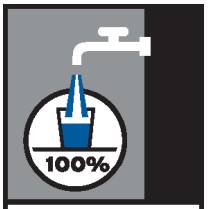
280 ML /
9.5 fl. oz. /
17 in³

825 ML /
28 fl. oz. /
50 in³

Content | Page

Product description	**2**
Properties and benefits	2
Applications and intended use	3
Handling and storage	3
Reactivity	3
Application in concrete	**4**
Setting instruction	4
Cleaning	6
Material properties	7
Setting parameter	8
Design values	9
Recommended loads	13
Fire resistance	15
Chemical resistance	**16**



NSF certificate acc. to NSF standard 61

Fire test report

Investments Hardware Limited
250 Rowntree Dairy Road
Woodbridge, Ontario
Canada L4L 9J7
Telephone (1) 416-748-0204
sales@IHLCanada.com
www.IHLCanada.com

Application in non-cracked concrete

Application in cracked concrete

Application under Seismic loading

FIRE RESIST-ANCE CLASS
R120

ICC ES
ESR-4785

LEED tested

NSF
Certified to NSF/ANSI 61

Made in Germany

Product description

The OCTOGOLD is a 2-component reaction resin mortar based on a vinylester resin styrene-free and will be delivered in a 2-c cartridge standard cartridge system. This high performance product may be used in combination with a hand/battery/pneumatic tool and a static mixer. It was designed especially for the anchoring of threaded rods, reinforcing bars or internal threaded rod sleeves into concrete. The OCTOGOLD is characterised, by a huge range of applications with an installation temperature from 10°C and an application temperature up to 120°C as well as by high chemical resistance for applications in extreme ambiences e.g. in swimming pools (chlorine) or in closeness to the sea (salt). The wide range of certificates and international approvals allow for nearly every application.

Properties and benefits

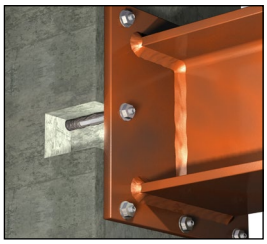
- Evaulated for indoor and outdoor applications; including overhead
- For heavy anchoring - doweling and post-installed rebar connection
- Waterfilled bore holes; water saturated concrete (wet)
- Suitable for attachment points with small edge and axial distances due to an anchoring free of expansion forces
- Suitable for the fixation of facades, roofs, wood constructions, metal constructions; metal profiles, columns, beams, consoles, railings, sanitary devices, cable trays, piping, and post-installed rebar connections
- High chemical resistance
- Low odour formulation
- Qualified for seismic loads
- high bending and pressure strength
- Cartridge can be reused up to the end of the shelf life by replacing the static mixer or resealing cartridge with the sealing cap

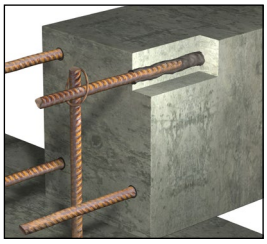
Approvals and Listings

- Fire resistance test report: 3290/0966
- US-approval acc. to AC 308 in concrete
- Certificated for drinking water applications acc. to NSF Standard 61
- ICC-ES 4785
- MTO Approved (MI 120)
- Road Authority Listing

Handling and storage

- **Storage:** store in a cold and dark place, storage temperature: from 5°C (41°F) up to 25°C (77 °F)
- **Shelf life:**
  18 months





Applications and intended use

- **Underground & Overhead Applications (Indoors/Outdoors):**
  cracked and non-cracked concrete, light-concrete, porous-concrete, solid masonry, hollow brick, natural stone (Attention! natural stone, can discolour; shall be checked in advance); hammer drilled holes, (hollow material shall be drilled without hammer drilled mode)
- **Anchor elements:**
  Threaded rods (zinc plated or hot dip, stainless steel and high corrosion resistance steel), reinforcing bars, internal threaded rods, profiled rod, steel section with undercuts (e.g. perforated section)
- **Temperature range:**
  14°F up to 104°F installation temperature
  cartridge temperature min. 41°F; optimal 70°F
  -40°F to 248°F base material temperature after full curing

