# R-65/F1



Pipeline Repair

Rehabilitation

Pipe Bends, Fittings, Valves, Odd Shapes



www.berrycpg.com







# Fast Cure Liquid Epoxy Coating R-65/F1 Pipeline Rehabilitation and Girth Weld Coating



#### **Product Features & Benefits**

#### **Product Description**

**Powercrete R-65/F1** is a 100% solids liquid epoxy coating with a fast cure time for efficient, user-friendly application and rapid backfill. In addition to ease of application, R65/F1 provides excellent long term corrosion protection for bare steel or FBE coated pipe. This high-build, two-component epoxy can easily achieve a dry film thickness (DFT) of up to 40+ mils (1 mm) in a single application.

Powercrete R-65/F1 can be applied using plural component spray equipment or by hand brush, roller or trowel. Powercrete R-65/F1's unique combination of handling and performance characteristics make it the ideal coating for pipes, girth welds and/or the repair & rehabilitation of existing pipelines.

<ul> <li>100% Solids Epoxy: no V.O.C.s / no Isocyanates</li></ul>	<ul> <li>High Adhesion and Abrasion Resistance</li></ul>
Safe to use. <li>Super Fast Cure Time</li>	Superior performance for superior asset protection. <li>High Wet Out for Ultra High Surface Anchorage</li>
Speeds up production time and saves costs. <li>High Build: 1 mm (40 mils) in a Single Pass</li>	Longer life, better performance. <li>Same Formula for Hand or Spray Application</li>
Saves time and costs. <li>Compatible with Bare Steel or FBE Coated Pipe</li>	Flexible and reduced inventory. Saves money. <li>Excellent Cathodic Disbondment at maximum</li>
Flexible Use & Reduces Inventory. <li>2:1 Part A:B Mix Ratio by Volume</li>	operating temperature.
Sprayable with Conventional Plural Component Equipment.	Broad range of applications.

#### **Typical Applications**

• Pipeline Coating (Girth Welds, Pipe Bends, Fittings, Valves, Odd Shapes), Repair & Rehabilitation

#### **Physical Properties**

Property		Test Method	Typical Value	
	Condition	Test Method	US Imperial	Metric
Hardness	(Shore D)	ASTM D-2240	85	85
Thin Film Water Absorption		ASTM D-570	0.22 %	0.22 %
Dielectric Strength	(Oil)	ASTM D-149	617 volts/mil	25 kV/mm
Chemical Resistance		ASTM G-20	Excellent	Excellent
Adhesion to FBE Bare Steel		ASTM D-4541 ASTM D-4541	> 3,000 psi > 3,400 psi	21 MPa 23 MPa
Impact Resistance		ASTM G-14	118 inch-lb/27mils	13 Joules/27mils
Flexibility	(Degrees per pipe diameter)	NACE RP-0394	< 0.45 °	< 0.45 °
Abrasion Resistance	(CS-17 wheel, wear cycles)	ASTM D-4060	986 cycles/mil	39 cycles/micron
Cathodic Disbondment	(30 days at 60°)	ASTM G-95	< 0.4 inch	< 10 mm
Hot Water Immersion	(24 hours immersion at 60°C)	CSA Z245-20-06	100% coating cohesion >3,000 psi	100% coating cohesion >21 MPa
Holiday Detection	Holiday free	ISO :21809-3 & CSA Z245.20 ASTM G 62 Method B	125 Volts per mil 84 Volts per mil	5 Volts per micron 3.3 Volts per micron

#### **Product Selection Guide**

Maximum Operating Temperature:	65⁰C (149⁰F)	Color:	Green
Compatible Line Coatings:	FBE	Typical Single Coat Thickness:	
Mixing Ratio:	2:1 Part A to B	Manually Applied	40 mils (1.0 mm)
By Volume		Spray Applied	40 mils (1.0 mm)
By Weight	100:36 Part A to B	Recoat Interval (Spray):	
Recommended Surface Profile	2.5 - 4.0 mils	@ 25°C (77°F)	10 - 17 minutes
	63.5 - 101.6 microns	@ 43°C (110°F)	3 - 7 minutes
Surface Preparation:	SA 2 1/2 SSPC-10 - Near-White SSPC-SP5 - White	Theoretical Coverage: Clean Up:	13.5 Sq. Ft./liter @30 mils Acetone, MEK, Toluene

<b>Typical Application</b>				Powercr	ete®	R-65/F1
Hand Apply		Coverage Rate	S	Spray Apply	Wast	te Factor
	Theoretical           425 mil-s           1605 mil-           1.0 mm-r           Recomender           Tip Size           331           419/431           519/531           619/631	Coverage Rates           sq. ft./Us gallon           n²/litre           ed Tip Sizes           Pipe Size (DN)           to 12" (DN300)           12"-16" (DN300-400)           16"-24" (DN400-600)           24"-48" (DN600-1200)	Flow Rates (approx.) 19tip = 1.1L / min. 31tip = 2.8L / min. Note: Fluid pressure at tip approx. 3,500 psi.		(a 10% 15% 25% 35%	Approx.) Kit Application 20" + pipe OD 14"-18" pipe OD 2"-12" pipe OD

#### **Temperature Considerations**

If the surface to be coated is below 10° C (50° F), preheating of the substrate is recommended. Preheat temperatures should not exceed 80° C (176° F) prior to application.

Note: The application should only be done when temperature of the steel is at least3° C (5° F) higher than the dew point, as recommended by NACE.

#### Storage and Handling

For optimum performance, store Powercrete R-65/F1 epoxy product in a dry well ventilated area. Maintain products in original packaging and sealed until just before use. Avoid exposure to direct sunlight, rain, snow, dust, and other adverse environmental conditions or contaminates. Always consult Material Safety Data Sheet prior to handling Powercrete R-65/F1.

Note: Avoid prolonged storage at temperatures above 40° C (104° F) or below 5° C (40° F)

Cure Times @ 25°C (77°F)	
Pot Life: 0.5 L / 2 Lb kit	9 minutes
Spray Application	
Gel T 40 mils	12 minutes
Dry Time: 40 mils	37 minutes
65 Shore "D" Reading: 40 mils	60 minutes
75 Shore "D" Reading: 40 mils	75 minutes
Shelf life (stored in specified conditions):	Part A - 2 years Part B - 1 vears

#### **Ordering Information**

#### 1. Drums

211912-000 Part A Drum: PC-F1-A-156L-41Gal (299Kg-660Lb) 380234-000 Part B Drum: PC-F1-B-156L-41Gal (215Kg-475Lb)

#### 2. Kits:

645247-000 0.5 L Kit: PC-F1-0.5L-kit 124017-000 1 L Kit: PC-F1-1L-kit 690692-000 2.5 L Kit: PC-F1-2.5L-kit

#### 3. Accessories Kit:

contains: latex gloves; trowels: mixing paddle for an electric drill; hand stirrer: wet mil gauge; disposable face masks.

