DEWALT®

ANCHORS & FASTENERS

Pure220+™

ULTRA HIGH STRENGTH EPOXY ANCHORING SYSTEM

Pure220+™ is a two-component adhesive anchor designed for bonding threaded rod and reinforcing bar hardware into drilled holes in concrete base materials and for post-installed reinforcing bar connections (rebar development). It can also be considered for other applications in concrete and masonry such as anchor bolt repairs, filling abandoned holes and large cracks.

OVER 20% STRONGER[1] BOND STRENGTH

EASIER TO DISPENSE[2]

- Formulation aids cold weather dispensing

50% CLOSER EDGE DISTANCE[3]

- Enables anchor placement closer to the end of the slab.

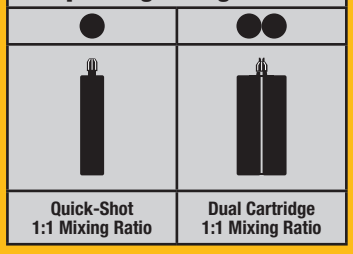
DUSTX+™ APPROVED[4]

- For OSHA Table 1 compliant dustless installation

MADE IN THE USA WITH GLOBAL MATERIALS

1. Bond strength compared to Pure110+® average load values with threaded rod in dry cracked concrete for size 3/8", 1/2", 3/4", 7/8" and 1".
2. vs. Pure110+®.
3. Based on average edge distance in inches, anchor sizes 5/8" - 1-1/4", compared to Pure110+®.
4. With the DWV015 dust extractor.

Dispensing Configurations



Quick-Shot 1:1 Mixing Ratio	Dual Cartridge 1:1 Mixing Ratio

ICC ES CODE LISTED ICC-ES ESR-5144

TENSION ZONE CRACKED CONCRETE

SEISMIC REGION QUALIFICATION

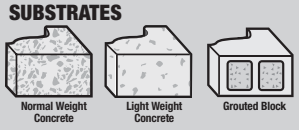
POST-INSTALLED REBAR CONNECTIONS

MADE IN THE USA WITH GLOBAL MATERIALS™ LOOK FOR THIS LOGO ON SPECIALLY MARKED DEWALT PACKAGES.

