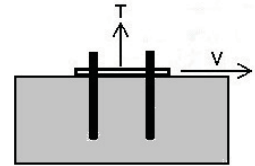
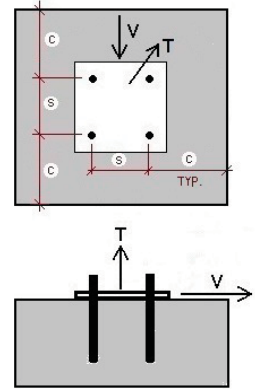


Table 1: AT-HP with Four Anchors, Four Edge Distances, Non-Cracked Concrete (T, V) ⁸

Design Resistance Values for TENSION and SHEAR ^{1, 2, 3, 4, 5, 6, 7}

Insert Diameter (d) = 8 mm		Anchor Spacing (s)											
Effective Embedment (h _{ef}) = 70 mm		37.5		50		75		100		125		150	
Min. Concrete Thickness (h _{min}) = 110 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	37.5	9.2	3.0	11.3	3.3	16.3	4.0	15.3	4.7	15.3	5.0	15.6	5.0
	50	10.3	4.0	12.2	4.4	16.7	5.1	21.8	5.8	20.7	6.6	20.4	7.3
	75	12.8	6.2	14.5	6.7	18.4	7.5	22.7	8.3	27.4	9.1	32.6	10.0
	125	18.0	10.4	19.6	10.8	23.0	11.7	26.7	12.6	30.6	13.5	34.8	14.4
Insert Diameter (d) = 10 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 90 mm		45		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 130 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	45	11.6	4.2	17.3	5.1	20.0	5.9	19.4	6.7	19.3	7.0	20.1	7.0
	75	14.5	7.1	19.3	8.1	23.8	9.0	28.8	9.9	34.3	10.8	32.4	12.7
	100	17.2	9.6	21.6	10.8	25.7	11.7	30.2	12.7	35.0	13.7	45.7	15.7
	150	22.7	14.2	26.8	15.4	30.5	16.4	34.4	17.4	38.6	18.5	47.7	20.5
Insert Diameter (d) = 12 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 110 mm		60		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 150 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	60	18.8	6.6	22.0	7.1	28.0	8.1	33.0	9.0	31.7	9.9	31.3	11.0
	75	20.4	8.2	23.4	8.8	28.9	9.7	35.0	10.7	41.7	11.7	39.3	13.6
	100	23.5	11.0	26.3	11.7	31.3	12.7	36.7	13.8	42.5	14.8	55.6	17.0
	150	30.0	17.0	32.6	17.7	37.0	18.8	41.8	20.0	46.9	21.2	57.9	23.5
Insert Diameter (d) = 16 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 140 mm		70		100		125		150		200		250	
Min. Concrete Thickness (h _{min}) = 180 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	70	25.0	9.02	32.6	10.3	39.8	11.4	43.5	12.5	41.7	14.6	41.9	15.03
	100	28.9	12.7	35.7	14.1	41.9	15.3	48.5	16.4	63.4	18.8	60.3	21.1
	125	32.5	15.9	38.8	17.4	44.6	18.7	50.7	19.9	64.2	22.4	79.2	24.9
	250	51.5	29.3	57.1	30.8	61.9	32.1	67.0	33.4	77.7	35.9	89.2	38.5
Insert Diameter (d) = 20 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 180 mm		90		125		150		175		200		250	
Min. Concrete Thickness (h _{min}) = 220 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	90	31.9	13.8	40.7	15.6	47.6	16.9	55.1	18.1	55.1	19.4	53.3	22.0
	125	36.4	18.7	44.3	20.7	50.4	22.0	56.9	23.4	63.8	24.8	78.7	27.6
	150	39.9	22.5	47.4	24.5	53.1	26.0	59.2	27.4	65.6	28.8	79.4	31.7
	200	47.2	30.4	54.2	32.6	59.5	34.1	65.1	35.7	70.8	37.2	83.1	40.3