Mortar properties

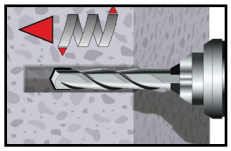
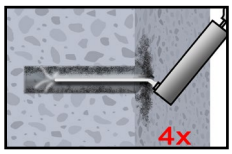
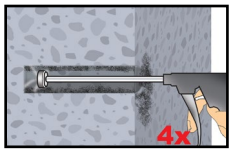
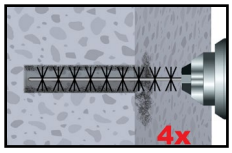
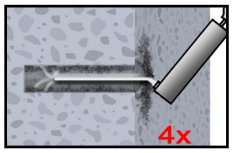
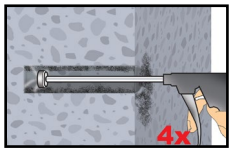
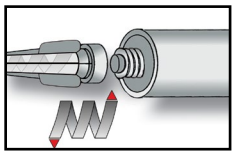
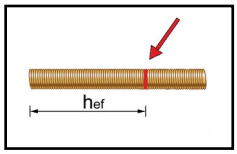
Properties	Test Method	Result
UV resistance		Pass
Watertightness	DIN EN 12390-8	0 inch
Temperature stability		120 °C
pH-value		> 12
Density		17.7 lb/gal
Compressive strength	EN 196 Teil1	14500 psi
Flexural strength	EN 196 Teil1	2170 psi
E modulus	EN 196 Teil1	2031930 psi
Shrinkage		< 0.3 %
Hardness Shore D		90
Electrical resistance	IEC 93	$3.6\ 10^{9}\ \Omega$ m
Thermal conductivity	IEC 60093	0.65 W/m·K

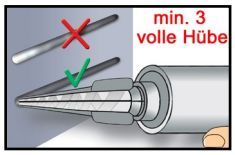
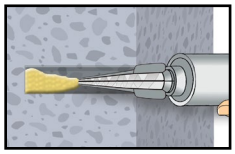
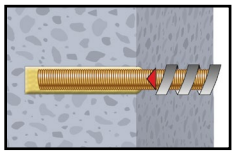
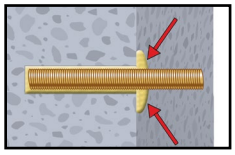
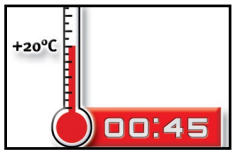
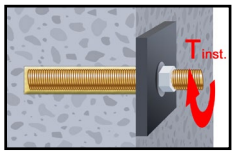
Reactivity

Temperature of base material	Gel- and working time	Full curing time in dry base material	Full curing time in wet base material
14°F[1)]	90 Min.	1440 Min.	2880 Min.
23 °F	90 Min.	840 Min.	1680 Min.
32 °F	45 Min.	420 Min.	840 Min.
41 °F	25 Min.	120 Min.	240 Min.
50 °F	15 Min.	80 Min.	160 Min.
70 °F	6 Min.	45 Min.	90 Min.
86 °F	4 Min.	25 Min.	50 Min.
95 °F	2 Min.	20 Min.	40 Min.

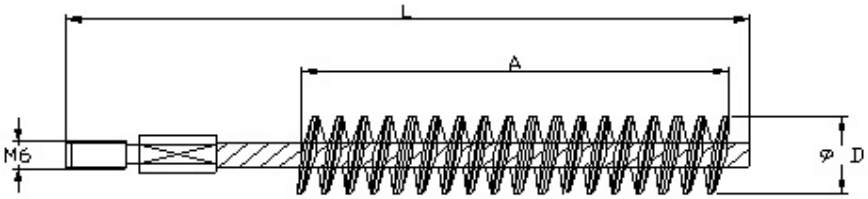
1) For installations in base material temperature between 14°F and 23°F the cartridge temperature must be conditioned to between 60°F and 77°F.

Usage instructions - concrete

	1. Drill with hammer drill mode a hole into the base material to the size and embedment depth required by the selected anchor. the tolerances of the carbide drill bit must meet the requirements of ANSI standard B212.15. Wear Sutiable Personal protection. Avoid inhalation of dusts during drilling and/or removal.
 or 	2a. In case of standing water in the drilled bore hole, all water must be removed before cleaning. Starting from the bottom or back of the bore hole, blow the hole clean with compressed air or a hand pump a minimum of four times. If the bore hole ground is not reached an extension shall be used. A compressed air (min. 90 psi) or hand-pump (min. volume 25 oz.) can be used for anchor sizes with bore hole diameters up to 3/4 inch. For bore holes larger then 3/4 inch or deeper then 10 inch, compressed air (min. 90 psi) must be used. A hand pump must not be used for anchors of this size.
	2b. Chose the appropriate brush diameter for the task, see page 6 Table of this document or Table 2 on the MPII. Attach the brush to a drilling machine or a battery screwdriver. Brush the hole full depth of the hole with an appropriate sized wire brush a minimum of four times. If the bore hole ground is not reached with the brush, a brush extension will be used.
 or 	2c. Finally blow the hole clean again with compressed air or a hand pump a minimum of FOUR times. If the bore hole ground is not reached an extension shall be used. A compressed air (min. 90 psi) or hand-pump (min. volume 25 oz.) can be used for anchor sizes with bore hole diameters up to 3/4 inch. For bore holes larger then 3/4 inch or deeper then 10 inch, compressed air (min. 90 psi) must be used. A hand pump must not be used for anchors of this size. When finsihed the hole should be clean and free of dust, debris, ice, grease, oil or other foreign material.
	3. Check the expiry date expiry date on the cartidge. Do not use expired adhesive. Review the Material Safety Data Sheet (MSDS) before use. Catridge temperature must be between 5°C to 25°C. Attach a supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. After every working interruption longer than the recommended working time as well as for new cartridges, a new static-mixer shall be used.
	4. Prior to inserting the anchor rod into the filled bore hole, the position of the embedment depth shall be marked on the anchor rods. Verify anchor element is straight and free of surface damage.