DDA DEWALT DESIGN ASSIST™

DUSTX+™ ANCHOR INSTALLATION SYSTEM

SUBSTRATES



PERMISSIBLE INSTALLATION CONDITIONS

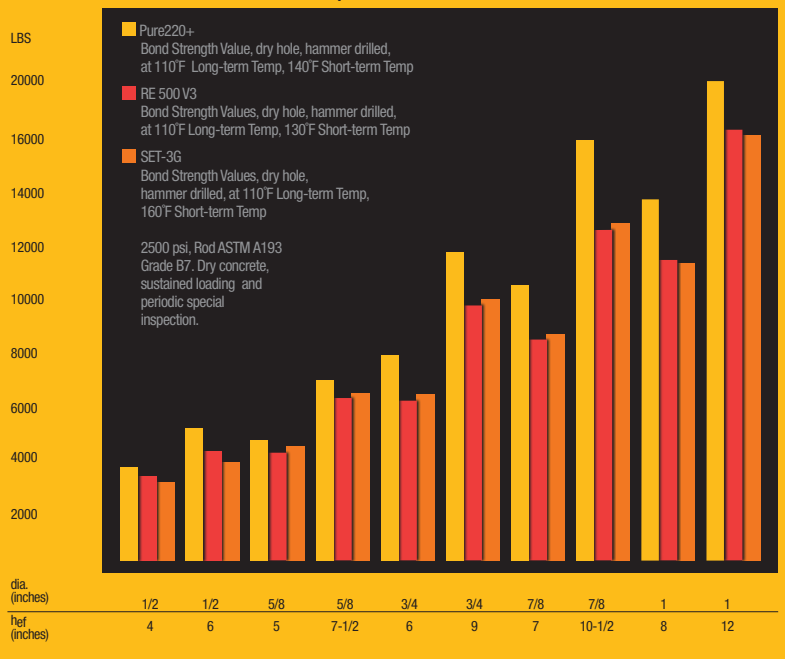
COMPETITIVE COMPARISON

	DEWALT Pure220+™	Hilti RE500-V3	Simpson SET-3G
Code Approval	ESR-3298 (December 2022)	ESR-3814 (March 2023)	ESR-4057 (April 2022)
Underwater (submerged)	Yes	Yes	Yes
Cracked Concrete + Seismic	Yes	Yes	Yes
Min. Cure Time at 68°F	8 hrs	7 hrs	24 hrs
Min. Cure Time at 50°F	24 hrs	16 hrs	72 hrs
Hollow Drill Bit Approval	Yes	Yes	Yes
Post-Installed Rebar Approval	Yes	Yes	Yes
Storage Temperature	41°F - 95°F	41°F - 77°F	45°F - 90°F
Fire Tested PIR	Yes	Yes	No

Hilti RE500-V3 is a trademark of Hilti Corporation
SET-XP is a registered trademark of Simpson Strong-Tie Company Inc.

BOND STRENGTH COMPETITIVE COMPARISON

Pure220+™ vs. Hilti RE 500 V3 vs. Simpson SET-3G



GEL (WORKING) TIME AND CURING TABLE

TEMPERATURE OF BASE MATERIAL	MAXIMUM WORKING TIME	INITIAL CURING TIME[1]	FULL CURING TIME
41°F (5°C) to 49°F (9°C)	80 minutes	24 hours	48 hours
50°F (10°C) to 58°F (14°C)	60 minutes	15 hours	30 hours
59°F (15°C) to 67°F (19°C)	40 minutes	10 hours	20 hours
68°F (20°C) to 76°F (24°C)	30 minutes	5 hours	11 hours
77°F (25°C) to 85°F (29°C)	12 minutes	4 hours	9 hours
86°F (30°C) to 103°F (39°C)	8 minutes	3 hours	6 hours
104°F (40°C) to 109°F (42°C)	6 minutes	2 hours	4 hours
110°F (43°C)	5 minutes	2 hours	4 hours

Cartridge temperature must be between 41ºF (5ºC) and 104ºF (40ºC).

1. Initial cure times are for post-installed rebar applications only. After the initial curing time, the installation of connecting reinforcements and formwork attachments is permitted for post-installed rebar applications.

Pure220+™ CARTRIDGES (1:1 MIX RATIO)

CAT. NO.	DESCRIPTION	PACK QTY.	PALLET QTY.
DFC114110	Pure220+ 9.5 fl. oz. Quick-Shot cartridge	12	846
DFC114121	Pure220+ 20.5 fl. oz. dual cartridge	12	720

A mixing nozzle is packaged with each cartridge.

Pure220+ mixing nozzles must be used to ensure complete and proper mixing of the adhesive.

MIXING NOZZLES AND NOZZLE EXTENSIONS

CAT. NO.	DESCRIPTION	PACK QTY.	CARTON QTY.
PFC1641600	Mixing nozzle (with 8" extension)	2	24
08609-PWR	High flow mixing nozzle (with 8" extension)	2	24
08281-PWR	Mixing nozzle extension, 8" long (3/8" O.D.)	2	24
08297-PWR	Mixing nozzle extension, 20" long (3/8" O.D.)	1	12
PFC1640600	Flexible Extension Hose, 25 ft. (5/8" O.D.)	1	12

DISPENSING TOOLS FOR INJECTION ADHESIVE

CAT. NO.	DESCRIPTION	PACK QTY.	CARTON QTY.
08437-PWR	Manual caulking gun for Quick-Shot cartridge	1	12
DCE560B (DCE560D1)	Cordless 20v Battery powered dispensing tool for Quick-Shot (Kit)	1	-
08409-PWR	20.5 fl. oz. Standard metal manual tool	1	10
DCE591B (DCE591D1)	20.5 fl. oz. cordless 20v Battery powered dispensing tool (Kit)	1	-
08459-PWR	20.5 fl. oz. Pneumatic tool	1	-