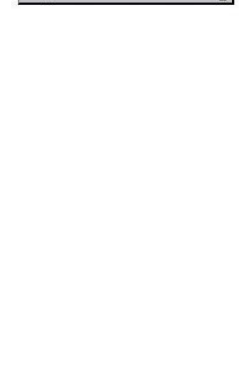
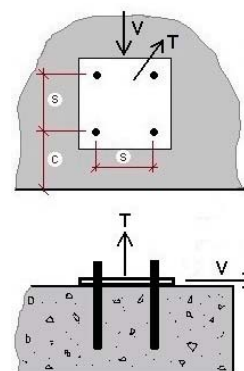


- Concrete strength is C20/25 ($f_{ck, cube} = 25$ MPa), hole condition is "dry", and installed between 5C and 35C.
- N_{Rd} value shown is based on the lesser of $N_{Rd,p}$, $N_{Rd,c}$ and $N_{Rd,sp}$. These values are good for any grade of steel used and Designer needs to check steel tension design resistance separately.
- V_{Rd} value shown is based on the lesser of $V_{Rd,c}$ and $V_{Rd,cp}$. These values are good for any grade of steel used and Designer needs to check steel shear design resistance separately.
- Reference "Anchor Design Methodology" on page 10 for the descriptions of N_{Rd} and V_{Rd}
- Concrete is considered un-reinforced, and therefore concrete splitting and spalling is not controlled. If reinforcement is present and can be verified per ETAG TR 029 requirements, then Designer should re-evaluate the design resistances using Simpson Strong-Tie® Anchor Designer™ Software as the design values may increase significantly.
- All design resistances are derived from the product's characteristic values and safety factors published in the ETA.
- Concrete edge Distance "c" is measured from edge of concrete to centerline of the bolt(s). Anchor Spacing "s" is measured from centerline of bolt(s) to centerline of bolt(s).
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete induced by external loads, anchors loads included).

Table 2: AT-HP with Four Anchors, One Edge Distance, Non-Cracked Concrete (T, VF)⁸

Design Resistance Values for TENSION and SHEAR ^{1, 2, 3, 4, 5, 6, 7}

Insert Diameter (d) = 8 mm		Anchor Spacing (s)											
Effective Embedment (h _{ef}) = 70 mm		37.5		50		75		100		125		150	
Min. Concrete Thickness (h _{min}) = 110 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	37.5	10.4	4.5	11.4	4.8	13.6	5.6	16.0	6.3	18.6	6.7	21.4	6.7
	50	11.3	6.1	12.4	6.5	14.8	7.3	17.3	8.1	20.0	8.9	22.9	9.7
	75	13.4	9.6	14.6	10.1	17.2	11.0	20.0	11.9	23.0	12.8	26.2	13.7
	125	18.1	14.1	19.5	14.5	22.7	15.3	26.1	16.2	29.7	17.1	33.6	17.9
Insert Diameter (d) = 10 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 90 mm		45		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 130 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	45	13.5	6.2	16.1	7.3	18.4	8.1	20.9	9.0	23.5	9.3	29.3	9.3
	75	15.9	10.8	18.8	12.0	21.4	13.1	24.2	14.1	27.1	15.1	33.4	17.1
	100	18.1	14.2	21.3	15.4	24.1	16.4	27.0	17.4	30.2	18.5	37.0	20.5
	150	22.9	19.1	26.6	20.2	29.8	21.2	33.3	22.2	36.9	23.1	44.8	25.1
Insert Diameter (d) = 12 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 110 mm		60		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 150 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	60	21.0	9.8	22.6	10.4	25.3	11.4	28.3	12.4	31.3	13.4	37.9	14.6
	75	22.5	12.3	24.1	13.0	27.0	14.1	30.1	15.1	33.2	16.2	40.1	18.4
	100	25.1	17.0	26.9	17.7	29.9	18.8	33.2	20.0	36.6	21.2	43.9	23.5
	150	30.7	22.3	32.7	23.0	36.2	24.1	39.9	25.2	43.8	26.3	52.1	28.5
Insert Diameter (d) = 16 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 140 mm		70		100		125		150		200		250	
Min. Concrete Thickness (h _{min}) = 180 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	70	29.0	13.4	32.6	14.8	35.7	16.0	38.9	17.2	45.8	19.6	53.3	20.0
	100	32.4	19.3	36.2	20.9	39.5	22.2	43.0	23.5	50.3	26.1	58.3	28.7
	125	35.3	24.2	39.3	25.8	42.8	27.2	46.5	28.5	54.3	31.3	62.6	34.0
	250	51.8	39.2	57.0	40.6	36.2	41.8	66.1	43.0	76.0	45.4	86.5	47.8
Insert Diameter (d) = 20 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 180 mm		90		125		150		175		200		250	
Min. Concrete Thickness (h _{min}) = 220 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	90	37.1	20.4	41.2	22.4	44.2	23.8	47.4	25.3	50.7	26.7	57.5	29.5
	125	40.9	28.5	45.3	30.6	48.6	32.1	51.9	33.7	55.4	35.2	62.7	38.3
	150	43.8	34.3	48.4	36.5	51.8	38.1	55.3	39.7	58.9	41.2	66.5	44.4
	200	49.9	41.1	54.8	43.2	58.5	44.7	62.3	46.2	66.2	47.6	74.4	50.6