#### **Product Support and Additional Information**

For additional information on delivery, application, training, appropiate equipment, sales and customer service, please visit www.berrycpg.com, call or email oneof the worldwide locations listed below.

> The leading global partner in protecting the integrity of critical infrastructure. Berry Plastics warrants that the product(s) represented within conform(s) to its/their chemical and

> physical description and is appropriate for the use as stated on the respective technical data sheet when used in compliance with Berry Plastics written instructions. Since many installation factors are beyond the control of Berry Plastics, the user is obligated to determine the suitability of the products

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(0.9Kg-2Lb)

(1.7Kg-4Lb)

(4.3Kg-10Lb)



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Liquid Epoxy Coating With Quick Application and Long Term Corrosion Protection of Bare Steel

# PHYSICAL PROPERTIES OF POWERCRETE R-65/F1

# Independent Laboratory Testing and Results





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Liquid Epoxy Coating With Quick Application and Long Term Corrosion Protection of Bare Steel

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TESTING GROUP www.bodycote.com www.bodycotetesting.com

# **Test Certificate**

Berry Plastics 11010 Wallisville Road Houston, TX 77013 REF No Ord No 0701187: Issue 2 Verbal 122599

Date Tested Date Reported 03-06-2007 03-31-2007

Phone: 713-676-0085 Fax: 713-676-0086 Attn: Bang Tran

Item Samples submitted to complete seven (7) testing procedures

Specification ASTM D570, D4541, G14, D4060, G20, G95 Modified NACE RP0394, and Customer Requirement

Several samples were supply by Mr. Bang Tran of Berry Plastics to perform various tests on the Berry Plastics Powercrete F1 pipeline coating.

This report has been assembled to record the results of this testing of the above-mentioned material.

Should you have any questions or concerns please contact the undersigned at (281) 848-0270 or by email at Donald.Selchow@bodycote.com, at your convenience.

Report re-issued (Issue 2) to reflect company name change from Covalence Adhesives to Berry Plastics at the customer request.

Sincerely,

Bodycote Testing,

Donald H. Selchow QA/H&S Manager Oil & Gas



## Materials Supplied and Tested

Berry Plastics Powercrete F1 material was supplied to perform the following tests:

Water absorption	ASTM D570	Free-Film (6)
Coating Adhesion	ASTM D4541	4-(6"x 6"x 1/4")
Coating Adhesion	Direct to FBE	3-(4"x 8")
Flexibility	NACE RP0394	5 Pieces
Hot Water Immersion	Customer Requirement	3 Pieces
Impact Resistance	ASTM G14	4-(6"x 6"x 1/4")
Abrasion Resistance	ASTM D4060	2 Pieces
Cathodic Disbondment	ASTM G95 Modified	3 Pieces
Chemical Resistance Test	ASTM G20	10 Pieces

Water absorption

ASTM D570

Free-Film (6)

Samples dried for 72 hours (over weekend) at 105C prior to immersion. Immersion in DI water at 25C for 24 hours

Sample #	Length (in)	Width (in)	Thick (in)	Weight Before (g)	Weight After (g)	Weight Gain (g)	% Increase in Weight
360(001)-1	3	1	0.044	3.8528	3.8613	0.0085	0.22
360(001)-2	3	1 1/32	0.038	3.4598	3.4682	0.0084	0.24
360(001)-3	2 15/16	1 1/32	0.039	3.5578	3.5664	0.0086	0.24
360(001)-4	2 31/32	1 1/16	0.046	4.4961	4.5043	0.0082	0.18
360(001)-5	2 31/32	1	0.039	3.5854	3.5944	0.0090	0.25
360(001)-6	3	1 1/32	0.051	4.9153	4.9243	0.0090	0.18
Average				3.9779	3.9865	0.0086	0.22

Sec.

Total percentage of water absorbed is 0.22%.

Specimens appeared the same after water soak as before.



Coating	Adhesion	
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# ASTM D4541

# 4-(6"x 6"x 1/4")

# **Coating Direct to Steel**

		Th	ckness (	mils)		Pull-Off		Failure Meth	od
Sample #	Point 1	Point 2	Point 3	Point 4	Average	Strength (psi)	% Glue Adhesion	% Coating Cohesion	% Coating/ Substrate Adhesion
361(002)	29.6	28.5	28	30.3	29	3986	95	5	0
362(003)	28	25.8	26.2	27.8	27	4068	95	5	0
363(004)	30.5	27.6	28.6	29.3	29	3090	100	0	0
381(005)	29.5	30	29.3	30	30	2764	99	1	0

**Coating Adhesion** 

Direct to FBE

3-(4"x 8")

# Coating Direct to FBE

		T	nickness	(mils)		Failure Method					
Sample #	Point 1	Point 2	Point 3	Point 4	Average	Pull-Off Strength (psi)	% Glue Adhesion	% Coating Cohesion	% Coating Substrate Adhesion		
364(006)	34.1	35	32.9	35.3	34	3497	10	90	0		
365(007)	35.5	36.8	33.6	33.8	35	3579	0	100	0		
366(008)	35.8	38.6	37.2	35.8	37	1868	0	50	50		

Flexibility	NACE RP0394	5 Pieces	
PERFORMANCE AND CONTRACTOR			

#### Coating Direct to Steel

R	0	t = T	hicknes	s (mils)		R = Bend	°/PD=
Sample #	Point 1	Point 2	Point 3	Point 4	Average	Radius	(57.3*t)/(R-(t/2))
701187 - 367(009)	0.289	0.292	0.293	0.294	0.292	36	0.467
701187 - 368(010)	0.288	0.287	0.285	0.287	0.287	36	0.458
701187 - 369(011)	0.285	0.283	0.281	0.280	0.282	36	0.451
701187 - 370(012)	0.276	0.274	0.276	0.276	0.276	36	0.440
701187 - 371(013)	0.283	0.280	0.280	0.278	0.280	36	0.448
Averag	le				0.283	36	0.453



Hot Water Imm	ersion @60°C
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Customer Requirement 3

3 Pieces

Samples were immersed in hot water held at 60°C for 24 hours prior to testing

ID	Thickness Mils	Pull-Off Strength (psi)	Cohesive Failure in PCF1	Color Faded
372 - #1	34	2764	100%	Yes
373 - #2	38	3090	100%	Yes
374 - #3	41	3334	100%	Yes

Impact Resistance	ASTM G14	4-(6"x 6"x 1/4")	

This testing was performed to a modified version of ASTM G-14. All the testing was performed at room temperature  $(75^{\circ}F \pm 3^{\circ}F)$  using a four (4) pound weight.