HOLE CLEANING TOOLS AND ACCESSORIES

CAT NO.	DESCRIPTION	PACK QTY.
PFC1671050	Premium Wire brush for 7/16" ANSI hole, 6" length	1
PFC1671100	Premium Wire brush for 1/2" ANSI hole, 6" length	1
PFC1671150	Premium Wire brush for 9/16" ANSI hole, 6" length	1
PFC1671200	Premium Wire brush for 5/8" ANSI hole, 6" length	1
PFC1671225	Premium Wire brush for 11/16" ANSI hole, 6" length	1
PFC1671250	Premium Wire brush for 3/4" ANSI hole, 6" length	1
PFC1671300	Premium Wire brush for 7/8" ANSI hole, 6" length	1
PFC1671350	Premium Wire brush for 1" ANSI hole, 6" length	1
PFC1671400	Premium Wire brush for 1-1/8" ANSI hole, 6" length	1
PFC1671450	Premium Wire brush for 1-1/4" and 1-3/8" ANSI hole, 6" length	1
PFC1671500	Premium Wire brush for 1-1/2" ANSI hole, 6" length	1
PFC1671830	SDS-plus adapter for premium steel brushes	1
PFC1671000	Premium manual brush wood handle	1
PFC1671820	Premium steel brush extension, 12" length	1
08292-PWR	Air compressor nozzle with extension, 18" length	1
	STD. WIRE BRUSHES FOR LARGE DIAMETER HOLES	
08299-PWR	Std. Wire brush for 1-3/4" ANSI hole, 11" length	1
08271-PWR	Std. Wire brush for 2" ANSI hole, 11" length	1
08272-PWR	Std. Wire brush for 2-3/16" ANSI hole, 11" length	1
08282-PWR	Std. steel brush extension, 12" length	1
08283-PWR	SDS-Plus adaptor for Std. steel brushes	1

PISTON PLUGS FOR POST-INSTALLED REBAR CONNECTIONS

CAT. NO.	DESCRIPTION	ANSI DRILL BIT DIA.	PACK QTY.
PFC1691510	5/8" Plug	5/8"	1
PFC1691515	11/16" Plug	11/16"	1
PFC1691520	3/4" Plug	3/4"	1
PFC1691530	7/8" Plug	7/8"	1
PFC1691540	1" Plug	1"	1
PFC1691550	1-1/8" Plug	1-1/8"	1
PFC1691555	1-1/4" Plug	1-1/4"	1
PFC1691560	1-3/8" Plug	1-3/8"	1
PFC1691570	1-1/2" Plug	1-1/2"	1
PFC1691580	1-3/4" Plug	1-3/4"	1
PFC1691590	2" Plug	2"	1
PFC1691600	2-3/16" Plug	2-3/16"	1

GENERAL INFORMATION

PURE220+™

Epoxy Injection Adhesive Anchoring System and Post-Installed Reinforcing Bar Connections

PRODUCT DESCRIPTION

The Pure220+ is a two-component, ultra high strength adhesive anchoring system. The system includes injection adhesive in plastic cartridges, mixing nozzles, dispensing tools and hole cleaning equipment. Pure220+ is designed for bonding threaded rod and reinforcing bar hardware into drilled holes in concrete base materials and for post-installed reinforcing bar connections (rebar development). It can also be considered for anchor bolt repairs, filling abandoned holes and large cracks.

