

2.1 VOC Corrosion Resistant Epoxy Primers

CRE-X21 Series Primers

CRE-121	White Epoxy Primer
CRE-321	Gray Epoxy Primer
CRE-921	Black Epoxy Primer
CRE-2xx	Tintable*

The CRE-X21 Series Primers provide a range of performance features that include excellent adhesion and chemical resistance and outstanding corrosion protection when applied over properly prepared steel and aluminum.

At 2.1 lbs/gal VOC as blended or when further reduced with exempt solvents, this series is lead and chrome-free and offers high build properties. Its excellent sag resistance and fill properties make this primer well suited for application over a sandblasted profile.

Note: For acceptable compatibility between this primer and CPC topcoats please see the CPC Primer/Topcoat compatibility chart (CPCTB01).

Features and Benefits:

- Capable of high film build
- Provide excellent adhesion
- Provide strong corrosion and chemical resistance
- Are plural component capable
- CRE standard primers can be intermixed
- *Tintable version is tinted with 7 ounces of H series tints to create custom colors.
- May be used over ZNP Series zinc rich primers

Associated Products:

- CRE-121 2.1 VOC White Epoxy Primer
- CRE-321 2.1 VOC Gray Epoxy Primer
- CRE-921 2.1 VOC Black Epoxy Primer
- CRE-2xx 2.1 VOC Tintable Epoxy Primer
- CRE-211H Catalyst for CRE-X21 Primers
- Exempt Solvent: Q30 - Acetone
- Non-Exempt Solvents*: Q50 - Aromatic 100, Q60 - MEK, Q70 - MAK, Q80 - Xylene, Q160 - Aromatic 150
- * Addition results in VOC greater than 2.1 lbs/gal

Physical Constants: All values are theoretical, depend on color and are Ready-to-Spray. Actual values could vary slightly due to manufacturing variability

	CRE-X21 or CRE-2xx w/tint	CRE-X21 or CRE-2xx w/tint : CRE-211H	CRE-X21 or CRE-2xx w/tint : CRE-211H : Q30	CRE-X21 or CRE-2xx w/tint : CRE-211H : Q50, Q60, Q70, Q80, Q160
Percent solids (by weight)	66.6 – 70.0	70.2 – 72.6	63.5 – 66.0	62.8 – 65.9
Percent solids (by volume)	53.4 – 56.5	60.7 – 62.8	52.0 – 53.8	52.0 – 53.8
HAPs (lbs/gallon of product)	≤ 1.1	≤ 1.0	≤ 1.0	≤ 1.9
Photo-chemically reactive	Yes	Yes	Yes	Yes
RTS Combinations:	CRE-X21 (Package) or CRE-2xx w/ tint	CRE-X21 or CRE-2xx w/tint : CRE-211H	CRE-X21 or CRE-2xx w/tint : CRE-211H : Q30	CRE-X21 or CRE-2xx w/tint : CRE-211H : Q60
Volume Ratio:	As is	2 : 1	2 : 1 : 1/2	2 : 1 : 1/2
Applicable Use Category	Primer	Primer	Primer	Primer
VOC Actual	194 – 222 g/L 1.62 – 1.85 lbs/gal	197 – 216 g/L 1.65 – 1.80 lbs/gal	169 – 185 g/L 1.42 – 1.55 lbs/gal	284 – 312 g/L 2.38 – 2.61 lbs/gal
VOC Regulatory (less water less exempt)	244 – 277 g/L 2.04 – 2.31	229 – 249 g/L 1.91 – 2.08	229 – 249 g/L 1.91 – 2.08	321 – 352 g/L 2.68 – 2.94
Density	1372 – 1461 g/L 11.45 - 12.19 lbs/gal	1255 – 1315 g/L 10.47 – 10.97 lbs/gal	1188 – 1239 g/L 9.91 – 10.34 lbs/gal	1190 – 1253 g/L 9.93 – 10.46 lbs/gal
Volatiles wt. %	30.0 – 33.4	27.4 – 29.8	34.0 – 36.4	34.1 – 37.2
Water wt. %	0.3 – 0.8	0.2 – 0.6	0.2 – 0.6	0.2 – 0.6
Exempt wt. %	15.4 – 17.8	11.4 – 13.0	19.5 – 21.1	10.2 – 11.8
Water vol. %	0.4 – 1.2	0.3 – 0.8	0.3 – 0.7	0.2 – 0.7
Exempt vol. %	17.3 – 20.8	11.5 – 13.8	24.1 – 26.1	9.9 – 11.9

