
	V_{Rd} [KN]	48.8	78.4	55.1
M24	N_{Rd} [KN]	117.3	188.0	132.1
	V_{Rd} [KN]	70.4	112.8	79.5
M27	N_{Rd} [KN]	153.3	245.3	80.4
	V_{Rd} [KN]	92.0	147.2	48.3
M30	N_{Rd} [KN]	186.7	299.3	98.3
	V_{Rd} [KN]	112.0	179.2	58.8

Instructions

- The steel grade potentially influences the load capacity of the anchor. Left table depicts ultimate steel strengths of threaded rods for given steel grades.
- The steel strength equals the load capacity of the anchor provided other failure modes, i.e. concrete failure or pullout failure, do not yield lower strengths and therefore do not control the anchor capacity.
- To determine the critical failure mode, the steel strength identified in left table has to be compared with the concrete and pullout strengths in the following tables.

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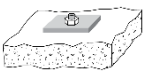
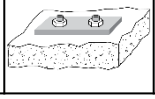
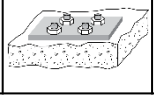
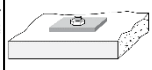
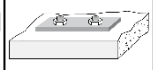
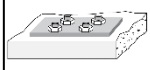
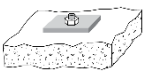
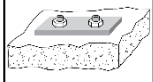
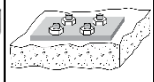
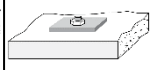
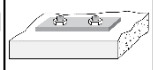
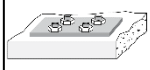
M8	C20/25 8.8 steel dry/wet concrete	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	80									
Member thickness	h [mm]	110									
Edge distance	c [mm]	-	-	-	-	-	40	40	40	40	40
Anchor spacing	s [mm]	0	40	240	40	240	0	40	240	40	240
40/24˚C 	N_{rd} [KN]	14.7	19.9	29.5	27.5	59.0	8.6	11.6	17.2	14.8	34.3
	$F_{rd}^{45°}$ [KN]	11.2	18.4	22.5	29.7	44.9	4.4	5.9	8.8	6.3	10.4
	V_{rd} [KN]	12.0	24.0	24.0	48.0	48.0	3.7	5.0	7.5	5.0	7.5
80/50˚C 	N_{rd} [KN]	10.7	15.3	21.4	22.4	42.9	6.7	9.6	13.5	14.8	26.9
	$F_{rd}^{45°}$ [KN]	9.6	15.8	19.2	25.4	38.4	4.1	5.6	8.1	6.3	9.9
	V_{rd} [KN]	12.0	24.0	24.0	44.9	48.0	3.7	5.0	7.5	5.0	7.5

- Steel strength controls - Concrete strength controls - Anchor pullout strength controls

M10	C20/25 8.8 steel dry/wet concrete	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	100									
Member thickness	h [mm]	130									
Edge distance	c [mm]	-	-	-	-	-	50	50	50	50	50
Anchor spacing	s [mm]	0	50	300	50	300	0	50	300	50	300
40/24˚C 	N_{rd} [KN]	22.7	28.7	45.4	37.0	90.8	12.7	14.3	21.0	16.7	42.7
	$F_{rd}^{45°}$ [KN]	17.2	27.4	34.5	41.8	69.0	6.5	8.2	12.2	8.6	14.8
	V_{rd} [KN]	18.4	36.8	36.8	73.6	73.6	5.5	7.3	10.9	7.3	10.9
80/50˚C 	N_{rd} [KN]	16.6	22.7	33.2	31.9	66.3	10.0	13.6	20.0	16.7	39.9
	$F_{rd}^{45°}$ [KN]	14.8	23.8	29.6	37.7	59.2	6.0	8.1	12.0	8.6	14.6
	V_{rd} [KN]	18.4	36.8	36.8	73.6	73.6	5.5	7.3	10.9	7.3	10.9

- Steel strength controls - Concrete strength controls - Anchor pullout strength controls