GENERAL APPLICATIONS AND USES

- Bonding threaded rod and reinforcing bar into hardened concrete
- Rebar development length and lap splice connections in concrete up to 60d embedments
- Evaluated for installation and use in dry and wet holes, including water-filled and submerged
- Can be installed in a broad range of base material temperatures with excellent working times
- Cracked and uncracked concrete conditions as well as wind and seismic loading (SDC A - F)

FEATURES AND BENEFITS

+ Suitable for use in hammer-drilled holes and core-drilled holes
+ Can be considered for oversized holes in concrete (see www.DEWALT.com)
+ Smooth paste formula allows for easier dispensing and very good flow rates
+ Standard curing system which offers excellent working times even in warm temperatures
+ Cartridge design allows for multiple uses using extra mixing nozzles
+ Mixing nozzles proportion adhesive and provide simple delivery method into drilled holes
+ Evaluated and recognized for freeze/thaw performance and sustained loading
+ Evaluated and recognized for long term and short term loading (see performance tables)
+ Outstanding bond strengths and performance data including at elevated temperatures
+ In-service temperature ratings between -40ºF (-40ºC) and 176ºF (80ºC)

APPROVALS AND LISTINGS

- International Code Council, Evaluation Service (ICC-ES) ESR-5144 for cracked and uncracked concrete
- Code Compliant with 2024 IBC/IRC, and 2021 IBC/IRC, 2018 IBC/IRC, and 2015 IBC/IRC
- Tested in accordance with ACI 355.4/ASTM E488, and ICC-ES AC308 for use in structural concrete with design according to ACI 318 (-19 & -14) Chapter 17 and ACI 318 Appendix D
- Tested and qualified for use in post-installed reinforcing bar connections including rebar development and lap splices in accordance with ICC-ES AC308, Table 3.8 and ACI 318 Chapter 12 and Chapter 25
- Evaluated and qualified by an accredited independent testing laboratory for recognition in cracked and uncracked concrete including static, wind and seismic loading
- Tested in accordance with ICC-ES AC308 for bond strength vs temperature for post-installed reinforcing bar applications subject to fire (within ESR-5144)
- City of Los Angeles, LABC and LARC Supplement (within ESR-5144)
- Florida Building Code, FBC Supplement including HVHZ (within ESR-5144)
- Compliant with NSF/ANSI/CAN 61 for drinking water system components - health effects Also classified as lead free in accordance with NSF/ANSI/CAN 372
- Compliant to California DPH for VOC emissions and South Coast AQMD for VOC content (LEED v4.1)
- Conforms to requirements of ASTM C881 including C882 and AASHTO M235, Types I, II, IV and V, Grade 3, Classes B & C
- Department of Transportation listings – see www.DEWALT.com or contact transportation agency

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchors, 04 05 19.16 Masonry Anchors and 05 05 19 Post-Installed Concrete Anchors. Adhesive anchoring system shall be Pure220+ as supplied by DEWALT, Towson, MD. Anchors shall be installed in accordance with published instructions and requirements of the Authority Having Jurisdiction.

SECTION CONTENTS

PURE220+ ADHESIVE IN CARTRIDGE
(STANDARD THREADED ROD AND REBAR STEEL SUPPLIED BY OTHERS)

PACKAGING (1:1 MIX RATIO)

Coaxial Cartridge

- 9.5 fl. oz. (280 ml or 17 in³)

Dual Cartridge (side-by-side)

- 20.5 fl. oz. (610 ml or 37 in³)

STORAGE LIFE & CONDITIONS

Coaxial and dual cartridges: Two years
Store in a dry, dark environment with temperature ranging from 41°F to 95°F (5°C to 35°C)

ANCHOR SIZE RANGE (TYPICAL)

- 3/8" to 1-1/4" diameter threaded rod
- No. 3 to No. 11 reinforcing bar (rebar)

SUITABLE BASE MATERIALS

- Normal-weight concrete
- Lightweight concrete
- Grouted Concrete Masonry

PERMISSIBLE INSTALLATION CONDITIONS (ADHESIVE)

- Dry concrete
- Water-saturated concrete (wet)
- Water-filled holes (flooded)
- Underwater concrete (submerged)