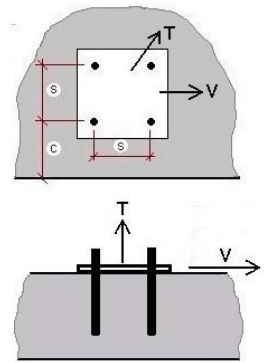


- Concrete strength is C20/25 ($f_{ck, cube} = 25$ MPa), hole condition is "dry", and installed between 5C and 35C.
- N_{Rd} value shown is based on the lesser of $N_{Rd,p}$, $N_{Rd,c}$ and $N_{Rd,sp}$. These values are good for any grade of steel used and Designer needs to check steel tension design resistance separately.
- V_{Rd} value shown is based on the lesser of $V_{Rd,c}$ and $V_{Rd,cp}$. These values are good for any grade of steel used and Designer needs to check steel shear design resistance separately.
- Reference "Anchor Design Methodology" on page 10 for the descriptions of N_{Rd} and V_{Rd}
- Concrete is considered un-reinforced, and therefore concrete splitting and spalling is not controlled. If reinforcement is present and can be verified per ETAG TR 029 requirements, then Designer should re-evaluate the design resistances using Simpson Strong-Tie® Anchor Designer™ Software as the design values may increase significantly.
- All design resistances are derived from the product's characteristic values and safety factors published in the ETA.
- Concrete edge Distance "c" is measured from edge of concrete to centerline of the bolt(s). Anchor Spacing "s" is measured from centerline of bolt(s) to centerline of bolt(s).
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete induced by external loads, anchors loads included).

Table 3: AT-HP with Four Anchors, One Edge Distance, Non-Cracked Concrete (T, V//) ⁸