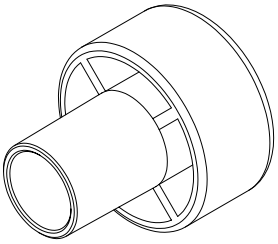
	5. Adhesive must be properly mixed to achieve published properties. Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the adhesive shows a consistent grey colour. Review and note the published working and cure times prior to injection of the mixed adhesive into the cleaned anchor hole.
	6. Starting from the bottom respective back of the cleaned anchor hole fill the hole up to approximately two-thirds with adhesive. Slowly withdraw of the static mixing nozzle as the hole is filled avoids creating air pockets. For embedments larger than 7.5 inch an extension nozzle shall be used. For overhead and horizontal installation in bore holes bigger than 3/4 inch resp. deeper than 10 inch a piston plug shall be used. Observe the gel-/ working times given.
	7. The anchor should be free of dirt, grease, oil or other material. Push the threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. Observe the gel (working) time. The anchor should be free of dirt, grease, oil or other foreign material.
	8. Be sure that the anchor is fully seated at the bottom of the hole and that excess adhesive is visible at the top of the hole and all around the top of the anchor. If there is not enough adhesive in the hole, the installation must be repeated. For overhead applications and applications between horizontal and overhead teh anchor must be secured from moving/falling during the cure time. Minor adjustments to the anchor may be performed during the gel time but the anchor shall not be moved after placement and during cure. If these requirements are not maintained, the application has to be redone.
	9. Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not disturb, move or load the anchor until it is fully cured.
	10. After full curing of the adhesive anchor, the add-on part or fixture can be installed to the anchor with the max. torque by using a calibrated torque wrench. Take care not to exceed the maximum torque for the selected anchor.

Cleaning of the drill hole - concrete



Metal Brush

Blower



Piston plug

Threaded rod	Rebar	Bore hole-∅	Brush	Min. brush-∅	Piston plug
(Inch)	(Inch)	(Inch)	Item #	$d_{b,min}$ (Inch)	Item #
3/8		7/16	31427	0.458	-
	#3	1/2	31429	0.520	-
1/2		9/16	31431	0.582	31442
	#4	5/8	31432	0.650	-
5/8	#5	3/4	31433	0.775	31443
3/4	#6	7/8	31434	0.905	31444
7/8	#7	1	31435	1.030	31445
1	#8	1-1/8	31436	1.160	31446
1-1/4	#9	1-3/8	31437	1.410	31447
	#10	1-1/2	31438	1.535	31448

Threaded rod and deformed reinforcing bar material properties

Steel description (General)	Steel Specification (ASTM)	Nominal Anchor Size (Inch)	Minimum Yield Strength, f_y (ksi)	Minimum Ultimate Strength, f_u (ksi)
Carbon rod	ASTM A 36 and F 1554 Grade 36	3/8 to 1-1/4	36.0	58.0
	ASTM F 1554 Grade 55	3/8 to 1-1/4	55.0	75.0
	ASTM A 449	3/8 to 1	92.0	120.0
		1-1/4	81.0	105.0
High strength carbon rod	ASTM A 193 Grade B7 abd F 1554 Grade 105	3/8 to 1-1/4	105.0	125.0
Stainless rod (Alloy 304/316)	ASTM F 593 Condition CW	3/8 to 5/8	65.0	100.0
		3/4 to 1-1/4	45.0	85.0
	ASTM A 193 Grade B8/B8M, Class 1	3/8 to 1-1/4	30.0	75.0
	ASTM A 193 Grade B8/B8M, Class 1	3/8 to 1-1/4	75.0	95.0
Reinforcing Bar	ASTM A 615, A 767, Grade 75	3/8 to 1-1/4	75.0	100.0
	ASTM A 615, A 767, Grade 60	3/8 to 1-1/4	60.0	90.0
	ASTM A 706, A 767, Grade 60	3/8 to 1-1/4	60.0	80.0
	ASTM A 615, A 767, Grade 40	3/8 to 1-1/4	40.0	60.0