Flashpoint:	CRE-121 = 65°F (18°C)	CRE-2xx = 65°F (18°C)	Q30 = 4°F (-6°C)	Q50 = 106°F (41°C)
	CRE-321 = 65°F (18°C)	CRE-211H = 59°F (15°C)	Q60 = 21°F (6°C)	Q70 = 102°F (39°C)
	CRE-921 = 65°F (18°C)		Q80 = 81°F (27°C)	Q160 = 145°F (63°C)

CRE-X21 Series Primers

Directions for Use

Substrate Preparation:

The surface to be coated must be abraded or sandblasted and free of all contamination (including dust, dirt, oil, grease and oxidation). A chemical treatment (or conversion coating) will improve adhesion and performance properties of the finished coat. Variability can occur with substrates, preparation, application method or environment. We recommend that adhesion and system compatibility be checked prior to full application.

Substrate	Direct to Substrate	Substrate	Direct to Substrate
Cold Rolled Steel	Excellent	Galvanized	Excellent
Hot Rolled Steel	Excellent	Aluminum	Excellent
Stainless Steel	Excellent	Plastic / Fiberglass	Surface should be free of all contamination. Because of the variability of plastic/fiberglass substrates, coating performance should be confirmed on the actual plastic/fiberglass substrate being used.
Galvaneal	Excellent		

* It is recommended that the substrate be cleaned with SSPC-SPC2 Hand Tool or SSPC-SPC3 Power Tool clean Minimum. For best performance, a minimum blast of SSPC-SP6 (NACE#3), Commercial Blast Cleaning is recommended.

Mix Directions:



Mix Directions

Thoroughly agitate component A on mechanical shaker prior to mixing. Stir thoroughly before and occasionally during use.

Thinning:

To maintain 2.1 VOC, Q30 (Acetone) or other exempt solvents may be used. To achieve 2.8 VOC, 1/2 part of Non-Exempt Solvent may be used. When applying with airless equipment reduction may not be necessary.



Blend Ratio

CRE-X21 : CRE-211H : Optional Regular or Exempt Solvent
2 : 1 : 1/2



Pot Life @ 77°F (25°C):

2 hours when reduced with any approved exempt or non-exempt solvent

Spray Viscosity Range:

#3 Zahn = 10 – 20 seconds

Shelf Life: (each component unopened)

CRE-X21 - 4 years in gallon containers, 2 years in 5-gallon containers
CRE-211H Catalyst - 2 years

Application Equipment:



Conventional (with or without pressure pot):

1.4 – 1.8 mm needle/nozzle with 50 – 70 psi at the gun

HVLP (with or without pressure pot):

1.3 – 1.6 mm needle/nozzle with 10 psi at cap or per manufacturer

Airless:

0.013 – 0.017 tip with a fluid pressure of 2000 – 2400 psi

Air-Assisted Airless:

0.013 – 0.017 tip with a fluid pressure of 1520 – 1800 psi with 25 – 30 psi air pressure

Brush or Roll:

Apply blended CRE-2XX and CRE-X21 using a high quality natural bristle brush or with a 3/8 solvent resistant nap roller, rolling in one direction. CRE may be reduced 10 – 15% with the slower evaporating Q-code solvents for ease of leveling and flow. * Use of these solvents will result in a blended VOC greater than 2.1 lbs/gal.

Electrostatic:

Minimum 1.5 mm tip with recommended reduction ratio using Q30, Q60 or Q70 solvent.

Application:



Apply:

1 – 2 wet coats with a 10 – 15 minute flash between coats. Apply only when air, product and surface temperatures are above 60°F (16°C) and when surface temperature is at least 5°F (3°C) above the dew point.

Recommended Total Wet Film Build:

CRE-X21 : CRE-211H CRE-X21 : CRE-211H : Exempt Solvent

3 – 13 mils

4 – 15 mils

Recommended Total Dry Film Build:

2 – 8 mils

2 – 8 mils

Square Foot Coverage @ 1mil no loss:

973 – 1007 sq. ft. (dependent on color)

834 – 863 sq. ft. (dependent on color)

Dry Times:



Air Dry @ 77°F (25°C) 50% RH*:

To Touch 90 – 120 minutes

To Handle 2 – 3 hours*

To Recoat 1 hour – 4 days. After 4 days the primer must be sanded before recoating.

To Topcoat 1 hour – 4 days. Medium to full wet coats should be applied.