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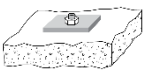
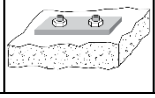
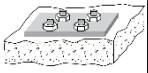
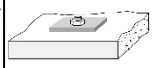
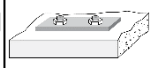
M12	C20/25 8.8 steel dry/wet concrete	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	120									
Member thickness	h [mm]	150									
Edge distance	c [mm]	-	-	-	-	-	60	60	60	60	60
Anchor spacing	s [mm]	0	60	360	60	360	0	60	360	60	360
40/24˚C 	N_{rd} [KN]	13.8	18.8	27.6	26.4	55.3	7.8	10.6	15.5	15.9	31.0
	$F_{rd}^{45°}$ [KN]	15.6	22.6	31.1	31.7	62.2	5.3	7.2	10.7	8.3	13.4
	V_{rd} [KN]	27.2	45.2	54.4	63.4	108.8	5.3	7.1	10.6	7.1	10.6
80/50˚C 	N_{rd} [KN]	10.1	14.3	20.1	21.1	40.2	6.0	8.6	12.1	13.6	24.2
	$F_{rd}^{45°}$ [KN]	12.0	17.2	24.1	25.3	48.2	4.8	6.6	9.6	7.9	12.5
	V_{rd} [KN]	24.1	34.4	48.3	50.6	96.5	5.3	7.1	10.6	7.1	10.6
40/24˚C 	N_{rd} [KN]	32.7	40.3	65.3	50.2	130.7	17.0	18.8	27.6	22.0	56.2
	$F_{rd}^{45°}$ [KN]	25.2	39.3	50.4	58.3	100.8	8.8	11.0	16.5	11.6	20.0
	V_{rd} [KN]	27.2	54.4	54.4	108.8	108.8	7.5	10.0	15.0	10.0	15.0
80/50˚C 	N_{rd} [KN]	23.9	32.2	47.8	44.6	95.5	14.4	18.8	27.6	22.0	56.2
	$F_{rd}^{45°}$ [KN]	21.6	34.3	43.2	53.5	86.3	8.3	11.0	16.5	11.6	20.0
	V_{rd} [KN]	27.2	54.4	54.4	107.1	108.8	7.5	10.0	15.0	10.0	15.0

- Steel strength controls - Concrete strength controls - Anchor pullout strength controls

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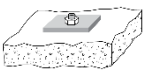
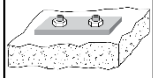
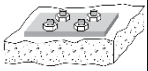
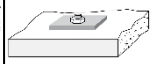
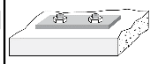
M16	C20/25 8.8 steel dry/wet concrete	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	160									
Member thickness	h [mm]	196									
Edge distance	c [mm]	-	-	-	-	-	80	80	80	80	80
Anchor spacing	s [mm]	0	80	480	80	480	0	80	480	80	480
40/24˚C 	N_{rd} [KN]	24.6	32.9	49.1	45.2	98.3	13.8	18.5	27.6	27.2	55.2
	$F_{rd}^{45°}$ [KN]	28.0	39.4	56.1	54.1	112.1	9.0	12.1	18.1	13.8	22.4
	V_{rd} [KN]	50.4	78.9	100.8	108.4	201.6	8.7	11.6	17.3	11.6	17.3
80/50˚C 	N_{rd} [KN]	17.9	25.2	35.7	36.7	71.5	10.8	15.2	21.5	23.6	43.0
	$F_{rd}^{45°}$ [KN]	21.4	30.2	42.8	43.9	85.6	8.1	11.1	16.3	13.2	21.0
	V_{rd} [KN]	42.9	60.6	85.8	88.1	171.6	8.7	11.6	17.3	11.6	17.3
40/24˚C 	N_{rd} [KN]	56.8	66.2	113.6	77.3	227.1	26.2	28.9	42.5	33.9	86.5
	$F_{rd}^{45°}$ [KN]	45.3	67.8	90.6	92.6	181.2	14.2	17.7	26.4	18.7	32.4
	V_{rd} [KN]	50.4	100.8	100.8	185.5	201.6	12.2	16.3	24.5	16.3	24.5
80/50˚C 	N_{rd} [KN]	42.4	55.8	84.9	75.1	169.8	25.5	28.9	42.5	33.9	86.5
	$F_{rd}^{45°}$ [KN]	39.1	61.0	78.2	90.0	156.4	14.0	17.7	26.4	18.7	32.4
	V_{rd} [KN]	50.4	100.8	100.8	180.2	201.6	12.2	16.3	24.5	16.3	24.5

- Steel strength controls - Concrete strength controls - Anchor pullout strength controls