CODE LISTED
ICC-ES ESR-5144
CONCRETE

DDA DEWALT DESIGN ASSIST
DUST X+ ANCHOR INSTALLATION SYSTEM

INSTALLATION SPECIFICATIONS

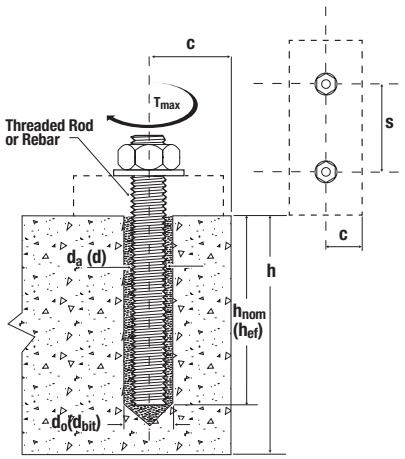
Installation Specifications for Threaded Rod and Reinforcing Bar[6]

Parameter	Symbol	Units	Fractional Nominal Rod Diameter (Inch) / Reinforcing Bar Size (No.)											
			3/8	#3	1/2	#4	5/8	#5	3/4 or #6	7/8 or #7	1 or #8	#9	1-1/4	#10
Threaded rod outside diameter	d_a (d)	inch (mm)	0.375 (9.5)		0.500 (12.7)		0.625 (15.9)		0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	-	1.250 (31.8)	-
Rebar nominal outside diameter	d_a (d)	inch (mm)	0.375 (9.5)		0.500 (12.7)		0.625 (15.9)		0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.125 (28.7)	-	1.250 (31.8)
Nominal drill bit (ANSI) / core bit diameter	d_o (d_{bit})	inch	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1	1-1/8	1-3/8	1-3/8	1-1/2
Minimum embedment[1,2]	$h_{ef,min}$	inch (mm)	2-3/8 (60)		2-3/4 (70)		3-1/8 (79)		3-1/2 (89)	3-1/2 (89)	4 (102)	4-1/2 (114)	5 (127)	5 (127)
Maximum embedment[1,2]	$h_{ef,max}$	inch (mm)	7-1/2 (191)		10 (254)		12-1/2 (318)		15 (381)	17-1/2 (445)	20 (508)	22-1/2 (572)	25 (635)	25 (635)
Minimum member thickness	h_{min}	inch (mm)	h_{ef} + 1-1/4 (h_{ef} + 30)				h_{ef} + $2d_o$							
Minimum anchor spacing	s_{min}	inch (mm)	1-7/8 (48)		2-3/8 (60)		3 (77)		3-3/4 (95)	4-1/4 (108)	4-3/4 (121)	5-1/4 (135)	5-7/8 (149)	6-1/4 (149)
Minimum edge distance (up to 100% T_{max})	c_{min}	inch (mm)	1-5/8 (41)		1-3/4 (44)		2 (51)		2-3/8 (60)	2-1/2 (64)	2-3/4 (70)	3 (76)	3-1/4 (82)	3-1/4 (82)
Max. torque[3]	T_{max}	ft-lbs (N-m)	20 [4] (27)		30 (41)		45 (61)		65 (88)	95 (129)	145 (197)	220 (298)	280 (380)	280 (380)
Min. edge distance, reduced[4] with up to (45% T_{max})	$c_{min,red}$	inch (mm)	-		-		1-3/4 (45)		1-3/4 (45)	1-3/4 (45)	1-3/4 (45)	2-3/4 (70)	2-3/4 (70)	2-3/4 (70)

For pound-inch units: 1 mm = 0.03937 inch, 1 N-m = 0.7375 ft-lbf. For SI: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m.

1. Embedment range qualified for use with the anchoring design provisions of ACI 318 (-19 & -14) or ACI 318 Appendix D as applicable, ICC-ES AC308, Section 4.2 and ESR-5144.
2. For rebar development lengths with embedments up to 60d, see the table for Installation Parameters for Common Post-installed Reinforcing Bar Connections.
3. Torque may not be applied to the anchors until the full cure time of the adhesive has been achieved.
4. Max. torque is 11 ft-lbs (15 N-m) for ASTM A36 / F1554 Grade 36 carbon steel threaded rods and ASTM A193 Grade B8/B8M (Class 1) stainless steel threaded rods.
5. For installations below the minimum edge distance, c_{min}, down to the reduced minimum edge distance, $c_{min,red}$, the reduced maximum torque is 0.45*T_{max}. The minimum anchor spacing, s_{min} is 5d_a.
6. Contact DEWALT for guidance on anchor diameters or hole sizes not included in this documentation.