Design Resistance Values for TENSION and SHEAR ^{1, 2, 3, 4, 5, 6, 7}

Insert Diameter (d) = 8 mm		Anchor Spacing (s)											
Effective Embedment (h _{ef}) = 70 mm		37.5		50		75		100		125		150	
Min. Concrete Thickness (h _{min}) = 110 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	37.5	10.4	11.1	11.4	12.0	13.6	13.9	16.0	15.7	18.6	16.7	21.4	16.7
	50	11.3	15.2	12.4	16.2	14.8	18.2	17.3	20.2	20.0	22.3	22.9	24.3
	75	13.4	24.0	14.6	25.2	17.2	27.5	20.0	29.8	23.0	32.1	26.2	34.3
	125	18.1	35.2	19.5	30.7	22.7	38.4	26.1	40.5	29.7	42.6	33.6	44.8
Insert Diameter (d) = 10 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 90 mm		45		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 130 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	45	13.5	15.6	16.1	18.2	18.4	20.3	20.9	22.5	23.5	23.3	29.3	23.3
	75	15.9	27.1	18.8	30.1	21.4	32.6	24.2	35.1	27.1	37.6	33.4	42.7
	100	18.1	35.4	21.3	38.5	24.1	41.0	27.0	43.6	30.2	46.2	37.0	51.3
	150	22.9	47.7	26.6	50.6	29.8	53.0	33.3	55.4	36.9	57.8	44.8	62.7
Insert Diameter (d) = 12 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 110 mm		60		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 150 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	60	21.0	24.4	22.6	25.9	25.3	28.5	28.2	31.0	31.3	33.5	37.9	36.6
	75	22.5	30.8	24.1	32.4	27.0	35.1	30.1	37.8	33.2	40.5	40.1	45.9
	100	25.1	42.4	26.9	44.1	29.9	47.1	33.2	50.0	36.6	53.0	43.9	58.8
	150	30.7	55.9	32.7	57.5	36.2	60.2	39.9	63.0	43.8	65.7	52.1	71.2
Insert Diameter (d) = 16 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 140 mm		70		100		125		150		200		250	
Min. Concrete Thickness (h _{min}) = 180 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	70	29.0	33.4	32.6	37.0	35.7	40.0	38.9	42.9	45.8	48.9	53.3	50.1
	100	32.4	48.2	36.2	52.1	39.5	55.4	43.0	58.7	50.3	65.2	58.3	71.7
	125	35.3	60.5	39.3	64.6	42.8	68.0	46.5	71.3	54.3	78.1	62.6	84.9
	250	51.8	98.0	57.0	101.6	61.5	104.6	66.1	107.6	76.0	113.6	86.5	119.5
Insert Diameter (d) = 20 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 180 mm		90		125		150		175		200		250	
Min. Concrete Thickness (h _{min}) = 220 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	90	37.1	51.1	41.2	56.1	44.2	59.6	47.4	63.1	50.7	66.7	57.5	73.8
	125	40.9	71.2	45.3	76.5	48.6	80.4	51.9	84.2	55.4	88.0	62.7	95.7
	150	43.8	85.7	48.4	91.2	51.8	95.2	55.3	99.1	58.9	103.1	66.5	111.0
	200	49.9	102.7	54.8	107.9	58.5	111.7	62.3	115.4	66.2	119.1	74.4	126.5



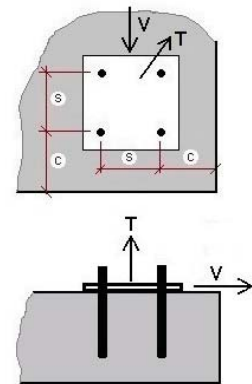
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- Concrete strength is C20/25 ($f_{ck, cube} = 25$ MPa), hole condition is "dry", and installed between 5C and 35C.
- N_{Rd} value shown is based on the lesser of $N_{Rd,p}$, $N_{Rd,c}$ and $N_{Rd,sp}$. These values are good for any grade of steel used and Designer needs to check steel tension design resistance separately.
- V_{Rd} value shown is based on the lesser of $V_{Rd,c}$ and $V_{Rd,cp}$. These values are good for any grade of steel used and Designer needs to check steel shear design resistance separately.
- Reference "Anchor Design Methodology" on page 10 for the descriptions of N_{Rd} and V_{Rd}
- Concrete is considered un-reinforced, and therefore concrete splitting and spalling is not controlled. If reinforcement is present and can be verified per ETAG TR 029 requirements, then Designer should re-evaluate the design resistances using Simpson Strong-Tie® Anchor Designer™ Software as the design values may increase significantly.
- All design resistances are derived from the product's characteristic values and safety factors published in the ETA.
- Concrete edge Distance "c" is measured from edge of concrete to centerline of the bolt(s). Anchor Spacing "s" is measured from centerline of bolt(s) to centerline of bolt(s).
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete induced by external loads, anchors loads included).