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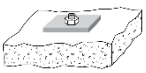
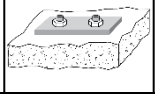
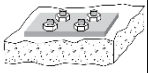
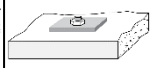
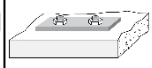
M20	C20/25 8.8 steel dry/wet concrete	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	200									
Member thickness	h [mm]	248									
Edge distance	c [mm]	-	-	-	-	-	100	100	100	100	100
Anchor spacing	s [mm]	0	100	600	100	600	0	100	600	100	600
40/24˚C 	N_{rd} [KN]	38.4	50.4	76.8	68.0	153.6	21.6	28.3	43.1	40.9	86.2
	$F_{rd}^{45°}$ [KN]	43.7	60.4	87.5	81.4	175.0	13.6	18.0	27.1	20.3	33.3
	V_{rd} [KN]	78.4	121.0	156.8	163.1	313.6	12.7	16.9	25.4	16.9	25.4
80/50˚C 	N_{rd} [KN]	27.9	39.0	55.9	56.2	111.7	16.8	23.5	33.6	36.2	67.2
	$F_{rd}^{45°}$ [KN]	33.5	46.7	66.9	67.3	133.8	12.3	16.7	24.6	19.6	31.3
	V_{rd} [KN]	67.0	93.7	134.0	134.8	268.1	12.7	16.9	25.4	16.9	25.4
40/24˚C 	N_{rd} [KN]	79.4	92.6	158.7	108.0	317.4	36.6	40.4	59.4	47.3	120.9
	$F_{rd}^{45°}$ [KN]	66.9	98.8	133.9	129.4	267.7	20.4	25.5	38.0	27.0	47.0
	V_{rd} [KN]	78.4	156.8	156.8	259.2	313.6	17.9	23.9	35.9	23.9	35.9
80/50˚C 	N_{rd} [KN]	66.3	85.1	132.6	108.0	265.3	36.6	40.4	59.4	47.3	120.9
	$F_{rd}^{45°}$ [KN]	61.0	93.6	121.9	129.4	243.9	20.4	25.5	38.0	27.0	47.0
	V_{rd} [KN]	78.4	156.8	156.8	259.2	313.6	17.9	23.9	35.9	23.9	35.9

- Steel strength controls - Concrete strength controls - Anchor pullout strength controls

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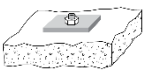
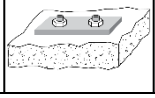
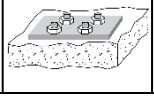
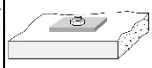
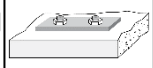
KWIK VE500-PRO®

M24	C20/25 8.8 steel dry/wet concrete	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	240									
Member thickness	h [mm]	296									
Edge distance	c [mm]	-	-	-	-	-	120	120	120	120	120
Anchor spacing	s [mm]	0	120	720	120	720	0	120	720	120	720
40/24˚C 	N_{rd} [KN]	55.3	71.7	110.6	95.3	221.2	31.6	41.0	63.2	58.0	126.3
	$F_{rd}^{45°}$ [KN]	63.0	85.9	125.9	114.1	251.9	19.0	25.1	38.0	28.1	46.2
	V_{rd} [KN]	112.8	172.2	225.6	228.6	451.2	17.4	23.2	34.7	23.2	34.7
80/50˚C 	N_{rd} [KN]	40.2	55.8	80.4	79.8	160.8	24.5	34.0	49.0	52.0	98.0
	$F_{rd}^{45°}$ [KN]	48.2	66.9	96.3	95.6	192.7	17.3	23.4	34.5	27.2	43.5
	V_{rd} [KN]	96.5	134.0	193.0	191.5	386.0	17.4	23.2	34.7	23.2	34.7
40/24˚C 	N_{rd} [KN]	104.3	121.7	208.6	142.0	417.2	48.1	53.1	78.1	62.2	158.9
	$F_{rd}^{45°}$ [KN]	92.0	134.2	183.9	170.1	367.9	27.6	34.3	51.1	36.4	63.6
	V_{rd} [KN]	112.8	225.6	225.6	340.8	451.2	24.5	32.7	49.0	32.7	49.0
80/50˚C 	N_{rd} [KN]	90.5	115.6	181.0	142.0	361.9	48.1	53.1	78.1	62.2	158.9
	$F_{rd}^{45°}$ [KN]	85.2	129.7	170.4	170.1	340.8	27.6	34.3	51.1	36.4	63.6
	V_{rd} [KN]	112.8	225.6	225.6	340.8	451.2	24.5	32.7	49.0	32.7	49.0

- Steel strength controls - Concrete strength controls - Anchor pullout strength controls