Detail of Steel Hardware Elements used with Injection Adhesive System



Nomenclature

d_a (d) = Diameter of anchor
d_o (d_{bit}) = Diameter of drilled hole
h = Base material thickness
h_{nom} (h_{ef}) = Embedment depth
s = Spacing of anchors
c = Edge distance
T_{max} = Maximum torque

Threaded Rod and Deformed Reinforcing Bar Material Properties

Steel Description (General)	Steel Specification (ASTM)	Nominal Anchor Size (inch/No.)	Minimum Yield Strength, f_y (psi)	Minimum Ultimate Strength, f_u (psi)
Carbon rod	A36 or F1554 Grade 36	3/8 through 1-1/4	36,000	58,000
	F1554 Grade 55		55,000	75,000
	A449	3/8 through 1	92,000	120,000
		1-1/4	81,000	105,000
	A193, Grade B7 or F1554 Grade 105	3/8 through 1-1/4	105,000	125,000
	F568M Class 5.8	3/4 through 1	58,000	72,500
Stainless rod	F593 Condition CW	3/8 through 5/8	65,000	100,000
		3/4 through 1-1/4	45,000	85,000
	A193/193M Grade B8/B8M, Class 1	3/8 through 1-1/4	30,000	75,000
	A193/A193M Grade B8/B8M2, Class 2B	3/8 through 1-1/4	75,000	95,000
Reinforcing Bar	A615, Grade 40	#3 through #6	40,000	60,000
	A615, Grade 60	#3 through #10	60,000	90,000
	A706, Grade 60		60,000	80,000
	A615, Grade 75	#3 through #10	75,000	100,000
	A615/A706, Grade 80	#3 through #10	80,000	100,000

Tabulated material properties are provided for reference; other steel hardware elements and sizes may also be considered. Reinforcing bars typically are bare, zinc coated or galvanized in accordance with ASTM A767.

MATERIAL SPECIFICATIONS

Pure220+ is a high strength, non-sag, non-shrink, 100% solids epoxy adhesive. The formula does not contain styrene or solvents.

Pure220+ conforms to requirements of ASTM C881 and AASHTO M235, Types I, II, IV and V, Grade 3, Classes B & C (also meets Type III except for elongation).

Properties of Cured Adhesive

Property (Standard)		Units	Value
Consistency (ASTM C881)		Non-sag (Grade 3)	
Compressive Yield Strength @ 7 days (ASTM D695)		psi	11,755
Compressive Modulus (ASTM C881)		psi	1,790,430
Tensile Strength @ 7 days (ASTM D638)		psi	2,360
Tensile Elongation @ 7 days (ASTM D639)		%	0.10
Water Absorption, 24 hours (ASTM D570)		%	0.11
Bond Strength (ASTM C882)	2 days (moist cure)	psi	2,460
	14 days (moist cure)	psi	2,945
Linear Coefficient of Shrinkage on Cure (ASTM C881)		in./in.	.001
Heat Deflection Temperature @7 days (ASTM C881)		ºF	138
Shore D Hardness (DIN EN ISO 868)		-	88
Gel time (ASTM C881)	@ 50ºF	minutes (minimum)	160
	@ 70ºF		30
Electrical resistance, specific surface resistance (IEC 93)		Ω	2.0×10^{15}
Electrical resistance, specific flow resistance (IEC 93)		Ω cm	1.6×10^{15}
Thermal Compatibility (ASTM C884)		Pass (no cracking or delamination)	

*There is no requirement in ASTM C881 and AASHTO M235 for viscosity, tensile strength or tensile elongation of Grade 3 products.