	J/N 701187 Identification	Drop Number	Avg. Thickness Mils	Height (inches)	Impact strength In/lbs (in-lbs/mil)	Impact strength Joules (Joules/mil)
	375(017)-25	#21	22.5	16.0	64 (2.8)	7.23 (0.32)
	376(018)-29	#12	26.9	22.0	88 (3.27)	9.94 (0.37)
	377(019)-27	#10	23.4	27.0	108 (4.60)	12.21 (0.52)
-	378(020)-31a	#5	26.5	29.5	118 (4.45)	13.34 (0.50)

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Abrasion Resistance

**ASTM D4060** 

2 Pieces

Specimen	Weight Loss (mg)	Wear Index	Mils Loss	Cycles Per Mil
701187 - 379(021)	132.5	132.5	1.2	860.2
701187 - 380(022)	119.7	119.7	0.9	1111.1
Mean	126.1	126.1	1.03125	985.7

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3 Pieces	
ASTM G95 Modified	
<b>Cathodic Disbondment</b>	

12

The following samples, labeled EF-1 (FE-4), were tested at 60°C for a period of 30days.

Position	Sample ID	Comments
EF-1 (FE-4)	045-64 (#1) / 32 Mils	Coating Blistered inside disbondment 9.2 mm radius
EF-1 (FE-4)	045-64-2 (#2) / 32 Mils	Coating Blistered inside disbondment 5.3 mm radius
EF-1 (FE-4)	045-64-2 (#2) / 32 Mils	Coating Blistered inside disbondment 7.9 mm radius

ASTM G20	
Resistance Test	
Chemical	

10 Pieces

10 samples were soaked the following solutions for a period of seven (7) weeks.

				30-Day	Review	5-Week	Review	6-Week	c Review	7-Wee	k Review
	Solution	Start	Thickness	Color		Color		Color		Color	
Chemical	2/0	Hd	Mills	Change	Blistered	Change	Blistered	Change	Blistered	Change	Blistered
Diesel	100%	00	36.4	No	No	N/C	No	N/C	No	N/C	No
Sulfuric Acid	25%	0	36.6	Yes	No	N/C	No	N/C	No	N/C	No
Acetic Acid	5%	-	33.8	No	No	N/C	No	N/C	No	N/C	No
Gasoline (unleaded)	100%	~	34.6	No	No	N/C	No	N/C	No	N/C	No
Hydrochloric Acid	10%	0	42.2	No	No	N/C	No	N/C	No	N/C	No
Kerosene	100%	~	38.7	No	No	N/C	No	N/C	No	N/C	No
Nitric Acid	10%	0	32.9	Yes	No	N/C	No	N/C	No	N/C	No
Sodium Carbonate	25%	11	39.8	No	No	N/C	No	N/C	No	N/C	No
Sodium Hydroxide	25%	12	36.7	No	No	N/C	No	N/C	No	N/C	No
Sodium Chloride	10%	8	36.6	No	No	N/C	No	N/C	No	N/C	No

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# Stork Southwestern Laboratories

222 Cavalcade Street, 77009-3213 P.O. Box 8768, Houston, Texas 77249-8768 Tel: (713) 692-9151 Fax: (713) 696-6205

Attention: Bang Tran **Berry Plastics Corrosion Protection Group** 11010 Wallisville Road Houston, TX 77013 P: (713) 676-0085 / F: 713/676-0086

W/O. No.: P.O. No.: Report Date: COV012-03-02-26901-1 Cash 3/5/2007

Identification:	TAR 044-84
Description:	Three Cubes
Material:	Powercrete R-65/F1

Unknown Date Cylinders Cast:

#### **RESULTS OF TESTS COMPRESSIVE STRENGTH – CUBES**

Specimen ID	Age (days)	Length (in.)	Width (in.)	Max Load (lbs)	Compressive Strength (psi)	Fracture Type
1A	Unknown	2.00	2.00	59,200	14,550	Cone
1B	Unknown	2.00	2.00	59,300	14,830	Cone
1C	Unknown	2.00	2.00	56,800	14,200	Cone

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**Respectfully Submitted** 

Terry Wilt

Manager, Product Evaluation

POLYHEDRON LABORATORIES<sup>®</sup>, INC.

PLASTICS, POLYMERS and RUBBER TESTING

10626 KINGHURST ST. HOUSTON, TX 77099 281-879-8600 • FAX: 281-879-8666 e-mail techsales@polyhedronlab.com

February 19, 2007

Berry Plastics Corrosion Protection Group 11010 Wallisville Road Houston, TX 77013

Attn: Mr. Bang Tran

# **Analytical Report**

#### Dielectric Strength by ASTM D 149 \*

Sample No.	Dielectric Breakdown Voltage (kv)	Thickness (mil)	Dielectric Breakdown Strength (v/mil)	Volume Resistivity by ASTM D 257 <sup>†</sup> (ohm-cm)
Powercrete F1	25.0	46.8	535	3.061 x 10 <sup>12</sup> ± 0.16 x 10 <sup>12</sup>
TAR-044-84	26.0	42.8	607	
	26.0	38.9	669	
	25.0	41.6	602	
	24.5	36.4	674	
			AV = 617 4 + 57 2	

\* Immersed in mineral oil

<sup>†</sup> Kiethly Electrometer Model 610C

Howard Kaye, Ph.D., FAIC Director

HK/dr







# COMPILATION OF BERRY PLASTICS\* REPORTS 701004, 701234, AND 701933

Prepared by

Donald Selchow QA/H&S Manager Oil & Gas

May 11, 2007

\*Formally Covalence Adhesives

14-1

\*

#### **REPORT NUMBER: 702456**

**ISSUE: 3** 

Report re-issued (Issue 3) to reflect company name change from Covalence Adhesives to Berry Plastics at the customer request.