Table 4: AT-HP with Four Anchors, Corner, Non-Cracked Concrete (T, V F) ⁸

Design Resistance Values for TENSION and SHEAR ^{1, 2, 3, 4, 5, 6, 7}

Insert Diameter (d) = 8 mm		Anchor Spacing (s)											
Effective Embedment (h _{ef}) = 70 mm		37.5		50		75		100		125		150	
Min. Concrete Thickness (h _{min}) = 110 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	37.5	7.0	3.5	7.9	3.8	9.7	4.5	11.7	5.2	13.9	5.5	16.3	5.5
	50	8.1	4.7	9.0	5.1	11.0	5.8	13.2	6.6	15.6	7.3	18.1	8.0
	75	10.7	7.4	11.7	7.8	14.1	8.7	16.6	9.5	19.3	10.3	22.3	11.1
	125	17.2	10.7	18.7	11.1	21.7	11.9	25.1	12.7	28.6	13.4	32.4	14.2
Insert Diameter (d) = 10 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 90 mm		45		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 130 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	45	9.0	4.9	11.1	5.8	13.0	6.6	15.1	7.4	17.3	7.7	22.2	7.7
	75	11.8	8.4	14.3	9.5	16.5	10.4	18.9	11.3	21.5	12.2	27.1	14.0
	100	14.5	10.9	17.4	12.0	19.9	12.9	22.6	13.9	25.5	14.8	31.7	16.6
	150	21.2	14.6	24.8	15.6	27.9	16.5	31.2	17.4	34.8	18.2	44.4	20.0
Insert Diameter (d) = 12 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 110 mm		60		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 150 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	60	14.3	7.7	15.6	8.2	17.8	9.2	20.2	10.1	22.8	11.0	28.4	12.1
	75	16.0	9.6	17.3	10.2	19.8	11.2	22.3	12.2	25.1	13.1	31.0	15.1
	100	19.1	13.1	20.6	13.8	23.3	14.8	26.1	15.9	29.2	17.0	35.7	19.1
	150	26.4	17.2	28.3	17.7	31.5	18.7	35.0	19.7	38.6	20.7	46.4	22.7
Insert Diameter (d) = 16 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 140 mm		70		100		125		150		200		250	
Min. Concrete Thickness (h _{min}) = 180 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	70	19.3	10.5	22.2	11.8	24.7	12.9	27.4	14.0	33.2	16.1	39.5	16.5
	100	23.1	15.0	26.3	16.4	29.1	17.6	32.1	18.8	38.4	21.1	45.3	23.5
	125	26.6	18.7	30.1	20.2	33.2	21.4	36.4	22.6	43.2	25.1	50.6	27.5
	250	49.3	29.9	54.4	31.2	58.8	32.3	63.3	33.4	73.0	35.5	83.3	37.7
Insert Diameter (d) = 20 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 180 mm		90		125		150		175		200		250	
Min. Concrete Thickness (h _{min}) = 220 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	90	24.7	16.1	28.0	17.9	30.5	19.2	33.1	20.4	35.8	21.7	41.5	24.3
	125	29.1	22.2	32.7	24.1	35.5	25.5	38.3	26.9	41.3	28.2	47.5	31.0
	150	32.5	26.6	36.4	28.6	39.3	30.0	42.3	31.4	45.5	32.8	52.1	35.7
	200	40.0	31.6	44.5	33.5	47.8	34.8	51.2	36.2	54.7	37.5	62.2	40.2