Setting parameter - concrete

Anchor size			3/8	1/2	5/8	3/4	7/8	1	1- 1/4
Effectness factor (cracked concrete)	$k_{c,cr}$	[-]	17						
Effectness factor (uncracked concrete)	$k_{c,uncr}$	[-]	24						
Min. edge distance	C_{min}	[inch]	1.88	2.50	3.13	3.75	4.38	5.00	6.25
Min. axial distance	S_{min}	[inch]	1.88	2.50	3.13	3.75	4.38	5.00	6.25
Embedment depth (hammer drilled)	$h_{ef,min}$	[inch]	2-3/8	2-3/4	3-1/8	3-1/2	3-1/2	4	5
	$h_{ef,max}$	[inch]	7-1/2	10	12-1/2	15	17-1/2	20	25
Min. part thickness	h_{min}	[inch]	h_{ef} + 1-1/4“			h_{ef} + $2d_0$			
Anchor diameter	d_a	[inch]	3/8	1/2	5/8	3/4	7/8	1	1-1/4
Drill diameter	d_0	[mm]	7/16	9/16	3/4	7/8	1	1 -1/8	1 -3/8
Installation torque	$T_{inst.}$	[ft-lb]	15	33	60	105	125	165	280

Anchor size			#3	#4	#5	#6	#7	#8	#9	#10
Effectness factor (cracked concrete)	$k_{c,cr}$	[-]	17							
Effectness factor (uncracked concrete)	$k_{c,uncr}$	[-]	24							
Min. edge distance	C_{min}	[inch]	1.88	2.50	3.13	3.75	4.38	5.00	5.63	6.25
Min. axial distance	S_{min}	[inch]	1.88	2.50	3.13	3.75	4.38	5.00	5.63	6.25
Embedment depth	$h_{ef,min}$	[inch]	2-3/8	2-3/4	3-1/8	3-1/2	3-1/2	4	4-1/2	5
	$h_{ef,max}$	[inch]	7-1/2	10	12-1/2	15	17-1/2	20	22-1/2	25
Min. part thickness	h_{min}	[inch]	h_{ef} + 1-1/4“		h_{ef} + $2d_0$					
Anchor diameter	d_a	[inch]	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4
Drill diameter	d_0	[mm]	1/2	5/8	3/4	7/8	1	1 -1/8	1 -3/8	1-1/2
Installation torque	$T_{inst.}$	[ft-lb]	15	33	60	105	125	165	220	280

Performance data - concrete (Threaded rod)[1)]

TENSION LOADS - Design acc. to ACI 318-11 Appendix D

Anchor size				3/8	1/2	5/8	3/4	7/8	1	1-1/4
Steel failure										
Nominal strength tension as governed by steel strength, ASTM A36		N_{sa}	[lb]	4,495	8,230	13,110	19,400	26,780	35,130	56,210
Nominal strength tension as governed by steel strength, ASTM A193 Grade B7		N_{sa}	[lb]	9,685	17,735	28,250	41,810	57,710	75,710	•
Reduction factor		ϕ		0.75						
Nominal strength tension as governed by steel strength, ASTM F593 CW Stainless		N_{sa}	[lb]	7,750	14,190	22,600	28,430	39,245	51,485	82,370
Reduction factor		ϕ		0.65						
Pullout and concrete cone failure										
Characteristic bond strength[3)] in concrete 2500psi										
Temperature Range: 75°F/104°F [1)]	uncracked concrete	$\tau_{k,uncr}$	[psi]	1450	1450	1450	1450	1450	1305	1030
	cracked concrete	$\tau_{k,cr}$		n.a.	871	907	907	907	918	918
Temperature Range: 122°F/176°F [1)]	uncracked concrete	$\tau_{k,uncr}$		823	823	823	823	823	743	588
	cracked concrete	$\tau_{k,cr}$		n.a.	498	519	519	519	519	525
Temperature Range: 161°F/248°F [1)]	uncracked concrete	$\tau_{k,uncr}$		405	405	405	405	405	366	n.a.
	cracked concrete	$\tau_{k,cr}$		n.a.	245	255	255	255	255	255
Strength reduction factor for permissible istallation condition	dry	ϕ_d		0.65						
	wet	ϕ_{ws}		0.55						
	water-filled	ϕ_{wf}		0.45						
		κ_{wf}		0.78	0.78	0.78	0.78	0.70	0.69	0.67
Embedment depth		$h_{ef,min}$	[inch]	2-3/8	2-3/4	3-1/8	3-1/2	3-1/2	4	5
		$h_{ef,max}$	[inch]	7-1/2	10	12-1/2	15	17-1/2	20	25
Increasing factor				$(f'_c/2500)^{0,13}$						
Concrete breakout										
Effectness factor (cracked concrete)		$k_{c,cr}$	[-]	17						
Effectness factor (uncracked concrete)		$k_{c,uncr}$	[-]	24						
Reduction factor Condition B[2)]		ϕ		0.65						
Seismic										
Reduction factor for seismic tension		$\alpha_{N,seis}$	[-]	1.0						

The data in this table are evaluated according AC308-11 and ACI 355.4.