Berry Plastics 11010 Wallisville Road Houston, TX 77013 Phone: 713-676-0085 Fax: 713-676-0086 REF No Ord No 0701004: Issue 3 Verbal Bang Tran

Date Tested Date Reported 02-23-2007 02-24-2007

Attn: Bang Tran

Item Comparison testing of three (3) pipeline coating products

Specification ASTM G14

Three (3) pipeline coating products were supplied to Bodycote Testing - Houston North by Bang Tran of Berry Plastics. Bodycote was to witness the preparation, application and perform the testing on samples prepared by Mr. Tran and his associate.

This report has been assembled to record the results of this witnessing and testing of the abovementioned material.

Should you have any questions or concerns please contact the undersigned at (281) 848-0270 or by email at Donald.Selchow@bodycote.com, at your convenience.

Sincerely,

Bodycote Testing.

Donald H. Selchow QA/H&S Manager Oil & Gas

# Bodycote

#### Materials Supplied and Tested

 Competitor #1
 1.0 L Kit

 Product ID:
 Competitor #1

 R.G. Base Batch No.:
 27100116 (01-16-2007)

 Hardener Batch No.
 26711208 (1-15-2007)

Competitor #2 1.0 L Kit Product ID: Competitor #2 Protal Brush Grade Base (part "A") Batch No.: 061060 (use by Dec 2008) Hardener Competitor #2 (part "B") Batch No.: 06L059 (use by Dec 2008)

Berry Plastics 1/2 L Kit Product ID: Powercrete F1 Part "A" Batch No.: 045-60A Part "B" Batch No.: 044-84B

# Samples Prepared

The following blasted metal parts were prepared for each of the 3 materials tested:

24.0

$$24 - 2"x \ 2"x \approx 1/4" 6 - 1"x \ 8" \ x \approx 1/4" 3* - 6"x \ 6" \ x \approx 1/4" 6 - 4"x \ 8" \ x \approx 1/8"$$

All the blasted metal parts was preheated to a temperature of approximately 160°F prior to coating and the coated was applied within 3 minutes of the samples being removed from the warming oven.

\* The Berry Plastics sample only had 2 of the 6"x 6"x  $\approx 1/4$ " panels coated.

# **Coating Preparation**

Because Competitor #1 and the Competitor #2 came in 1.0 liter kits that did not identify the actual ratio of the material (Part "A" to Part "B") these samples were thoroughly mixed and reloaded into new containers and weighed allowing the ratio of Part "A" to Part "B" to be calculated.



The same thing was done with the Part "B" Hardener to insure the ratio calculation was accurate. The Competitor #1 Part "A" weighed 1100 grams and the Part "B" weighed 265 grams. The Competitor #2 Part "A" weighed in at 1143 grams with the Part "B" weighing 246 grams.

The part "A" material was then measure and weighed to 100-gram batches into containers to be used for the mixing and coating process. The following are the 100-gram coating ratios used to prepare the samples:

Competitor #1 Competitor #2 Berry Plastics Powercrete F1 100gm Part "A" to 24.1gm Part "B" 100gm Part "A" to 21.5gm Part "B" 100gm Part "A" to 36gm Part "B"

#### **Mixing Practice**

All the mixing performed during this testing was done by hand. When the mixing process started the time was noted and a timer was started to control the mixing time. The mixing process was started after the Part "B" was added to the Part "A" and hand mixed for 90 seconds and then the coating was transferred to a new, clean container and mixed an additional 90 seconds. The use of a second container was to insure that the sample was completely mixed. Immediately after being mixed the coating was applied to the sample plates, which had just been removed from the warming oven about three (3) minutes previously.

#### **Coating Process**

The coating was applied by hand using a plastic applicator with the exception of the 6"x 6" x  $\approx 1/4$ " panels which required a 6" wide putty knife. The material was spread first in one direction then the sample was rotated 180 degrees and a second application was laid down. The next sample(s) would then have the coating applied. The coating thickness of the first sample was measured using a hand held thickness gage. All the samples were coated to a thickness of 28 mils as indicated by the thickness gage. Typically this process would take two (2) to three (3) applications of the coating. Once the 28 mils thickness was obtained the time again was recorded and the sample were put aside to harden. 12 samples of the 2"x2"x ¼" panels were placed into a refrigerator to duplicate the application of the material in cold climate environment. These samples were then tested Three (3) days later (see Table 3).



#### Hardness Testing

During the coating process for each material tested a sample was placed on a plastic sheet and spread out to a thickness of 50 to 100 mils. The time that the sample was mixed was recorded on the plastic sheet. At various times thereafter the Shore hardness was checked. Once the samples achieved Shore "D" Hardness reading of 75 the time was recorded again. This process took place at room temperature (75°F).

Material	Mix time	Last Check Time	Total Time	Result
Competitor #1	12:57 pm	3:00 pm	2 hrs 3 min	*Very soft
Competitor #2	12:08 pm	3:00 pm	2 hrs 52 min	*Soft
Berry Plastics Powercrete F1	12:18 pm	1:30 pm	1 hr 12min	Shore "D" 60
		1:47 pm	1 hr 29 min	Shore "D" 73
		2:00 pm	1 hr 42 min	Shore "D" 75

\* Unable to take Shore Hardness reading

#### **Sample Preparation**

Table 1 (below) details the Coating Material, the Start Time of the mixing process, the End Time when the coating was applied to the sample at a thickness of 28 Mils, the Total Time to coat the samples and the Samples Coated.