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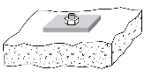
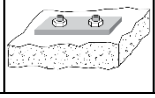
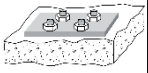
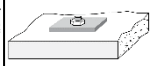
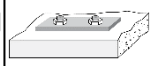
KWIK VE500-PRO®

M27	C20/25 8.8 steel dry/wet concrete	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	270									
Member thickness	h [mm]	334									
Edge distance	c [mm]	-	-	-	-	-	135	135	135	135	135
Anchor spacing	s [mm]	0	135	810	135	810	0	135	810	135	810
40/24˚C 	N_{rd} [KN]	82.7	102.1	165.4	120.8	330.8	47.4	55.3	94.8	69.1	192.5
	$F_{rd}^{45°}$ [KN]	89.9	122.4	179.7	145.0	359.5	24.9	31.8	49.8	34.1	59.1
	V_{rd} [KN]	147.2	245.1	294.4	289.9	588.8	21.3	28.3	42.5	28.3	42.5
80/50˚C 	N_{rd} [KN]	57.3	78.4	114.5	110.1	229.0	35.9	49.2	71.8	69.1	143.6
	$F_{rd}^{45°}$ [KN]	68.6	93.9	137.2	131.9	274.4	22.7	30.5	45.3	34.1	55.7
	V_{rd} [KN]	137.4	188.1	274.8	264.2	549.7	21.3	28.3	42.5	28.3	42.5
40/24˚C 	N_{rd} [KN]	124.5	145.2	248.9	169.4	497.9	57.3	63.3	93.2	74.2	189.6
	$F_{rd}^{45°}$ [KN]	114.5	165.0	228.9	202.9	457.8	33.4	41.6	61.9	44.1	77.4
	V_{rd} [KN]	147.2	294.4	294.4	406.6	588.8	30.0	40.0	60.0	40.0	60.0
80/50˚C 	N_{rd} [KN]	101.8	133.2	203.6	169.4	407.2	57.3	63.3	93.2	74.2	189.6
	$F_{rd}^{45°}$ [KN]	102.1	155.6	204.2	202.9	408.5	33.4	41.6	61.9	44.1	77.4
	V_{rd} [KN]	147.2	294.4	294.4	406.6	588.8	30.0	40.0	60.0	40.0	60.0

- Steel strength controls - Concrete strength controls - Anchor pullout strength controls

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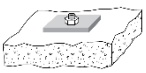
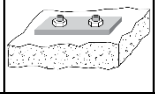
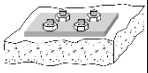
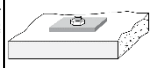
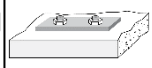
KWIK VE500-PRO®

M30	C20/25 8.8 steel dry/wet concrete	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	300									
Member thickness	h [mm]	370									
Edge distance	c [mm]	-	-	-	-	-	150	150	150	150	150
Anchor spacing	s [mm]	0	150	900	150	900	0	150	900	150	900
40/24˚C 	N_{rd} [KN]	102.1	121.2	204.2	141.5	408.4	55.5	64.8	111.1	81.0	245.8
	$F_{rd}^{45°}$ [KN]	110.4	145.5	220.8	169.8	441.5	29.6	37.8	59.3	40.6	71.6
	V_{rd} [KN]	179.2	291	358.4	339.5	716.8	25.5	33.9	50.9	33.9	50.9
80/50˚C 	N_{rd} [KN]	70.7	97.0	141.4	136.3	282.7	45.9	62.9	91.7	81.0	183.5
	$F_{rd}^{45°}$ [KN]	84.7	116.2	169.4	163.3	338.7	27.8	37.4	55.6	40.6	67.6
	V_{rd} [KN]	169.6	232.8	339.3	327.2	678.6	25.5	33.9	50.9	33.9	50.9
40/24˚C 	N_{rd} [KN]	145.8	170.1	291.6	198.4	583.1	67.2	74.2	109.1	86.9	222.0
	$F_{rd}^{45°}$ [KN]	136.4	195.7	272.8	237.7	545.7	39.7	49.4	73.6	52.4	92.2
	V_{rd} [KN]	179.2	358.4	358.4	476.2	716.8	35.9	47.9	71.9	47.9	71.9
80/50˚C 	N_{rd} [KN]	110.0	148.0	219.9	198.4	439.8	67.2	74.2	109.1	86.9	222.0
	$F_{rd}^{45°}$ [KN]	115.6	177.3	231.3	237.7	462.6	39.7	49.4	73.6	52.4	92.2
	V_{rd} [KN]	179.2	355.2	358.4	476.2	716.8	35.9	47.9	71.9	47.9	71.9