1) Long term temperature/ Short term temperature. Long term concrete temperatures are roughly constant over significant periods of time. Short term elevated temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling. Room temperature range is not recognized by ACI 318-14 or ACI 318-11 and does not meet the minimum temperature requirement of ACI 355.4, Table 8.1 and consequently is not applicable to design under ACI 318-14, ACI 318-11 or current and past editions of the International Building Code (IBC). The tabulated values
are provided for analysis and evaluation of existing conditions only.

2) Condition A requires supplemental reinforcement, while Condition B applies where supplemental reinforcement is not provided or where pullout or pryout governs, as set forth in ACI 318-11 D.4.3. The tabulated value of f applies when the load combinations of Section 1605.2 of the IBC, or ACI 318-11 9.2 are used. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of f must be determined in accordance with ACI 318-11 D.4.4.

3) Characteristic bond strengths are for sustained loads including dead and live loads. For load combinations consisting of short-term loads only such as wind or seismic, bond strengths may be increased by 43 percent for Temperature Range 122°F/176°F and 122 percent for Temperature Range 161°F/248°F.

Performance data - concrete (Threaded rod)

SHEAR LOADS - Design acc. to ACI 318-11 Appendix D

Anchor size			3/8	1/2	5/8	3/8	7/8	1	1-1/4
Steel failure									
Nominal shear strength as governed by steel strength, ASTM A36	V_{sa}	[lb]	2,695	4,940	7,860	11,640	16,065	21,080	33,725
Nominal shar strength as governed by steel strength, ASTM A193 Grade B7	V_{sa}	[lb]	4,845	10,640	16,950	25,085	34,625	45,425	72,680
Reduction factor	ϕ		0.65						
Reduction factor for seismic shear	ϕ		0.85	0.85	0.85	0.85	0.85	0.80	0.80
Nominal shear strength as governed by steel strength, ASTM F593 CW Stainless	V_{sa}	[lb]	4,650	8,515	13,560	17,055	23,545	30,890	49,420
Reduction factor	ϕ		0.60						
Reduction factor for seismic shear	ϕ		0.85	0.85	0.85	0.85	0.85	0.80	0.80
Concrete edge failure									
Effective length of anchor in shear loading	l_e	[Inch]	min (h_{ef}; $8d_a$)						
Outside diameter of anchor	d_a	[Inch]	3/8	1/2	5/8	3/8	7/8	1	1-1/4
Reduction factor Condition B[1)]	ϕ		0.65						

The data in this table are evaluated according AC308-11 and ACI 355.4.

1) Condition A requires supplemental reinforcement, while Condition B applies where supplemental reinforcement is not provided or where pullout or pryout governs, as set forth in ACI 318-11 D.4.3. The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, or ACI 318-11 9.2 are used. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4.

Performance data - concrete (Rebar)

TENSION LOADS - Design acc. to ACI 318-11 Appendix D

Anchor size				#3	#4	#5	#6	#7	#8	#9	#10
Steel failure											
Nominal tension strength as governed by steel strength, ASTM A615 Grade 60		N_{sa}	[lb]	9,900	18,000	27,900	39,600	54,000	71,100	90,000	114,300
Reduction factor		ϕ		0,65							
Nominal tension strength as governed by steel strength, ASTM A706, Grade 60		N_{sa}	[lb]	8,800	16,000	24,800	35,200	48,000	63,200	80,000	101,600
Reduction factor		ϕ		0,75							
Pullout and concrete cone failure											
Characteristic bond strength[3] in concrete 2500psi											
Temperature Range: 75°F/104°F [1]	uncracked conc.	$\tau_{k,uncr}$	[psi]	1450	1450	1450	1450	1450	1305	1160	1030
	cracked conc.	$\tau_{k,cr}$		n.a.	871	907	907	907	918	918	918
Temperature Range: 122°F/176°F [1]	uncracked conc.	$\tau_{k,uncr}$		823	823	823	823	823	743	668	588
	cracked conc.	$\tau_{k,cr}$		n.a.	331	345	345	345	345	345	349
Temperature Range: 161°F/248°F [1]	uncracked conc.	$\tau_{k,uncr}$		405	405	405	405	405	366	329	n.a.
	cracked conc.	$\tau_{k,cr}$		142	163	170	170	170	170	172	172
Strength reduction factor for permissible istallation condition	dry	ϕ_d		0.65							
	wet	ϕ_{ws}		0.55							
	water-filled	ϕ_{wf}		0.45							
		κ_{wf}		0.78	0.78	0.78	0.78	0.70	0.69	0.68	0.67
Embedment depth		$h_{ef,min}$	[inch]	2-3/8	2-3/4	3-1/8	3-1/2	3-1/2	4	4-1/2	5
		$h_{ef,max}$	[inch]	7-1/2	10	12-1/2	15	17-1/2	20	22-1/2	25
Increasing factor				$(f'_c/2500)^{0,13}$							
Concrete breakout											
Effectness factor (cracked concrete)		$k_{c,uncr}$	[-]	17							
Effectness factor (uncracked concrete)		$k_{c,uncr}$	[-]	24							
Reduction factor Condition B[2]		ϕ		0.65							
Concrete breakout											
Reduction factor for seismic tension		$\alpha_{N,seis}$	[-]	1.0							

The data in this table are evaluated according AC308-11 and ACI 355.4.

