NEW!

High Performance, Down Cold

AT-XP[®] Anchoring Adhesive for **Cracked and Uncracked Concrete**

The latest innovation from Simpson Strong-Tie, AT-XP® anchoring adhesive has been formulated for high-strength anchorage of threaded rod and rebar into concrete under a wide range of conditions. AT-XP adhesive dispenses easily in cold or warm environments with little to no odor, and when mixed properly is a teal color for easy post-installation identification.

Code-listed per IAPMO UES ER-263 in accordance with ICC-ES AC308 and IBC 2009 requirements for cracked and uncracked concrete in static or seismic conditions, AT-XP anchoring adhesive has demonstrated superior performance in reduced-temperature testing (14°F (-10°C)), has NSF/Standard 61 certification (43.2 in²/1000 gal), and is made in the USA.

Features:

- · AT-XP adhesive has passed the demanding adversecondition tests of ICC-ES AC308 pertaining to reduced temperature, elevated temperature and long-term creep
- Code-listed per IAPMO UES ER-263
- Can be used under static and seismic loading conditions in both cracked and uncracked concrete
- Low-odor formula dispenses easily at below-freezing temperatures without the need to warm cartridge
- Cures in substrate temperatures as low as 14°F in 24 hours or less
- · Easiest hole-cleaning method no power brushing needed
- When properly mixed, adhesive will be a teal color for easy identification
- Available in 9.4 oz., 12.5 oz. and 30 oz. cartridges for jobsite versatility

Applications:

- Threaded rod anchoring into concrete
- · Rebar doweling into concrete
- · Suitable for horizontal, vertical and overhead applications

For installation instructions, visit www.strongtie.com or our Anchoring and Fastening Systems for Concrete and Masonry catalog.

AT-XP[®] Adhesive Cartridge System

Model No.	Capacity ounces (cubic in.)	Cartridge Type	Carton Qty.	Dispensing Tool	Mixing Nozzle
AT-XP10	9.4 (16.9)	coaxial	12	CDT10S	
AT-XP13	12.5 (22.5)	side-by-side	10	ADT813S	AMN19Q
AT-XP30	30 (54)	side-by-side	5	ADT30S, ADTA30P or ADT30CKT	

1. Cartridge estimation guides are available at www.strongtie.com/apps.

2. Detailed information on dispensing tools, mixing nozzles and other

adhesive accessories is available at www.strongtie.com.

3. Use only Simpson Strong-Tie® mixing nozzles in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair AT-XP adhesive performance.

4. One AMN19Q nozzle and one nozzle extension is supplied with each cartridge.



SIMPSON

Strong-Ti





AT-XP10

(AT-XP30 similar)

AMN19Q

Cure Schedule

	laterial erature	Gel Time (min.)	Cure Time (hrs.)
°F	°C	()	(115.)
14	-10	30	24
32	0	15	8
50	10	7	3
68	20	4	1
86	30	1.5	30 min.
100	38	1	20 min.

For water-saturated concrete (including damp or water-filled holes), the cure times must be doubled.

Design Information

Installation Information and Additional Data for Threaded Rod and Rebar in Normal-Weight Concrete¹

Characteristic			Units	Nominal Anchor Diameter (inch) / Rebar Size									
Gilaraciensuc	Gilaracteristic				1⁄2 / #4	⁵⁄a / #5	³ ⁄4 / #6	∛ 8 / #7	1 / #8	1-1⁄4 / #10			
Installation Information													
Drill Bit Diameter for Threaded Rod		d _{hole}	in.	7⁄16	9⁄16	¹¹ ⁄16	13/16	1	11/8	1 3/8			
Drill Bit Diameter for Rebar			in.	1⁄2	5⁄8	3⁄4	7⁄8	1	11/8	1 3/8			
Maximum Tightening Torque		Tinst	ft-lb	10	20	30	45	60	80	125			
Permitted Embedment Depth Range ²	Minimum	h _{ef}	in.	23/8	23⁄4	31/8	3 1/2	3¾	4	5			
Permitted Embedment Depth hange	Maximum	h _{ef}	in.	71/2	10	121/2	15	171⁄2	20	25			
Minimum Concrete Thickness		h _{min}	in.	h _{ef} + 5d _o									
Critical Edge Distance			in.	3 x h _{ef}									
Minimum Edge Distance			in.	1 %									
Minimum Anchor Spacing		S _{min}	in.		6								

The information presented in this table is to be used in conjunction with the design criteria of ICC-ES AC308.
Minimum and maximum embedment depths are set so as to fit the ICC-ES AC308 design model.