- Steel strength controls - Concrete strength controls - Anchor pullout strength controls

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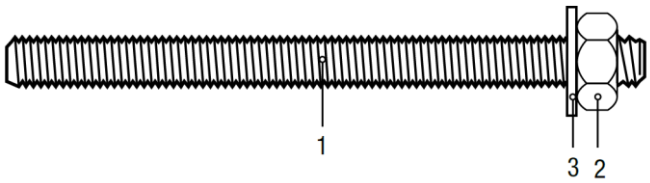
MATERIAL SPECIFICATIONS – THREADED ROD



Part No.	Designation	Material
Carbon Steel 5.8		
1	Anchor rod	Steel zinc plated ≥ 5 µm or hot-dip galvanized ≥ 40 µm; Strength class 5.8, R_m = 500 MPa; $R_{p\,0.2}$ = 400 MPa
2	Hexagon nut	Steel zinc plated ≥ 5 µm or hot-dip galvanized ≥ 40 µm; Strength class 5
3	Washer	Steel zinc plated ≥ 5 µm or hot-dip galvanized ≥ 40 µm
Carbon Steel 8.8		
1	Anchor rod	Steel zinc plated ≥ 5 µm or hot-dip galvanized ≥ 40 µm; Strength class 8.8, R_m = 800 MPa; $R_{p\,0.2}$ = 640 MPa
2	Hexagon nut	Steel zinc plated ≥ 5 µm or hot-dip galvanized ≥ 40 µm; Strength class 8
3	Washer	Steel zinc plated ≥ 5 µm or hot-dip galvanized ≥ 40 µm
Stainless Steel A4		
1	Anchor rod	Stainless steel 1.4401 / 1.4404 / 1.457; Strength class 50, R_m = 500 MPa; $R_{p\,0.2}$ = 210 MPa (for > M24) Strength class 70, R_m = 700 MPa; R_p 0.2= 450 MPa (for ≤ M24)
2	Hexagon nut	Stainless steel 1.4401 / 1.4404 / 1.4571; Strength class 50 (for > M24); Strength class 70 (for ≤ M24)
3	Washer	Stainless steel 1.4401 / 1.4404 / 1.4571
Stainless Steel HCR		
1	Anchor rod	Stainless steel 1.4529 / 1.4565; Strength class 50, R_m = 500 MPa; $R_{p\,0.2}$= 210 MPa (for > M24) Strength class 70, R_m = 700 MPa; $R_{p\,0.2}$ = 450 MPa (for ≤ M24)
2	Hexagon nut	Stainless steel 1.4529 / 1.4565; Strength class 50 (for > M24); Strength class 70 (for ≤ M24)
3	Washer	Stainless steel 1.4529 / 1.4565

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MATERIAL SPECIFICATIONS – REINFORCEMENT BAR

Extract of EN 1992-1-1 Annex C, Table C.1	Class B	Class C
Characteristic yield strength f_{yk} or $f_{0.2k}$ [MPa]	400 to 600	
Minimum value of k = $(f_t / f_y)_k$ [-]	≥ 1.08	≥ 1.15 < 1.35
Characteristic strain at maximum force ε_{uk} [%]	≥ 5.0	≥ 7.5
Bendability	Bend / Rebend test	
Maximum deviation from nominal mass [%]	± 6.0 for nominal bar size ≤ 8 mm; ± 4.5 for nominal bar size > 8 mm	
Extract of EN 1992-1-1 Annex C, Table C.2N	**Class B**	**Class C**
Minimum value of related rib area $f_{R,min}$	0.040 for nominal bar size 8 mm to 12 mm; 0.056 for nominal bar size > 12 mm	

ORDERING INFORMATION

Article No.	Product	Box Qty.	Product Image
KITVE0360	KWIK VE500-PRO (360ml) – Vinylester Chemical	12 nos.	
KMDG0360	Manual Dispensing Gun – 360ml	1 no.	

Kwik Fastening Solutions Pvt. Ltd.
Office : 8, Highway Commercial Centre, I. B. Patel Road, Near Western Express Highway, Goregaon (E), Mumbai - 400063, Maharashtra, India.
Email: contact@kwikindia.com • Web: www.kwikindia.com; www.kwikanchors.com • Contact: +91 9769099641 / +91 9930233390