1) Long term temperature/ Short term temperature. Long term concrete temperatures are roughly constant over significant periods of time. Short term elevated temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling. Room temperature range is not recognized by ACI 318-14 or ACI 318-11 and does not meet the minimum temperature requirement of ACI 355.4, Table 8.1 and consequently is not applicable to design under ACI 318-14, ACI 318-11 or current and past editions of the International Building Code (IBC). The tabulated values are provided for analysis and evaluation of existing conditions only.

2) Condition A requires supplemental reinforcement, while Condition B applies where supplemental reinforcement is not provided or where pullout or pryout governs, as set forth in ACI 318-11 D.4.3. The tabulated value of □ applies when the load combinations of Section 1605.2 of the IBC, or ACI 318-11 9.2 are used. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of □ must be determined in accordance with ACI 318-11 D.4.4.

3) Characteristic bond strengths are for sustained loads including dead and live loads. For load combinations consisting of short-term loads only such as wind or seismic, bond strengths may be increased by 43 percent for Temperature Range 122°F/176°F and 122 percent for Temperature Range 161°F/248°F.

Performance data - concrete (Rebar)

SHEAR LOADS - Design acc. to ACI 318-11 Appendix D, hammer and diamond drilled bore holes

Anchor size			#3	#4	#5	#6	#7	#8	#9	#10
Steel failure										
Nominal shear strength as governed by steel strength, ASTM A615 Grade 60	V_{sa}	[lb]	5,940	10,800	16,740	23,760	32,400	42,660	54,000	68,580
Reduction factor	ϕ		0,60							
Reduction factor for seismic shear	ϕ		0,70							
Nominal shear strength as governed by steel strength, ASTM A706, Grade 60	V_{sa}	[lb]	5,280	9,600	14,880	21,120	28,800	37,920	48,000	60,960
Reduction factor	ϕ		0.65							
Reduction factor for seismic shear	ϕ		0.70							
Concrete edge failure										
Effective length of anchor in shear loading	l_e	[Inch]	min (h_{ef}; $8d_a$)							
Outside diameter of anchor	d_a	[Inch]	3/8	1/2	5/8	3/8	7/8	1	1-1/8	1-1/4
Reduction factor Condition B[1)]	ϕ		0.65							

The data in this table are evaluated according AC308-11 and ACI 355.4.

1) Condition A requires supplemental reinforcement, while Condition B applies where supplemental reinforcement is not provided or where pullout or pryout governs, as set forth in ACI 318-11 D.4.3. The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, or ACI 318-11 9.2 are used. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4.

Allowable loads - concrete (Threaded rod)

The allowable loads are only valid for single anchor for a roughly design, if the following conditions are valid:

min edge distance $c_a \geqq c_{ac}$ min spacing $S \geqq 2 \times C_{Na}$

min thickness concrete $h \geqq 2 \times h_{ef}$ concrete compressive strength $f'c \geqq$ 2500 psi

Static loads only. Allowable stress design conversion α=1,2D+1,6L=1,4

If the conditions are not fulfilled the loads must be calculated acc. to ACI 318-11 Appendix D.

The safety factors are already included in the allowable loads.