After 4 days, the primer must be sanded before topcoating.

This CRE primer may be recoated with itself up to 2 weeks after initial application without sanding as long as the primer remains free of contaminants. Primed surface may be cleaned with an appropriate CFX cleaner if necessary before topcoating.

Force Dry @ 140°F (60°C): 40 minutes at 140°F (60°C) after 15 minute flash at 77°F (25°C)

* Paint film is not fully cured for 7 days. Drying time varies, depending upon film build, color selection, temperature, humidity and degree of air movement.

CRE-X21 Series Primers

Technical Data*

Performance Properties: In Service Temperature Limit

Complete paint system, including appropriate topcoat, dry temperature limit = 300°F. (149°C).
If the in-service part has primer only, the color of the primer will change as you approach 300°F. Primer integrity will be maintained up to 300°F. If the primed part has been exposed to elevated temperatures for any extended period of time, the part must be cleaned and sanded prior to topcoating.

Technical Properties:

BONDERITE® 1000
CRE-321
No Topcoat

Test	ASTM Method	Results
Pencil Hardness	D3363	F
Adhesion	D3359	5B
Chip Resistance	D3170	6

Chemical Resistance:

Bonderite 1000
CRE-321
No Topcoat

Chemical	ASTM Method	Result
Toluene	D1308	Very Slight Ring
10% NaOH (Sodium Hydroxide)	D1308	Pass
10% HCl (Hydrochloric acid)	D1308	Slight gloss loss
10% H ₂ SO ₄ (Sulphuric acid)	D1308	Moderate gloss loss
Gasoline	D1308	Pass
Isopropanol	D1308	Pass
Water**	D1308	Pass

** Although resistant to intermittent exposure, this product is not recommended for immersion.

Weather Resistance:

Salt Spray System:
Blasted Hot Rolled Steel
CRE-321
AUE-300 Urethane

	ASTM Method	Result
Salt Spray – 1000 hours	B117	
Corrosion Creep***	D1654	9A
Scribe Blisters	D714	4F
Face Blisters	D714	None

*** Results based upon 4 – 5 mils DFT.

Humidity System:
Bonderite 1000
CRE-321
AUE-300 Urethane

	ASTM Method	Result
Humidity – 100 hours	D2247	
5 Minute Recovery Adhesion	D3359	5B
1 Hour Recovery Adhesion	D3359	5B
24 Hour Recovery Adhesion	D3359	5B

All tests results assume proper cure and preparation of test substrates. Unless otherwise stated, all results were obtained spraying product direct to metal on Bonderite 1000.

* The application and performance property data above are believed to be reliable based on laboratory findings. It is for the buyer to satisfy itself on the suitability of the product for its particular use. Variation in environment, procedures of use, or extrapolation of data may cause unsatisfactory results.

CRE-X21 Series Primers

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Resistant Epoxy Primers**

Health and Safety:



Please refer to Material Data Safety Sheets (MSDS) for full health safety details and storage regulations.

See Material Safety Data Sheet and Labels for additional safety information and handling instructions.

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Note: For acceptable compatibility between this primer and CPC topcoats please see the CPC Primer/Topcoat compatibility chart (CPCTB01).

Features and Benefits:

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- Provide excellent adhesion
- Provide strong corrosion and chemical resistance
- Are plural component capable
- CRE standard primers can be intermixed
- *Tintable version is tinted with 7 ounces of H series tints to create custom colors.
- May be used over ZNP Series zinc rich primers

Associated Products:

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- CRE-2xx 2.1 VOC Tintable Epoxy Primer
- CRE-211H Catalyst for CRE-X21 Primers
- Exempt Solvent: Q30 - Acetone
- Non-Exempt Solvents*: Q50 - Aromatic 100, Q60 - MEK, Q70 - MAK, Q80 - Xylene, Q160 - Aromatic 150
- * Addition results in VOC greater than 2.1 lbs/gal

Physical Constants: All values are theoretical, depend on color and are Ready-to-Spray. Actual values could vary slightly due to manufacturing variability