		T	able 1		
- Coating	Ratio	Start	End	Coating	Samples
Material	A/B (gms)	Time	Time	Time	Coated
Competitor #1	100/24.1	9:15	9:36	21 min	24 - 2"x2"
Powercrete F1	100/36	9:47	9:59	12 min	24 - 2"x2"
Competitor #1	100/24.1	10:09	10:20	11 min	1-6"x 6" & 6-1"x8"
Competitor #2	100/21.5	10:56	11:03	7 min	24 - 2"x2"
Competitor #1	100/24.1	11:20	11:28	8 min	2-6"x6"
Competitor #2	100/21.5	11:50	11:59	9 min	1 -6"x6" & 6-1"x8"
Competitor #2	100/21.5	12:08	12:14	6 min	2-6"x6"
Powercrete F1	100/36	12:18	12:26	8 min	1 -6"x6" & 6-1"x8"
Powercrete F1	100/36	12:30	12:35	5 min	1 -6"x6"
Competitor #1	100/24.1	12:57	1.03	6 min	3 – 4"x 8" x 1/8"
Competitor #1	100/24.1	1:08	1.16	8 min	3 – 4"x 8" x 1/8"
Competitor #2	100/21.5	1:20	1:28	8 min	3 – 4"x 8" x 1/8"
Competitor #2	100/21.5	1:37	1:44	7 min	3 – 4"x 8" x 1/8"
Powercrete F1	100/36	1:51	1:59	8 min	3 – 4"x 8" x 1/8"

# Bodycote

Impac	t Testing						
1970. <b>6</b> 51.35	Powercrete F1	100/36	2:02	2:10	8 min	3 – 4"x 8" x 1/8"	

The Impact Testing was performed in accordance with ASTM G14 Standard Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test). Tables 2 & 3 (below) list the results of that testing. Table 1 indicates when the individual coatings reached a Shore 75 reading in minutes after applying on the test plates.

Material	Sample	Thickness Mils*	Height (inches)	Buzz No Buzz	Pass/ Fail	Comments
	rumber	Friday	2/23/2007	TTO DULL	1 un	
Competitor #1	#1	24	6		Fail	Cracked
Application Started: 9:36 am	#2	26	6		Fail	Cracked
TimeTested: 11:35 am	#3	26	5	No Buzz	Pass	Cracked
Set Time: 119 minutes	#4	27	6 1/2	Buzz (delayed)	Fail	Crack lines
	#5	27	7	Buzz	Fail	Cracked
	#6	28	7	No Buzz	Pass	Crack lines
Powercrete F1	#1	24	6	No Buzz	Pass	
Application Started: 9:59 am	#2	22	6	Buzz	Fail	
Time Tested: 10:35 am	#3	21	6	No Buzz	Pass	
Set Time 36 minutes	#4	24	7	Buzz	Fail	
	#5	24	6 1/2	No Buzz	Pass	1.08 in-lbs/mil
	#6	24	6 3/4	Buzz	Fail	
	#7	28	7 1/2	Buzz	Fail	
	#8	30	7 1/2	No Buzz	Pass	
Competitor #2	#1	28	7	No Buzz	Pass	
Application Started: 11:03 and	#2	28	7 1/4	No Buzz	Pass	
Time Tested: 2:50 pm	#3	29	7 1/2	No Buzz	Pass	
Set Time 227 minutes	#4	23	6 1/2	No Buzz	Pass	
	#5	23	6 3/4	Buzz	Fail	
	#6	22	6 1/2	No Buzz	Pass	

#### Table 2

Note: The weight of the falling ball indenter is 4lbs

\* The thickness in Mils was taken prior to testing at the point of impact



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Material	Sample Number	Thickness Mils*	Height (inches)	Buzz No Buzz	Pass/ Fail	Comments
N	Ionday 2/2	6/2007 (stor	ed in refri	gerator for	3 days	@ 40°F)
Competitor #1	#1	24	7	Buzz	Fail	Cracked & Shattered
	#2	24	6	Buzz	Fail	Cracked & Shattered
	#3	18	6	Buzz	Fail	Cracked & Shattered
	#4	22	4 1/2	Buzz	Fail	Cracked & Shattered
Powercrete F1	#1	28	7	No Buzz	Pass	Cracked
	#2	25	6 1/4	No Buzz	Pass	Cracked
	#3	25	6 1/2	Buzz	Fail	Cracked
	#4	31	8	Buzz	Fail	Cracked
Competitor #2	#1	21	5 1/4	Buzz	Fail	Cracked & Shattered
	#2	20	5	Buzz	Fail	Cracked & Shattered
	#3	23	5	Buzz	Fail	Cracked & Shattered
	#4	27	6	Buzz	Fail	Cracked & Shattered

\* The thickness in Mils was taken prior to testing at the point of impact

# Pot Life Test

The Pot Life Test consisted of mixing a typical sample amount (1/2 Liter Kit) for three (3) minutes and letting the sample sit until such time it was no longer useable for application. Table 4 (below) shows the results of this test.

24-11

Table 4

Material	Mix Ratio	Start time	Setup Time	Pot Life
Competitor #1	1/2 Liter Kit	2:21 pm	2:37 pm	16 min
Competitor #2	1/2 Liter Kit	2:31 pm	2:43 pm	12 min
Berry Plastics Powercrete F1	1/2 Liter Kit	2:37 pm	2:47 pm	10 min



## Observations

Each of the three (3) materials use a different color to identify they're coating. The following are the colors used:

Competitor #1	Light Blue
Competitor #2	Dark Green
Berry Plastics Powercrete F1	Turquoise Green

The surface of the both the Competitor #1 and Competitor #2) appear to have pock-mocks (looks like paint "fish eye") on the surface of the coating which remain even after the coating has set. The Berry Plastics Powercrete F1 exhibited a very smooth clean surface (see Figures 1, 2 & 3 below).

Of the three (3) materials tested the Competitor #1 appeared to be the least viscous and the Berry Plastics Powercrete F1 most viscous (a consistency of peanut butter).

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**REF No** 

0701004 : Issue 3

Coating Application

	Location	Position	Magnification	
After Coating	0		X N/A	





Berry P	lastics
---------	---------

REF No

0701004 : Issue 3

Coating Application

	Location	Position	Magnification	
After Coating			X N/A	
100 million -	Real Property in the	Hall Hanna and	The lot of the second s	
A 1011				
LA DECK				
				LAND WEIGHT
<b>HURNAUN</b>				
. L. L. L. L	2141414			HH/14 KU071
		1		
2			3	4
		F	igure 2.	
This photogra	ph shows the	surface of the Co	mpetitor #2 coating. Note	what appears to be "Fis
		Eve" o	n the surface.	ara concluter the fight of the fight of the fight of the



Berry Plastics

REF No

0701004 : Issue 3

Coating Application

	Location	Position	Magnification	
After Coating			X N/A	
ă.		21946		
1000	and the second		A REAL PROPERTY AND A REAL	and the second states of
and the second second				
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1 min mar 2		a management	1	
	2		3	4
	6		0	
		F	iqure 3	
TPL in 1	and Parts	1	D DI C D	The second second
This photog	graph displays	the surface of the	e Berry Plastics Powercre	ete FI coating. Note the
	surface of th	is coating is very	smooth with no pits or "	Fish Eye".
		and the second		



Berry Plasti	cs	REF No	701234	: Issue 3
11010 Wall	isville Road	Ord No		
Houston, T.	X 77013			
		Date Tested	04/13/07	
		Date Reported	04/17/07	
Phone: 713	-676-0085			
Fax: 713-6	76-0086			
Attn: Bang	Tran			
Itom	0 Control Donals	for CDT testing to ASTM CO	5 Medified	
nem	9 Coated Panels	for CD1 testing to AS1M GS	5 Modified	

Specification ASTM G95 Modified

Nine (9) coated panels were supplied by Mr. Bang Tran to Bodycote for the purpose of Cathodic Disbondment Testing to a modified version of ASTM G95-87 (1998) e1.