Anchor size			3/8	1/2	5/8	3/4	7/8	1	1-1/4
Allowable tension load for all Steel strength									
Temperature Range: 75°F/104°F 1)	$N_{allowable,ucr}$	[lb]	2,151	3,688	5,122	7,991	11,474	14,752	16,009
	$N_{allowable,cr}$	[lb]	n.a.	2,215	3,204	4,998	71,77	10,377	14,269
Temperature Range: 122°F/176°F 1)	$N_{allowable,ucr}$	[lb]	1,221	2,093	2,907	4,535	6,512	8,399	9,139
	$N_{allowable,cr}$	[lb]	n,a,	1,267	1,833	2,860	4,107	5,867	8,160
Temperature Range: 161°F/248°F 1)	$N_{allowable,ucr}$	[lb]	601	1,030	1,431	2,232	3,205	4,137	n.a.
	$N_{allowable,cr}$	[lb]	n.a.	623	901	1,405	2,018	2,883	3,964
Allowable shear load for steel strength, ASTM A36									
Temperature Range: 75°F/104°F 1)	$V_{allowable,ucr}$	[lb]	1,251	2,294	3,649	5,404	7,459	9,787	15,658
	$V_{allowable,cr}$	[lb]	n.a.	2,294	3,649	5,404	7,459	9,787	15,365
Temperature Range: 122°F/176°F 1)	$V_{allowable,ucr}$	[lb]	1,251	2,294	3,649	5,404	7,459	9,787	15,655
	$V_{allowable,cr}$	[lb]	n.a.	2,294	3,649	5,404	7,459	9,787	15,365
Temperature Range: 161°F/248°F 1)	$V_{allowable,ucr}$	[lb]	1,251	2,294	3,466	5,404	7,459	9,787	n.a.
	$V_{allowable,cr}$	[lb]	n.a.	1,732	2,503	3,905	5,608	8,011	11,015
Allowable shear load for steel strength, ASTM A193 Grade B7									
Temperature Range: 75°F/104°F 1)	$V_{allowable,ucr}$	[lb]	2,249	4,940	7,045	11,204	15,298	20,497	21,511
	$V_{allowable,cr}$	[lb]	n.a.	3,843	5,032	8,003	10,927	14,641	15,365
Temperature Range: 122°F/176°F 1)	$V_{allowable,ucr}$	[lb]	2,249	4,940	7,045	11,204	15,298	20,497	21,511
	$V_{allowable,cr}$	[lb]	n.a.	3,520	5,032	7,949	10,927	14,641	153,65
Temperature Range: 161°F/248°F 1)	$V_{allowable,ucr}$	[lb]	1,670	2,863	3,976	6,203	8,906	11,498	n.a.
	$V_{allowable,cr}$	[lb]	n.a.	1,732	2,503	3,905	5,608	8,011	11,015
Allowable shear load for steel strength, ASTM F593 CW Stainless									
Temperature Range: 75°F/104°F 1)	$V_{allowable,ucr}$	[lb]	1,993	3,649	5,811	7,309	10,091	13,239	21,180
	$V_{allowable,cr}$	[lb]	n.a.	3,649	5,032	7,309	10,091	13,239	15,365
Temperature Range: 122°F/176°F 1)	$V_{allowable,ucr}$	[lb]	1,993	3,649	5,811	7,309	10,091	13,239	21,180
	$V_{allowable,cr}$	[lb]	n.a.	3,520	5,032	7,309	10,091	13,239	15,365
Temperature Range: 161°F/248°F 1)	$V_{allowable,ucr}$	[lb]	1,670	2,863	3,976	6,203	8,906	11,498	n.a.
	$V_{allowable,cr}$	[lb]	n.a.	1,732	2,503	3,905	5,608	8,011	11,015
Embedment depth	h_{ef}	[Inch]	3-1/2	4-1/2	5	6-1/2	8	10	11
Edge distance	c_{ca}	[Inch]	6.51	8.36	9.29	12.08	14.87	17.82	17.83
Axial distance	C_{Na}	[Inch]	4.31	5.74	7.18	8.61	10.05	10.89	12.10

1) Long term temperature/ Short term temperature. Long term concrete temperatures are roughly constant over significant periods of time. Short term elevated temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling. Room temperature range is not recognized by ACI 318-14 or ACI 318-11 and does not meet the minimum temperature requirement of ACI 355.4, Table 8.1 and consequently is not applicable to design under ACI 318-14, ACI 318-11 or current and past editions of the International Building Code (IBC). The tabulated values are provided for analysis and evaluation of existing conditions only.

Allowable loads - concrete (Rebar)

The allowable loads are only valid for single anchor for a roughly design, if the following conditions are valid:
min edge distance $c_a \geqq c_{ac}$ min spacing $S \geqq 2 \times C_{Na}$
min thickness concrete $h \geqq 2 \times h_{ef}$ concrete compressive strength $f'c \geqq$ 2500 psi
Static loads only. Allowable stress design conversion α=1,2D+1,6L=1,4
If the conditions are not fulfilled the loads must be calculated acc. to ACI 318-11 Appendix D.
The safety factors are already included in the allowable loads.

Anchor size			#3	#4	#5	#6	#7	#8	#9	#10
Allowable tension load for all steel strength										
Temperature Range A: 75°F/104°F [1]	$N_{allowable,ucr}$	[lb]	2,151	3,688	5,122	7,991	11,474	14,752	16,227	16,009
	$N_{allowable,cr}$	[lb]	n.a.	2,215	3,204	4,998	7,177	10,377	12,842	14,269
Temperature Range A: 122°F/176°F [1]	$N_{allowable,ucr}$	[lb]	1,221	2,093	2,907	4,535	6,512	8,399	9,345	9,139
	$N_{allowable,cr}$	[lb]	n.a.	842	1,219	1,901	2,730	3,900	4,826	5,425
Temperature Range B: 161°F/248°F [1]	$N_{allowable,ucr}$	[lb]	601	1,030	1,431	2,232	3,205	4,137	4,602	n.a.
	$N_{allowable,cr}$	[lb]	n.a.	415	601	937	1,345	1,922	2,406	2,673
Allowable shear load for all steel strength										
Temperature Range A: 75°F/104°F [1]	$V_{allowable,ucr}$	[lb]	2,451	4,457	6,909	9,806	13,371	17,606	22,286	21,511
	$V_{allowable,cr}$	[lb]	n.a.	3,843	5,032	8,003	10,927	14,641	16,113	15,365
Temperature Range A: 122°F/176°F [1]	$V_{allowable,ucr}$	[lb]	2,451	4,457	6,909	9,806	13,371	17,606	22,286	21,511
	$V_{allowable,cr}$	[lb]	n.a.	2,340	3,387	5,284	7,587	10,838	13,413	15,076
Temperature Range B: 161°F/248°F [1]	$V_{allowable,ucr}$	[lb]	1,670	2,863	3,976	6,203	8,906	11,498	12,791	n.a.
	$V_{allowable,cr}$	[lb]	n.a.	1,152	1,669	2,604	3,738	5,341	6,687	7,430
Embedment depth	h_{ef}	[Inch]	3-1/2	4-1/2	5	6-1/2	8	10	11	11
Edge distance	c_{ca}	[Inch]	6.51	8.36	9.29	12.08	14.87	17.82	18.70	17.83
Axial distance	C_{Na}	[Inch]	4.31	5.74	7.18	8.61	10.05	10.89	11.55	12.10