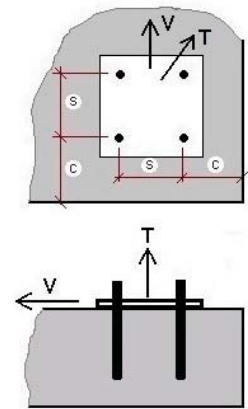


- Concrete strength is C20/25 ($f_{ck, cube} = 25$ MPa), hole condition is "dry", and installed between 5C and 35C.
- N_{Rd} value shown is based on the lesser of $N_{Rd,p}$, $N_{Rd,c}$ and $N_{Rd,sp}$. These values are good for any grade of steel used and Designer needs to check steel tension design resistance separately.
- V_{Rd} value shown is based on the lesser of $V_{Rd,c}$ and $V_{Rd,cp}$. These values are good for any grade of steel used and Designer needs to check steel shear design resistance separately.
- Reference "Anchor Design Methodology" on page 10 for the descriptions of N_{Rd} and V_{Rd}
- Concrete is considered un-reinforced, and therefore concrete splitting and spalling is not controlled. If reinforcement is present and can be verified per ETAG TR 029 requirements, then Designer should re-evaluate the design resistances using Simpson Strong-Tie® Anchor Designer™ Software as the design values may increase significantly.
- All design resistances are derived from the product's characteristic values and safety factors published in the ETA.
- Concrete edge Distance "c" is measured from edge of concrete to centerline of the bolt(s). Anchor Spacing "s" is measured from centerline of bolt(s) to centerline of bolt(s).
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete induced by external loads, anchors loads included).

Table 5: AT-HP with Four Anchors, Corner, Non-Cracked Concrete (T, V//) ⁸

Design Resistance Values for TENSION and SHEAR ^{1, 2, 3, 4, 5, 6, 7}

Insert Diameter (d) = 8 mm		Anchor Spacing (s)											
Effective Embedment (h _{ef}) = 70 mm		37.5		50		75		100		125		150	
Min. Concrete Thickness (h _{min}) = 110 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	37.5	7.0	8.8	7.9	9.6	9.7	11.3	11.7	12.9	13.9	13.8	16.3	13.8
	50	8.1	11.8	9.0	12.8	11.0	14.6	13.2	16.4	15.6	18.2	18.1	20.0
	75	10.7	18.5	11.7	19.6	14.1	21.6	16.6	23.7	19.3	25.8	22.3	27.8
	125	17.2	26.9	18.7	27.8	21.7	29.7	25.1	31.6	28.6	33.6	32.4	35.5
Insert Diameter (d) = 10 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 90 mm		45		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 130 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	45	9.0	12.3	11.1	14.6	13.0	16.5	15.1	18.5	17.3	19.3	22.2	19.3
	75	11.8	21.0	14.3	23.7	16.5	26.0	18.9	28.2	21.5	30.5	27.1	35.0
	100	14.5	27.2	17.4	30.0	19.9	32.3	22.6	34.6	25.5	36.9	31.7	41.5
	150	21.2	36.4	24.8	39.0	27.9	41.2	31.2	43.6	34.8	45.5	42.4	49.9
Insert Diameter (d) = 12 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 110 mm		60		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 150 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	60	14.3	19.2	15.6	20.6	17.8	22.9	20.2	25.2	22.8	27.4	28.4	30.2
	75	16.0	24.1	17.3	25.5	19.8	28.0	22.3	30.4	25.1	32.8	31.0	37.7
	100	19.1	32.8	20.6	34.4	23.3	37.1	26.1	39.7	29.2	42.4	35.7	47.7
	150	26.4	42.9	28.3	44.4	31.5	46.8	35.0	49.3	38.6	51.8	46.4	56.7
Insert Diameter (d) = 16 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 140 mm		70		100		125		150		200		250	
Min. Concrete Thickness (h _{min}) = 180 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	70	19.3	26.3	22.2	29.5	24.7	32.2	27.4	34.9	33.2	40.3	39.5	41.3
	100	23.1	37.5	26.3	41.1	29.1	44.0	32.1	46.9	38.4	52.8	45.3	58.7
	125	26.6	46.8	30.1	50.5	33.2	53.5	36.4	56.6	43.2	62.7	50.6	68.8
	250	49.3	74.8	54.4	78.0	58.8	80.7	63.3	83.4	73.0	88.8	83.3	94.1
Insert Diameter (d) = 20 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 180 mm		90		125		150		175		200		250	
Min. Concrete Thickness (h _{min}) = 220 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	90	24.7	40.2	28.0	44.7	30.5	47.9	33.1	51.1	35.8	54.3	41.5	60.7
	125	29.1	55.4	32.7	60.3	35.5	63.7	38.3	67.2	41.3	70.6	47.3	77.5
	150	32.5	66.4	36.4	71.4	39.3	74.9	42.3	78.5	45.5	82.1	52.1	89.2
	200	40.0	79.1	44.5	83.7	47.8	87.1	51.2	90.4	54.7	93.8	62.2	100.5