	CRE-X21 or CRE-2xx w/tint	CRE-X21 or CRE-2xx w/tint : CRE-211H	CRE-X21 or CRE-2xx w/tint : CRE-211H : Q30	CRE-X21 or CRE-2xx w/tint : CRE-211H : Q50, Q60, Q70, Q80, Q160
Percent solids (by weight)	66.6 – 70.0	70.2 – 72.6	63.5 – 66.0	62.8 – 65.9
Percent solids (by volume)	53.4 – 56.5	60.7 – 62.8	52.0 – 53.8	52.0 – 53.8
HAPs (lbs/gallon of product)	≤ 1.1	≤ 1.0	≤ 1.0	≤ 1.9
Photo-chemically reactive	Yes	Yes	Yes	Yes
RTS Combinations:	CRE-X21 (Package) or CRE-2xx w/ tint	CRE-X21 or CRE-2xx w/tint : CRE-211H	CRE-X21 or CRE-2xx w/tint : CRE-211H : Q30	CRE-X21 or CRE-2xx w/tint : CRE-211H : Q60
Volume Ratio:	As is	2 : 1	2 : 1 : 1/2	2 : 1 : 1/2
Applicable Use Category	Primer	Primer	Primer	Primer
VOC Actual	194 – 222 g/L 1.62 – 1.85 lbs/gal	197 – 216 g/L 1.65 – 1.80 lbs/gal	169 – 185 g/L 1.42 – 1.55 lbs/gal	284 – 312 g/L 2.38 – 2.61 lbs/gal
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Density	1372 – 1461 g/L 11.45 – 12.19 lbs/gal	1255 – 1315 g/L 10.47 – 10.97 lbs/gal	1188 – 1239 g/L 9.91 – 10.34 lbs/gal	1190 – 1253 g/L 9.93 – 10.46 lbs/gal
Volatiles wt. %	30.0 – 33.4	27.4 – 29.8	34.0 – 36.4	34.1 – 37.2
Water wt. %	0.3 – 0.8	0.2 – 0.6	0.2 – 0.6	0.2 – 0.6
Exempt wt. %	15.4 – 17.8	11.4 – 13.0	19.5 – 21.1	10.2 – 11.8
Water vol. %	0.4 – 1.2	0.3 – 0.8	0.3 – 0.7	0.2 – 0.7
Exempt vol. %	17.3 – 20.8	11.5 – 13.8	24.1 – 26.1	9.9 – 11.9
Flashpoint:	CRE-121 = 65°F (18°C) CRE-321 = 65°F (18°C) CRE-921 = 65°F (18°C)	CRE-2xx = 65°F (18°C) CRE-211H = 59°F (15°C)	Q30 = 4°F (-6°C) Q60 = 21°F (6°C) Q80 = 81°F (27°C)	Q50 = 106°F (41°C) Q70 = 102°F (39°C) Q160 = 145°F (63°C)

CRE-X21 Series Primers

Directions for Use

Substrate Preparation:

The surface to be coated must be abraded or sandblasted and free of all contamination (including dust, dirt, oil, grease and oxidation). A chemical treatment (or conversion coating) will improve adhesion and performance properties of the finished coat. Variability can occur with substrates, preparation, application method or environment. We recommend that adhesion and system compatibility be checked prior to full application.

Substrate	Direct to Substrate	Substrate	Direct to Substrate
Cold Rolled Steel	Excellent	Galvanized	Excellent
Hot Rolled Steel	Excellent	Aluminum	Excellent
Stainless Steel	Excellent	Plastic / Fiberglass	Surface should be free of all contamination. Because of the variability of plastic/fiberglass substrates, coating performance should be confirmed on the actual plastic/fiberglass substrate being used.
Galvaneal	Excellent		

* It is recommended that the substrate be cleaned with SSPC-SPC2 Hand Tool or SSPC-SPC3 Power Tool clean Minimum. For best performance, a minimum blast of SSPC-SP6 (NACE#3), Commercial Blast Cleaning is recommended.

Mix Directions:



Mix Directions

Thoroughly agitate component A on mechanical shaker prior to mixing. Stir thoroughly before and occasionally during use.



Thinning:

To maintain 2.1 VOC, Q30 (Acetone) or other exempt solvents may be used. To achieve 2.8 VOC, 1/2 part of Non-Exempt Solvent may be used. When applying with airless equipment reduction may not be necessary.