Tension Design Data for Threaded Rod in Normal-Weight Concrete^{1,11}

	Characteristic		Symbol	Units			-	chor Dia	· · ·	· · ·	
				•	3⁄8	1⁄2	5⁄8	3⁄4	7⁄8	1	1¼
	Minimum Tensile Stress Area	teel Strength in		in ²	0.078	0.142	0.226	0.334	0.462	0.606	0.969
	Tension Resistance of Steel: - ASTM F1554,	Crada 26	A _{se}	111-	4,525						56,200
Threaded Rod	· · · · · · · · · · · · · · · · · · ·	Grade 30				0,230	13,110	41,750	20,795	35,150	101 105
	- ASTM A193, Grade B7		— N _{sa}	lb.							106,590
	- Type 410 Stainless (ASTM A193, Grade B6				-						
	- Type 304 and 316 Stainless (ASTM A193,	Grade B8 & B8IV	-		4,445	8,095	12,880		26,335	34,540	55,235
	Strength Reduction Factor - Steel Failure Concrete Breakout Str	ongth in Tonoio	φ	-	0 000 50	.:.		0.758		-	
Effectiveness Factor - U		engui in tensio		SIUS	o,uuu µs 	51)		24			
Effectiveness Factor - C			k _{uncr}	-				17		-	
Strength Reduction Fac			k _{cr}					0.6510	-		
Strength Reduction Fac		in Tension (2,50	φ 0 noi < f'o <	-	noi)			0.05**			
	Characteristic Bond Strength ⁷	III TEIISIUII (2,50	1	0,000 psi	1,390	1,590	1,715	1,770	1,750	1.655	1,250
Temp. Range 1 for		Minimum	τ _{k,uncr}	psi	23/8	23/4	31/8	31/2	33/4	4	5
Uncracked Concrete ^{2,4,5}	Permitted Embedment Depth Range	Maximum	— h _{ef}	in.	2 % 7 ½	10	121/2	15	171/2	20	25
	Characteristic Bond Strength ^{7,12,13,14}	Maximum		nai	1.085	1.035	980	950	815	800	700
Temp. Range 1 for		Minimum	τ _{k,cr}	psi	1,065	3	31/8	950 31⁄2	33/4	4	5
Cracked Concrete ^{2,4,5}	Permitted Embedment Depth Range	Maximum	— h _{ef}	in.	$\frac{3}{7\frac{1}{2}}$	10	121/2	15	171/2	20	5 25
	Characteristic Dand Strangth	Maximum			-		-	-	-		
Temp. Range 2 for	Characteristic Bond Strength ⁷	N.4:	τ _{k,uncr}	psi	1,390	1,590	1,715	1,770	1,750	1,655	1,250
Uncracked Concrete ^{3,4,5}	Permitted Embedment Depth Range	Minimum	— h _{ef}	in.	23/8	23/4	31/8	31/2	33/4	4	5
	Observation Daniel Otran ath 7.12.13.14	Maximum			71/2	10	121⁄2 980	15 950	171⁄2 815	20	25 700
Temp. Range 2 for	Characteristic Bond Strength ^{7,12,13,14}	N.A.	τ _{k,cr}	psi	1,085	1,035			33/4	800	
Cracked Concrete ^{3,4,5}	Permitted Embedment Depth Range	Minimum	— h _{ef}	in.	3	3	31/8	31/2		4	5
	Bond Strength in Tension - Bond Str	Maximum	Eastara fa	Contin	71/2	10	121/2	15	171⁄2	20	25
Strength Reduction Fac		engin neuuciio	1	-	uous op		0.65 ⁹		-	0	55 ⁹
•	tor - Water-Saturated Concrete		φdry	-			0.05	0.45 ⁹	-	0.	33-
Additional Factor for Wa		· · · ·	φ _{sat}	-	0.546 0.776					0.966	
	Bond Strength in Tension - Bond S	trongth Doducti	K _{sat}				oction	0.77	-	0.	90
Strength Reduction Fac		uengin neuuci	1	-	uic oper	siai ilisp	0.55 ⁹			0	45 ⁹
	tor - Water-saturated Concrete		Φdry	-			0.55	0.45 ⁹		0.	40
Additional Factor for Wa			φ _{sat} K _{sat}	-						0	81 ⁶
	nted in this table is to be used in conjunction								af AOL 0		• ·
	a of ICC-ES AC308, except as modified below.	9.	The value of used and th								
	Maximum short-term temperature of 110°F.		combination								
Maximum long-term te			the appropr	iate valu	e of φ		,				
	Maximum short-term temperature of 180°F.	10.	The value of								
Maximum long-term te Short-term concrete te	emperature of 110°F. Imperatures are those that occur over		used and th								
short intervals (diurna			combination D4.4(c) for								
. Long-term concrete te											
over a significant time	period.		Section D4.	alue of ϕ . If the load combinations of ACI 318 Appendix C are used, refer to ection D4.5 to determine the appropriate value of ϕ .							
					d all-light						
			For anchors F, the bond								
according to ICC-ES A			$\alpha_{\text{N,seis}} = 0.8$		values to	1 72 , 78 ,	%4 anu i	anchors	s must be	munph	eu by
	when the load combinations of ACI 318	13.	For anchors		d in reaio	ns assior	ned to Se	ismic De	sign Cate	gory C. C), E or F.
Section 9.2 are used. I	f the load combinations of ACI 318 Appendix		the bond str	ength va	alues for '	1-1⁄4" ancl	nors mus	t be mult	iplied by	α _{N.seis} =	0.75.
C are used, refer to Se	ction D4.5 to determine the appropriate value of q	D. 14.	For anchors	installed	l in regio	ns assigr	ned to Se	ismic De	sign Cate	gory C, E), E or F,
			the bond str	ength va	auues for f	/s" ancho	rs must t	be multip	nea by α	_{N,seis} = 0	.59.