Where ASTM C881 specifically referenced, the tests were also conducted in accordance with AASHTO M235.

Gel (working) Time and Curing Table

Temperature of base material	Maximum working time	Initial curing time[1]	Full curing time
41°F (5°C) to 49°F (9°C)	80 minutes	24 hours	48 hours
50°F (10°C) to 58°F (14°C)	60 minutes	15 hours	30 hours
59°F (15°C) to 67°F (19°C)	40 minutes	10 hours	20 hours
68°F (20°C) to 76°F (24°C)	30 minutes	5 hours	11 hours
77°F (25°C) to 85°F (29°C)	12 minutes	4 hours	9 hours
86°F (30°C) to 103°F (39°C)	8 minutes	3 hours	6 hours
104°F (40°C) to 109°F (42°C)	6 minutes	2 hours	4 hours
110°F (43°C)	5 minutes	2 hours	4 hours

Cartridge temperature must be between 41ºF (5ºC) and 104ºF (40ºC).

1. Initial cure times are for post-installed rebar applications only. After the initial curing time, the installation of connecting reinforcements and formwork attachments is permitted for post-installed rebar applications.

Chemical Resistance

Chemical Agent	Concentration %	Resistant	Not Resistant
Accumulator acid			•
Acetic acid	10		•
Acetic acid	40		•
Laitance		•	
Acetone	5		•
Acetone	10		•
Acetone	100		•
Ammonia, aqueous solution	5	•	
Ammonia, aqueous solution	32		•
Aniline	100		•
Beer	100	•	
Benzyl alcohol	100		•
Chlorine	all	•	
Phosphoric acid	85	•	
Boric acid, aqueous solution		•	
Calcium carbonate, suspended in water	all	•	
Calcium chloride, suspended in water		•	
Calcium hydroxide, suspended in water		•	
Chlorinated lime (calcium hypochlorite)	10		•
Carbon tetrachloride	100	•	
Caustic soda solution	10	•	
Caustic soda solution	40	•	
Citric acid	10		•
Citric acid	50		•
Citric acid	all	•	
Chlorine water, swimming pool	all		•
Demineralized water	all		•
Diesel oil	100	•	
Ethyl alcohol, aqueous solution	100		•
Ethyl alcohol, aqueous solution	50		•
Formic acid	10	•	
Formic acid	30		•
Formic acid	100		•
Formaldehyde, aqueous solution	20	•	
Formaldehyde, aqueous solution	30	•	
Freon		•	
Fuel oil		•	
Gasoline (premium grade)	100	•	
Glycol (ethylene glycol)		•	
Hydraulic fluid	conc.		•
Hydrochloric acid (muriatic acid)	conc.		•
Hydrogen peroxide	10		•
Hydrogen peroxide	30		•
Isopropyi alcohol	100		•
Kerosene (jet fuel)	100	•	
Lactic acid	10		•
Lactic acid	all		•
Linseed oil	100	•	
Lubricating oil	100	•	
Magnesium chloride, aqueous solution	all	•	
Methanol	100		•
Standard benzine			•
Motor oil (SAE 20 W-50)	100	•	
Nitric acid	10		•
Oleic acid	100	•	
Perchloroethylene	100	•	
Petroleum	100	•	
Phenol, aqueous solution	8		•
Phosphoric acid	10	•	
Potash lye (potassium hydroxide)	10	•	
Potash lye (potassium hydroxide)	40	•	
Potassium carbonate, aqueous solution	all	•	
Potassium chlorite, aqueous solution	all	•	
Potassium nitrate, aqueous solution	all	•	
Sodium carbonate	all	•	
Sodium chloride, aqueous solution	all	•	
Sodium phosphate, aqueous solution	all	•	
Sodium silicate	all	•	
Sulfuric acid	10		•
Sulfuric acid	30		•
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 fully cured adhesive (e.g. temporary contact with the adhesive during a spill).