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# ASTM G95-87 (1998) e1 Cathodic Disbondment Testing

The nine (9) sample provided by Berry Plastics were tested in accordance with ASTM G95-87 (1998) e1 but modified to the extent that instead of room temperature the samples were tested at 60°C for 30 days. The table below documents the results of this testing and the attached photographs illustrate the condition of the samples after testing (see Figure 1 - 3).

Item	Sample	Coating Thickness	Coating Disbondment
1	PCF-1-1	DFT: 33.3 Mils	Coating Disbondment to 4.0 mmr
2	PCF-1-2	DFT: 29.0 Mils	Coating Disbondment to 4.5 mmr
3	PCF-1-3	DFT: 28.1 Mils	Coating Disbondment to 4.6 mmr
4	Competitor #2-1	DFT: 25.2 Mils	Coating Disbondment to 5.6 mmr
5	Competitor #2-2	DFT: 25.8 Mils	Coating Disbondment to 7.8 mmr
6	Competitor #2-3	DFT: 27.4 Mils	Coating Disbondment to 5.5 mmr
7	Competitor #1-1	DFT: 22.1 Mils	Coating Disbondment to 6.7 mmr
8	Competitor #1-2	DFT: 27.0 Mils	Coating Disbondment to 7.1 mmr
9	Competitor #1-3	DFT: 24.2 Mils	Coating Disbondment to 5.3 mmr

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# Berry Plastics

# **REF No**

: Issue 3

701234

Cathodic Disbondment Testing





Berry Plastics

REF No

701234 : Issue 3

Cathodic Disbondment Testing

Location	Position	Magnification		
	After 336 Hours	X N/A		
npetitor #	#2 CDT Samp	les After 30	Days @60C	
ayo 60°C	CD7 070813		070283	
	12			<b>》</b>
	7,012.37	2	20234	0
#1		12	#3	100
	Location	Location       Position         After 336 Hours         mpetitor #2 CDT Samp         app 60°C CD7         app 60°C CD7         app 700234         app 700234	Location       Position       Magnification         After 336 Hours       X N/A	Location Position After 336 Hours X N/A



Berry Plastics

#### REF No

: Issue 3

701234

Cathodic Disbondment Testing





Berry Plastics		REF No	0701933: Issue 3
11010 Wallisville Road		Ord No	124157
Houston, TX 7	7013		12/10/04/2012/04/2012/04/2012/04/2012
		Date Tested	04-25-2007
		Date Reported	04-30-2007
Phone: 713-67	6-0085		
Fax: 713-676-	0086		
Attn: Bang Tra	n		
Item	Samples submitted	to complete five (5) testin	g procedures
Specification	ASTM D570, D454 and Customer Requ	1, G14, D4060 and NACI	E RP0394 Appendix H

Several samples were supply by Mr. Bang Tran of Berry Plastics to perform various tests on the Covalence Powercrete F1 pipeline coating as well as Competitor #2 and Competitor #1 pipeline coatings.

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Materials Supplied and Tested

Berry Plastics Powercrete F1, Competitor #2 and Competitor #1 material was supplied to perform the following tests:

Water absorption *	ASTM D570	
Coating Adhesion	ASTM D4541	
Flexibility	NACE RP0394	
Impact Resistance	ASTM G14	
Abrasion Resistance *	ASTM D4060	

Free-Film (6) 3-(6"x 6"x 1/4") 9 Pieces 3-(6"x 6"x 1/4") 6 Pieces

• Note: These samples were prepared by Berry Plastics at their facility.



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Water absorption	ASTM D570	Free-Film (6)	

Samples dried for 72 hours (over weekend) at 105C prior to immersion. Immersion in DI water at 60C for 24 hours

#### Powercrete F1 Ref-045-93

Sample #	Length (in)	Width (in)	Thick (in)	Weight Before (g)	Weight After (g)	Weight Gain (g)	% Increase in Weight
467(001)-1	2 15/16	1.00	0.030	2.4469	2.4877	0.0408	1.67
467(001)-2	3.00	1.00	0.029	2.4451	2.4851	0.0400	1.64
467(001)-3	3.00	1.00	0.029	2.4680	2.5080	0.0400	1.62
467(001)-4	3.00	1 1/16	0.030	2.6002	2.6423	0.0421	1.62
467(001)-5	3.00	1 1/16	0.031	2.6530	2.6930	0.0400	1.51
Average				2.5226	2.5632	0.0406	1.61

Total percentage of water absorbed is 1.61%.

Specimens appeared slightly faded in color after water soak compared to before.

#### Competitor #2 Ref-045-93

Sample #	Length (in)	Width (in)	Thick (in)	Weight Before (g)	Weight After (g)	Weight Gain (g)	% Increase in Weight
468(002)-1	3	1.00	0.033	2.4606	2.5564	0.0958	3.89
468(002)-2	3.00	1.00	0.031	2.3499	2.4436	0.0937	3.99
468(002)-3	3.00	1.00	0.034	2.4496	2.5413	0.0917	3.74
468(002)-4	3.00	1.00	0.037	2.6613	2.7565	0.0952	3.58
468(002)-5	3.00	1.00	0.042	2.8927	2.9854	0.0927	3.20
Average				2.5628	2.6566	0.0938	3.66

Total percentage of water absorbed is 3.66%.

Specimens appeared slightly faded in color after water soak compared to before.