Design Information

SIMPSON Strong-Tie

Tension Design Data for Rebar in Normal-Weight Concrete^{1,11}

	Characteristic		Symbol	Units	Rebar Size							
					#3	#4	#5	#6	#7	#8	#10	
	r	Steel Strength in T	1	r	-		1		-			
Rebar	Minimum Tensile Stress Area		A _{se}	in ²	0.11	0.2	0.31	0.44	0.6	0.79	1.27	
	Tension Resistance of Steel - Rebar (ASTN	,	N _{sa}	lb.	9,900			39,600				
nobu		ion Resistance of Steel - Rebar (ASTM A706 Grade 60)			8,800	16,000	24,800	35,200	48,000	63,200	101,60	
	Strength Reduction Factor - Steel Failure		φ	-				0.658				
		Strength in Tension (2,500 psi	\leq f'c \leq	8,000 ps	si)				-		
Effectiveness Factor - L	Incracked Concrete		k _{uncr}	-				24				
Effectiveness Factor - C			k _{cr}					17				
Strength Reduction Fac	tor - Breakout Failure		φ	-				0.6510				
	Bond Strengt	h in Tension (2,500	psi ≤ f'c ≤	8,000	osi)	-						
Tama Danas 1 fan	Characteristic Bond Strength ⁷		$\tau_{k,uncr}$	psi	1,355	1,365	1,355	1,330	1,280	1,215	1,025	
Temp. Range 1 for Uncracked Concrete ^{2,4,5}	Permitted Embedment Depth Range	Minimum	h.	in.	23⁄8	2¾	31⁄8	31⁄2	3¾	4	5	
	Termitted Embedment Depth hange	Maximum	- h _{ef}		7 ½	10	121⁄2	15	17 ½	20	25	
Town Down 4 for	Characteristic Bond Strength ^{7,12,13,14}		$\tau_{k,cr}$	psi	1,085	1,035	980	950	815	800	700	
Temp. Range 1 for Cracked Concrete ^{2,4,5}	Permitted Embedment Depth Range	Minimum		in.	3	3	31⁄8	31⁄2	3¾	4	5	
	Ferninged Embedment Depth Range	Maximum	h _{ef}		7 ½	10	121⁄2	15	171⁄2	20	25	
Temp. Range 2 for Uncracked Concrete ^{3,4,5}	Characteristic Bond Strength ⁷		$\tau_{k,uncr}$	psi	1,355	1,365	1,355	1,330	1,280	1,215	1,025	
	Permitted Embedment Depth Range	Minimum	h	in.	23/8	23⁄4	31⁄8	31⁄2	3¾	4	5	
		Maximum	- h _{ef}		7 ½	10	121⁄2	15	17½	20	25	
	Characteristic Bond Strength ^{7,12,13,14}		$\tau_{k,cr}$	psi	1,085	1,035	980	950	815	800	700	
Temp. Range 2 for Cracked Concrete ^{3,4,5}	Permitted Embedment Depth Range	Minimum	- h _{ef} in.	in	3	3	31⁄8	31⁄2	3¾	4	5	
	Fermitted Embedment Depth Range	Maximum		111.	7 ½	10	121⁄2	15	17½	20	25	
	Bond Strength in Tension - Bond	Strength Reduction I	actors for	Contin	uous Sp	ecial Ins	pection					
Strength Reduction Fac	tor - Dry Concrete		φdry	-			0.65 ⁹			0.	55 ⁹	
Strength Reduction Fac	tor - Water-Saturated Concrete		φ _{sat}	-	0.45%							
Additional Factor for W	ater-Saturated Concrete		K _{sat}	-	0.5	54 ⁶		0.776		0.	96 ⁶	
	Bond Strength in Tension - Bond	Strength Reduction		or Perio	dic Spe	cial Insp	ection					
Strength Reduction Fac	tor - Dry Concrete		φdry	-			0.55 ⁹			0.	45 ⁹	
Strength Reduction Fac	tor - Water-Saturated Concrete		φ _{sat}	-				0.45 ⁹				
Additional Factor for W	ater-Saturated Concrete		K _{sat}	-	0.4	16 ⁶		0.656		0.	81 ⁶	
with the design criteria Temperature Range 1: Maximum long-term t Temperature Range 2: Maximum long-term t Short-term concrete to short intervals (diurna	Maximum short-term temperature of 180°F. emperature of 110°F. emperatures are those that occur over I cycling). mperatures are constant temperatures over	us cc th 10. Tr us cc Dr va	e value of φ ed and the mbinations e appropria e value of φ ed and the mbinations 4.4(c) for C lue of φ. If ection D4.5	requirer s of ACI tte value φ applie requirer s of ACI ondition the load	nents of 318 Appe of φ. s when b nents of 318 Sect A are mo combina	Section I endix C a oth the lo Section I ion 9.2 a et, refer t ations of	04.4(c) for re used, i bad comb 04.4(c) for re used a o Section ACI 318	or Conditi refer to So prinations or Conditi nd the rep 1 D4.4 to Appendix	on B are ection D4 of ACI 31 on B are quiremer determin	met. If th 4.5 to det 18 Section met. If th hts of Sec ie the app	ne load ermine n 9.2 ar ne load stion propriate	