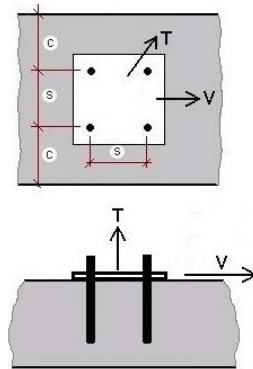
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- Concrete strength is C20/25 ($f_{ck, cube} = 25$ MPa), hole condition is "dry", and installed between 5C and 35C.
- N_{Rd} value shown is based on the lesser of $N_{Rd,p}$, $N_{Rd,c}$ and $N_{Rd,sp}$. These values are good for any grade of steel used and Designer needs to check steel tension design resistance separately.
- V_{Rd} value shown is based on the lesser of $V_{Rd,c}$ and $V_{Rd,cp}$. These values are good for any grade of steel used and Designer needs to check steel shear design resistance separately.
- Reference "Anchor Design Methodology" on page 10 for the descriptions of N_{Rd} and V_{Rd}
- Concrete is considered un-reinforced, and therefore concrete splitting and spalling is not controlled. If reinforcement is present and can be verified per ETAG TR 029 requirements, then Designer should re-evaluate the design resistances using Simpson Strong-Tie® Anchor Designer™ Software as the design values may increase significantly.
- All design resistances are derived from the product's characteristic values and safety factors published in the ETA.
- Concrete edge Distance "c" is measured from edge of concrete to centerline of the bolt(s). Anchor Spacing "s" is measured from centerline of bolt(s) to centerline of bolt(s).
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete induced by external loads, anchors loads included).

Table 6: AT-HP with Four Anchors, 2-Edges, Non-Cracked Concrete (T, V//) ^{1, 2, 3, 4, 5, 6, 7, 8}