Blend Ratio

CRE-X21 : CRE-211H : Optional Regular or Exempt Solvent
2 : 1 : 1/2

Pot Life @ 77°F (25°C):

2 hours when reduced with any approved exempt or non-exempt solvent

Spray Viscosity Range:

#3 Zahn = 10 – 20 seconds

Shelf Life: (each component unopened)

CRE-X21- 4 years in gallon containers, 2 years in 5-gallon containers
CRE-211H Catalyst - 2 years

Application Equipment:



Conventional (with or without pressure pot):

1.4 – 1.8 mm needle/nozzle with 50 – 70 psi at the gun

HVLP (with or without pressure pot):

1.3 – 1.6 mm needle/nozzle with 10 psi at cap or per manufacturer

Airless:

0.013 – 0.017 tip with a fluid pressure of 2000 – 2400 psi

Air-Assisted Airless:

0.013 – 0.017 tip with a fluid pressure of 1520 – 1800 psi with 25 – 30 psi air pressure

Brush or Roll:

Apply blended CRE-2XX and CRE-X21 using a high quality natural bristle brush or with a 3/8 solvent resistant nap roller, rolling in one direction. CRE may be reduced 10 – 15% with the slower evaporating Q-code solvents for ease of leveling and flow. * Use of these solvents will result in a blended VOC greater than 2.1 lbs/gal.

Electrostatic:

Minimum 1.5 mm tip with recommended reduction ratio using Q30, Q60 or Q70 solvent.

Application:



Apply:

1 – 2 wet coats with a 10 – 15 minute flash between coats. Apply only when air, product and surface temperatures are above 60°F (16°C) and when surface temperature is at least 5°F (3°C) above the dew point.

Recommended Total Wet Film Build:

CRE-X21 : CRE-211H CRE-X21 : CRE-211H : Exempt Solvent

3 – 13 mils

4 – 15 mils

Recommended Total Dry Film Build:

2 – 8 mils

2 – 8 mils

Square Foot Coverage @ 1mil no loss:

973 – 1007 sq. ft. (dependent on color)

834 – 863 sq. ft. (dependent on color)

Dry Times:



Air Dry @ 77°F (25°C) 50% RH*:

To Touch 90 – 120 minutes

To Handle 2 – 3 hours*

To Recoat 1 hour – 4 days. After 4 days the primer must be sanded before recoating.

To Topcoat 1 hour – 4 days. Medium to full wet coats should be applied.

After 4 days, the primer must be sanded before topcoating. This CRE primer may be recoated with itself up to 2 weeks after initial application without sanding as long as the primer remains free of contaminants. Primed surface may be cleaned with an appropriate CFX cleaner if necessary before topcoating.

Force Dry @ 140°F (60°C): 40 minutes at 140°F (60°C) after 15 minute flash at 77°F (25°C)

* Paint film is not fully cured for 7 days. Drying time varies, depending upon film build, color selection, temperature, humidity and degree of air movement.

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Technical Data*

Performance Properties: In Service Temperature Limit

Complete paint system, including appropriate topcoat, dry temperature limit = 300°F. (149°C).
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Technical Properties:

BONDERITE® 1000
CRE-321
No Topcoat

Test	ASTM Method	Results
Pencil Hardness	D3363	F
Adhesion	D3359	5B
Chip Resistance	D3170	6

Chemical Resistance:

Bonderite 1000
CRE-321
No Topcoat

Chemical	ASTM Method	Result
Toluene	D1308	Very Slight Ring
10% NaOH (Sodium Hydroxide)	D1308	Pass
10% HCl (Hydrochloric acid)	D1308	Slight gloss loss
10% H ₂ SO ₄ (Sulphuric acid)	D1308	Moderate gloss loss
Gasoline	D1308	Pass
Isopropanol	D1308	Pass
Water**	D1308	Pass

** Although resistant to intermittent exposure, this product is not recommended for immersion.

Weather Resistance:

Salt Spray System:
Blasted Hot Rolled Steel
CRE-321
AUE-300 Urethane

	ASTM Method	Result
Salt Spray – 1000 hours	B117	
Corrosion Creep***	D1654	9A
Scribe Blisters	D714	4F
Face Blisters	D714	None

*** Results based upon 4 – 5 mils DFT.

Humidity System:
Bonderite 1000
CRE-321
AUE-300 Urethane

	ASTM Method	Result
Humidity – 100 hours	D2247	
5 Minute Recovery Adhesion	D3359	5B
1 Hour Recovery Adhesion	D3359	5B
24 Hour Recovery Adhesion	D3359	5B

All tests results assume proper cure and preparation of test substrates. Unless otherwise stated, all results were obtained spraying product direct to metal on Bonderite 1000.

* The application and performance property data above are believed to be reliable based on laboratory findings. It is for the buyer to satisfy itself on the suitability of the product for its particular use. Variation in environment, procedures of use, or extrapolation of data may cause unsatisfactory results.

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