7. For anchors installed in overhead and subjected to tension resulting

from sustained loading, multiply the value calculated for N_a according to ICC-ES AC308 by 0.75. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C 8. are used, refer to Section D4.5 to determine the appropriate value of ϕ . 12. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values for #4, #5, #6 and #8 rebar anchors must be multiplied by $\alpha_{N,seis} = 0.85$. 13. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values for #10 rebar anchors must be multiplied by $\alpha_{N,seis} = 0.75$. 14. For anchors installed in regions assigned to Seismic Design Category C, D, E or F,

the bond strength values for #7 rebar anchors must be multiplied by $\alpha_{N,seis} = 0.59$.

Design Information

SIMPSON Strong-Tie

Shear Design Data for Threaded Rod in Normal-Weight Concrete^{1,5}

Characteristic			Units	Nominal Anchor Diameter (inch)								
	Gildideletistic				1/2	5⁄8	3⁄4	7⁄8	1	1¼		
	Steel Strength in She	ar										
	Minimum Shear Stress Area	A _{se}	in ²	0.078	0.142	0.226	0.334	0.462	0.606	0.969		
	Shear Resistance of Steel: - ASTM F1554, Grade 36			2,260	4,940	7,865	11,625	16,080	21,090	33,720		
	- ASTM A193, Grade B7		16	4,875	10,650	16,950	25,050	34,650	45,450	72,675		
	- Type 410 Stainless (ASTM A193, Grade B6)	- V _{sa}	lb.	4,290	9,370	14,910	22,040	30,490	40,000	63,955		
	- Type 304 and 316 Stainless (ASTM A193, Grade B8 & B8M)			2,225	4,855	7,730	11,420	15,800	20,725	33,140		
Threaded Rod	Reduction for Seismic Shear - ASTM F1554, Grade 36			0.85								
-	Reduction for Seismic Shear - ASTM A193, Grade B7	1		0.85								
	Reduction for Seismic Shear - Type 410 Stainless (ASTM A193, Grade B6)	$\alpha_{V,seis}^{6}$	-	0.85	85 0.75 0					0.85		
	Reduction for Seismic Shear - Type 304 and 316 Stainless (ASTM A193, Grade B8 & B8M)			0.85			0.75			0.85		
-	Strength Reduction Factor - Steel Failure	φ	-	0.652								
	Concrete Breakout Strength	in Shear										
Outside Diamet	er of Anchor	do	in.	0.375	0.5	0.625	0.75	0.875	1	1.25		
Load Bearing L	ength of Anchor in Shear	ℓe	in.				h _{ef}					
Strength Reduction Factor - Breakout Failure			-				0.70 ³					
	Concrete Pryout Strength in	1 Shear										
Coefficient for Pryout Strength			-				2.0					
Strength Reduc	ction Factor - Pryout Failure	φ	-				0.704					
1. The information	on presented in this table is to be used in conjunction with the 4. The	e value of q	applie	s when	both the	load con	nbination	s of ACI	318 Sect	ion 9.2		