1) Long term temperature/ Short term temperature. Long term concrete temperatures are roughly constant over significant periods of time. Short term elevated temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling. Room temperature range is not recognized by ACI 318-14 or ACI 318-11 and does not meet the minimum temperature requirement of ACI 355.4, Table 8.1 and consequently is not applicable to design under ACI 318-14, ACI 318-11 or current and past editions of the International Building Code (IBC). The tabulated values are provided for analysis and evaluation of existing conditions only.

Fire resistance

Fire resistance times in combination with threaded rods (3/8“ to 1-1/4“) made of zinc plated steel, property class ASTM A36 or higher.

	Fire resistance time in minutes			
Anchor size	30 max F [lbf]	60 max F [lbf]	90 max F [lbf]	120 max F [lbf]
3/8“	≦ 504	≦ 344	≦ 181	≦ 101
1/2“	≦ 823	≦ 635	≦ 447	≦ 354
5/8“	≦ 1.306	≦ 1.008	≦ 709	≦ 562
3/4“	≦ 1.933	≦ 1.491	≦ 1.049	≦ 831
7/8“	≦ 2.666	≦ 2.057	≦ 1.447	≦ 1.147
1“	≦ 3.498	≦ 2.699	≦ 1.899	≦ 1.505
1-1/4“	≦ 5.592	≦ 4.314	≦ 3.035	≦ 2.405

The special details acc. to the Assessment Report 21825_2en – condensed version must be observed.

Chemical resistance

Chemical Agent	Concentration	Resistant	Not Resistant
Accumulator acid		•	
Acetic acid	40		•
Acetic acid	10	•	
Acetone	10		•
Ammonia, aqueous solution	5	•	
Aniline	100		•
Beer		•	
Benzene (kp 100-140°F)	100	•	
Benzol	100		•
Boric Acid, aqueous solution		•	
Calcium carbonate, suspended in water	all	•	
Calcium chloride, suspended in water		•	
Calcium hydroxide, suspended in water		•	
Carbon tetrachloride	100	•	
Caustic soda solution	10	•	
Citric acid	all	•	
Chlorine water, swimming pool	all	•	
Diesel oil	100	•	
Ethyl alcohol, aqueous solution	50		•
Formic acid	100		•
Formaldehyde, aqueous solution	30	•	
Freon		•	
Fuel Oil		•	
Gasoline (premium grade)	100	•	
Glycol (Ethylene glycol)		•	
Hydraulic fluid	conc.	•	
Hydrochloric acid (Muriatic Acid)	conc.		•
Hydrogen peroxide	30		•
Isopropyl alcohol	100		•
Lactic acid	all	•	
Linseed oil	100	•	
Lubricating oil	100	•	
Magnesium chloride, aqueous solution	all	•	
Methanol	100		•
Motor oil (SAE 20 W-50)	100	•	
Nitric acid	10		•
Oleic acid	100	•	
Perchloroethylene	100	•	
Petroleum	100	•	
Phenol, aqueous solution	8		•
Phosphoric acid	85	•	
Potash lye (Potassium hydroxide)	10	•	
Potassium carbonate, aqueous solution	all	•	
Potassium chlorite, aqueous solution	all	•	
Potassium nitrate, aqueous solution	all	•	
Sea water, salty	all	•	
Sodium carbonate	all	•	
Sodium Chloride, aqueous solution	all	•	
Sodium phosphate, aqueous solution	all	•	
Sodium silicate	all	•	
Standard Benzine	100	•	
Sulfuric acid	10	•	
Sulfuric acid	70		•
Tartaric acid	all	•	
Tetrachloroethylene	100	•	
Toluene			•
Trichloroethylene	100		•
Turpentine	100	•	

Results shown in the table are applicable to brief periods of chemical contact with full cured adhesive (e.g. temporary contact with adhesive during a spill).