Design Resistance Values for TENSION and SHEAR

Insert Diameter (d) = 8 mm		Anchor Spacing (s)											
Effective Embedment (h _{ef}) = 70 mm		37.5		50		75		100		125		150	
Min. Concrete Thickness (h _{min}) = 110 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	37.5	5.4	11.1	6.3	12.0	8.1	13.9	10.1	15.7	12.3	16.7	14.7	16.7
	50	6.8	15.2	7.8	16.2	9.7	18.2	11.9	20.2	14.3	22.3	16.9	24.3
	75	10.0	24.0	11.0	25.2	13.4	27.5	15.9	29.8	18.6	32.1	21.6	34.3
	125	17.2	35.2	18.6	36.2	21.7	38.4	25.0	40.5	28.6	42.6	32.3	44.8
Insert Diameter (d) = 10 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 90 mm		45		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 130 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	45	6.7	15.6	8.8	18.2	10.8	20.3	12.8	22.5	15.1	23.3	20.0	23.3
	75	10.4	27.1	12.8	30.1	15.1	32.6	17.5	35.1	20.1	37.6	25.7	42.7
	100	13.7	35.4	16.5	38.5	19.0	41.0	21.7	43.6	24.6	46.2	30.8	51.3
	150	21.1	47.7	24.6	50.6	27.8	53.0	31.1	55.4	34.6	57.8	42.3	62.7
Insert Diameter (d) = 12 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 110 mm		60		75		100		125		150		200	
Min. Concrete Thickness (h _{min}) = 150 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	60	11.1	24.4	12.4	25.9	14.7	28.5	17.1	31.0	19.7	33.5	25.3	36.6
	75	13.3	30.8	14.7	32.4	17.1	35.1	19.7	37.8	22.4	40.5	28.4	45.9
	100	17.2	42.4	18.7	44.1	21.4	47.1	24.2	50.0	27.3	53.0	33.8	58.9
	150	25.7	55.9	27.6	57.5	30.8	60.2	34.3	63.0	37.9	65.7	45.7	71.2
Insert Diameter (d) = 16 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 140 mm		70		100		125		150		200		250	
Min. Concrete Thickness (h _{min}) = 180 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	70	14.5	33.4	17.4	37.0	19.9	40.0	22.6	42.9	28.3	48.9	34.6	50.1
	100	19.4	48.2	22.6	52.1	25.4	55.4	28.4	58.7	34.7	65.2	41.6	71.7
	125	23.8	60.5	27.3	64.6	30.3	68.0	33.5	71.3	40.4	78.1	47.8	84.9
	250	49.2	98.0	54.2	101.6	58.6	104.6	63.2	107.6	72.9	113.6	83.2	119.5
Insert Diameter (d) = 20 mm		Spacing (s)											
Effective Embedment (h _{ef}) = 180 mm		90		125		150		175		200		250	
Min. Concrete Thickness (h _{min}) = 220 mm		N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}	N _{Rd}	V _{Rd}
Edge Distance (c)	90	18.5	51.1	21.8	56.1	24.3	59.6	26.9	63.1	29.6	66.7	35.3	73.8
	125	24.2	71.2	27.9	76.5	30.6	80.4	33.4	84.2	36.4	88.0	42.6	95.7
	150	28.5	85.7	32.4	91.2	35.3	95.2	38.3	99.1	41.5	103.1	48.1	111.0
	200	37.6	102.7	42.0	107.9	45.3	111.7	48.8	115.4	52.3	119.1	59.7	126.5



- Concrete strength is C20/25 ($f_{ck, cube} = 25$ MPa), hole condition is "dry", and installed between 5C and 35C.
- N_{Rd} value shown is based on the lesser of $N_{Rd,p}$, $N_{Rd,c}$ and $N_{Rd,sp}$. These values are good for any grade of steel used and Designer needs to check steel tension design resistance separately.
- V_{Rd} value shown is based on the lesser of $V_{Rd,c}$ and $V_{Rd,cp}$. These values are good for any grade of steel used and Designer needs to check steel shear design resistance separately.
- Reference "Anchor Design Methodology" on page 10 for the descriptions of N_{Rd} and V_{Rd}
- Concrete is considered un-reinforced, and therefore concrete splitting and spalling is not controlled. If reinforcement is present and can be verified per ETAG TR 029 requirements, then Designer should re-evaluate the design resistances using Simpson Strong-Tie® Anchor Designer™ Software as the design values may increase significantly.
- All design resistances are derived from the product's characteristic values and safety factors published in the ETA.
- Concrete edge Distance "c" is measured from edge of concrete to centerline of the bolt(s). Anchor Spacing "s" is measured from centerline of bolt(s) to centerline of bolt(s).
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete induced by external loads, anchors loads included).