#### Competitor #1Ref-045-93

Sample #	Length (in)	Width (in)	Thick (in)	Weight Before (g)	Weight After (g)	Weight Gain (g)	% Increase in Weight
469(003)-1	2 15/16	1.00	0.048	3.2261	3.2801	0.0540	1.67
469(003)-2	3.00	1.00	0.042	2.7831	2.8353	0.0522	1.88
469(003)-3	3.00	1.00	0.049	3.2806	3.3347	0.0541	1.65
469(003)-4	3.00	1.00	0.046	3.1176	3.1780	0.0604	1.94
469(003)-5	3.00	1.00	0.045	2.7718	2.8208	0.0490	1.77
Average				3.0358	3.0898	0.0539	1.78

Total percentage of water absorbed is 1.78%.

Specimens appeared considerably faded in color after water soak compared to before.



Coating Adhesion	ASTM D4541	3-(4"x 8"x 1/8") 1 of each coating

			Failure M	ode		
Mils	Average Mils	%Glue	%Cohesion	%Adhesion	Pull Off Strength (PSI)	Mean PSI
27.6		0	100	0	1944	
26.2	27	0	100	0	1460	1893
26.6		5	95	0	2275	
28.9		75	25	0	971	1786
25.6	27	15	85	0	2112	
27.5		40	60	0	2275	i
22.2		90	10	0	1460	
24.5	23	85	15	0	1053	1569
23.6		90	10	0	2194	
	Mils 27.6 26.2 26.6 28.9 25.6 27.5 22.2 24.5 23.6	Mils         Average Mils           27.6         27           26.2         27           26.6         28.9           25.6         27           27.5         27           24.5         23	Mils         Average Mils         %Glue           27.6         0           26.2         27         0           26.6         5         5           28.9         27         15           25.6         27         15           27.5         40         22.2           24.5         23         85           23.6         90         90	Average Mils         Average Mils         Cohesion           27.6         0         100           26.2         27         0         100           26.6         5         95           28.9         75         25           25.6         27         15         85           27.5         40         60           22.2         90         10           24.5         23         85         15           23.6         90         10	Average Mils         Average Mils         Glue         Cohesion         Adhesion           27.6         0         100         0           26.2         27         0         100         0           26.6         27         5         95         0           28.9         75         25         0           25.6         27         15         85         0           27.5         40         60         0         0           22.2         90         10         0         0           24.5         23         85         15         0           23.6         90         10         0         0	Failure Mode           Average         Pull Off           Mils         Mils         %Glue         %Cohesion         %Adhesion         PVII           27.6         0         100         0         1944           26.2         27         0         100         0         1460           26.6         5         95         0         2275           28.9         75         25         0         971           25.6         27         15         85         0         2112           27.5         40         60         0         2275           22.2         90         10         0         1460           24.5         23         85         15         0         1053           23.6         90         10         0         2194         1053

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Flexibility	NACE RP0394	9 Pieces- (1"x 8"x 1/4") 1 of each
coating		

# Powercrete F1 Ref-070223

	t = Thickness (mils)					R = Bend	°/PD=	
Sample #	Point 1	Point 2	Point 3	Point 4	Average	Radius	(57.3*t)/(R-(t/2)	
701933 - 473(007)-1	0.273	0.274	0.278	0.279	0.276	48	0.330	
701933 - 473(007)-2	0.268	0.268	0.274	0.276	0.272	48	0.325	
701933 - 473(007)-3	0.272	0.276	0.277	0.277	0.275	48	0.330	
Average	0.271	0.272	0.276	0.277	0.274	48.000	0.328	

# Competitor #2 Ref-070223

	t = Thickness (mils)					R = Bend	°/PD=
Sample #	Point 1	Point 2	Point 3	Point 4	Average	Radius	(57.3*t)/(R-(t/2))
701933 - 474(008)-1	0.278	0.274	0.274	0.276	0.275	24	0.661
701933 - 474(008)-2	0.277	0.277	0.276	0.277	0.277	36	0.442
701933 - 474(008)-3	0.276	0.274	0.274	0.275	0.275	36	0.439
Average	0.277	0.275	0.274	0.276	0.276	32.000	0.514

# Competitor #1 Ref-070223

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		t = Thickness (mils)					°/PD=	
_ Sample #	Point 1	Point 2	Point 3	Point 4	Average	Radius	(57.3*t)/(R-(t/2)	
701933 - 475(009)-1	0.270	0.270	0.274	0.279	0.273	7.5	2.124	
701933 - 475(009)-2	0.279	0.272	0.273	0.274	0.275	6	2.684	
701933 - 475(009)-3	0.269	0.268	0.267	0.266	0.267	9	1.728	
Average	0.272	0.270	0.271	0.273	0.272	7.500	2.179	



# Impact Resistance

ASTM G14

#### 3-(6"x 6"x 1/4") 1 of each coating

This testing was performed to a modified version of ASTM G-14. All the testing was performed at room temperature  $(75^{\circ}F \pm 3^{\circ}F)$  using a four (4) pound weight.

Drop Number	Coating Thickness Mils	Height of Drop (in.)	Failed (y/n)	In_lbs / Mil
3	19.4	6	no	1.24
7	22.5	7	no	1.24
4	20.2	7	no	1.39
5	21.2	8	yes	1.51
6	19.1	7.5	yes	1.57
2	20.4	10	yes	1.96
1	20.2	15	yes	2.97

# Powercrete F1, Sample # 701933-476(010)

# Competitor #2, Sample # 701933-477(011)

Drop Number	Coating Thickness Mils	Height of Drop (in.)	Failed (y/n)	In_lbs / Mil
9	16.3			0.00
1	25.5	10	no	1.57
8	22.7	11	no	1.94
7	20.1	10.5	yes	2.09
2	27.5	15	no	2.18
6	19.1	11	yes	2.30
5	25.2	15.5	yes	2.46
4	22.6	16	yes	2.83
3	24.4	18	yes	2.95

#### Competitor #1, Sample # 701933-478(012)

Drop Number	Coating Thickness Mils	Height of Drop (in.)	Failed (y/n)	In_lbs / Mil
8	19			0.00
4	24.5	11.5	no	1.88
7	20	9.5	no	1.90
5	24.9	12.25	yes	1.97
1	24.3	12	no	1.98
3	24.2	12.5	yes	2.07
2	24.1	14	yes	2.32
6	20.3	12	yes	2.36

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# **ASTM D4060**

# 6-(4"x 4"x 1/32") 2 of each coating

Specimen Powercrete F1 Ref-045-90	Weight Loss (mg)	Wear Index	Mils Loss	Cycles Per Mil
701933 - 479(013)	117.1	117.1	0.85	1176.5
701933 - 480(014)	108.0	108.0	1.05	952.4
Mean	112.55	112.55	0.95	1064.4