design criteria of ICC-ES AC308, except as modified below.

2. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ .

3. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4 (c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of φ . If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of φ .

are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ .

5. Sand-lightweight and all-lightweight concrete are beyond the scope of this table. 6. The values of Vsa are applicable for both cracked concrete and uncracked concrete. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, V_{sa} must be multiplied by $\alpha_{V,seis}$ for the corresponding anchor steel type.

Shear Design Data for Rebar in Normal-Weight Concrete^{1,5}

Characteristic		Sumbo	I Units	Rebar Size								
	Gildideteristic			#3	#4	#5	#6	#7	#8	#10		
	Steel Strength in S	hear		#3 #4 #5 #6 #7 #8 # 0.11 0.2 0.31 0.44 0.6 0.79 1. 4,950 10,800 16,740 23,760 32,400 42,660 68, 4,400 9,600 14,880 21,120 28,800 37,920 60, 0.56 0.80 0.56 0.80 0.60 ² 0.60 ² 0.60 ² 0.375 0.5 0.625 0.75 0.875 1 1. h _{ef} 1 1 1 1 1 1 1								
	Minimum Shear Stress Area	Ase	in ²	0.11	0.2	0.31	0.44	0.6	0.79	1.27		
	Shear Resistance of Steel - Rebar (ASTM A615 Grade 60)	V _{sa}	lb.	4,950	10,800	16,740	23,760	32,400	42,660	68,580		
Rebar	Shear Resistance of Steel - Rebar (ASTM A706 Grade 60)	v sa	10.	4,400	9,600	14,880	21,120	28,800	37,920	60,960		
nebai	Reduction for Seismic Shear - Rebar (ASTM A615 Grade 60)			0.56			0.80					
	Reduction for Seismic Shear - Rebar (ASTM A706 Grade 60)	α _{V,seis}			0.56							
	Strength Reduction Factor - Steel Failure				0.60 ²							
	Concrete Breakout Streng	th in Shear										
Outside Diam	eter of Anchor	do	in.	0.375	0.5	0.625	0.75	0.875	1	1.25		
Load Bearing	Length of Anchor in Shear	le	in.	h _{ef}								
Strength Red	uction Factor - Breakout Failure	φ	-	0.703								
	Concrete Pryout Strength	in Shear										
Coefficient fo	Coefficient for Pryout Strength			2.0								
Strength Red	Strength Reduction Factor - Pryout Failure		-	0.704								
design crite 2. The value of	ation presented in this table is to be used in conjunction with the 4. bria of ICC-ES AC308, except as modified below. 4. f φ applies when the load combinations of ACI 318 Section 9.2 are 4. e load combinations of ACI 318 Appendix C are used, refer to Section 4.	4. The value of φ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of φ.							net. If			

D.4.5 to determine the appropriate value of ϕ . The value of φ applies when both the load combinations of ACI 318 Section 9.2 3 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4 (c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ . If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of φ .

Sand-lightweight and all-lightweight concrete are beyond the scope of this table. 5.

The values of Vsa are applicable for both cracked concrete and uncracked 6. concrete. For anchors installed in regions assigned to Seismic Design

Category C, D, E or F, V_{sa} must be multiplied by $\alpha\varsigma_{,seis}$ for the corresponding anchor steel type.

This flier is effective until December 31, 2014, and reflects information available as of December 1, 2012. This information is updated periodically and should not be relied upon after December 31, 2014; contact Simpson Strong-Tie for current information and limited warranty or see www.strongtie.com.

800-999-5099 www.strongtie.com