Specimen Competitor #2 Ref-045-90	Weight Loss (mg)	Wear Index	Mils Loss	Cycles Per Mil
701933 - 481(015)	59.5	59.5	0.73	1379.3
701933 - 482(016)	52.1	52.1	0.52	1904.8
Mean	55.8	55.8	0.63	1642.0

Specimen Competitor #1 Ref-045-90	Weight Loss (mg)	Wear Index	Mils Loss	Cycles Per Mil
701933 - 483(017)	62.1	62.1	0.92	1081.1
701933 - 484(018)	61.8	61.8	0.89	1126.8
Mean	61.95	61.95	0.91	1103.9

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# Powercrete R-65/F1 Manual Application Guide





#### Liquid Epoxy Coating with Quick Application and Long Term Corrosion Protection of Bare Steel

Powercrete R-65/F1 is a 100% solids liquid epoxy coating with quick cure time for efficient, user-friendly application to allow fast backfill. Along with excellent application productivity, R-65/F1 provides sound longterm corrosion protection of the bare steel substrate, outstanding adhesion, abrasion, and impact resistance. This high build two component epoxy can easily achieve a dry film thickness of up to 40+mils in a single application. Product can be applied on bare steel by spray or by hand (brush, roller, and trowel). Powercrete R-65/F1unique combination of handling and performance is best suited for girth welds corrosion protection of the new and rehabilitation of the operational pipeline. For large diameter pipe, please consult a Corrosion Protection Group representative.

This Manual Application guides gives detailed explanation on manual application of Powercrete R-65/F1. For spray application refer to application specifications for plant or field applied Powercrtete R-65/F1 over bare steel.

#### 1. Product



3. Surface Preparation

1. The two component epoxy coating is supplied in premeasured kits. Part A (large container) is the base and Part B (small container) is the curing agent. Prior to application ensure that the temperature of both parts is above 20° C (68° F).

#### 2. Application Kit



4. Surface Preparation



6. Surface Preparation



2. The application kit contains latex gloves, trowels, mixer for electric drill, hand stirrer, wet mil gauge, and disposable face mask



3. Ensure that the surface is clean of grease, oil, salts, and other contaminants. If necessary, use Acetone, MEK or other suitable solvent. Perform cleaning when pipe is 3° C (5° F) above dew point.

5. Surface Preparation



5. Burnishing or polishing using power wire brush or grinder is prohibited. Surface preparation can be controlled using surface profile tape or profilometer. Dry surface and insure ideal surface preparation using a tack cloth or by non-petroleum solvent (like Acetone) right after sand blasting or Monti-MBX Bristle Blasting tooling, to clean all contaminants.

4. Blast clean surface to a near white ISO-8501, NACE No. 2, SA-2 1/2 (SSPC-SP 10) or better using particle blasting or Monti MBX Bristle Blaster tool. Must create a surface profile of 2.5 to 4 mils. Sweep (brush-off) blast adjacent FBE or mainline coating 50 mm (2") to either side of bare steel area (i.e. cut-back area).

6. Warm the pipe substrate and adjacent area to 65°C (150°F), with propane torch, so as to illuminate moisture. Do not scorch the heat so that substrate develops blackening due to residual carbon powder.

#### 7. Combining and Mixing



#### 9. Application



#### 11. Thickness Measurement



7. If necessary, warm parts A and B to 20° C (68° F). Agitate part B before mixing to avoid settling. Mix by pouring all of part B into part A. Thoroughly scrape container and lid of part B. Slowly begin mixing to avoid introducing air into the mixture.

9. Reconfirm that the application temperature is above 10° C (50° F) and 3° C (5° F) above dew point. Slowly pour well-mixed epoxy onto the pipe. Apply thin film evenly to wet out substrate, then build coating to desired thickness. If the pipe is heated before and during application, R65-F-1 can be applied at temperatures below 10° C (50° F).

8. Mixing



#### 10. Application



12. Cure Times



#### 8. Use mixing speed that uniformly blends the 2 parts. Mix around 90 seconds with a electric drill mixer or 2-3 minutes with hand stirrer. Blend both parts to create uniform color with no streaks. While mixing R-65/F-1 with a drill mixer, the temperature of the epoxy should be closely monitored. When the temperature of the mixed R-65/F-1 reaches 80-90 deg. F (27-33 deg. C), it should be applied immediately onto pipe." DO NOT APPLY GELLED MATERIAL ON PIPE.

10. Use trowel, brush or roller to apply required minimum thickness of coating. Cover at least 50 mm (2") of the adjacent mainline coating.Watch & break air bubbles. The more and fast you trowel, more air-bubbles escape out of the applied material when it is wet.

12. The curing rate will vary according to pipe and ambient application temperature. Refer to Cure Chart to determine when to perform a shore D check. Do not perform shore D test when coating is soft. Prior to shore D testing, press the coating with thumb nail. If there is no thumb nail mark, coating would have attained 75 shore D.

Storage

For optimum performance, store Powercrete<sup>®</sup> Epoxy products in a dry, well-ventilated area. Maintain products in original packaging and sealed until just before use. Avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental conditions or contaminates.

NOTE: Avoid prolonged storage at temperatures above 40°C (104°F) or below 5°C (40°F).

#### Safety Guidelines

Important: Read the MSDS prior to using the products. Product installation should be done in well-ventilated area and in accordance with local health and safety regulations. These application guidelines are intended as a guide for standard products. Consult your Berry Plastics representative for specific projects or unique applications.



#### Manual Application Guide





Liquid epoxy coating with Quick Application and Long Term Corrosion Protection of Bare Steel

# POWERCRETE R-65/F1

# GEL, RE-COAT AND CURING TIME CHART

This chart provides approximate Gel, Re-coat, and Curing Time based on conditions and procedures outlined below:

- 1. Keep Part A at 77 °F (25°C) for hand application and 140°F (60°C) for spray application, keep Part B at 77°F (25°C) and warm/cool the High Density Polyethylene Sheet to be used as substrate to the designated temperature.
- 2. Mix Part A and Part B thoroughly, and pour the mixture on the substrate, spread to about 60 mils thick.
- 3. Set the mixtures in oven/refrigerator to maintain the temperature of testing.
- 4. Touch with finger to check gel time and dry time.
- 5. Cool down/warm up the coating mixture to room temperature 77° F (25° C) and measure the hardness with a Durometer Type "D" that has stabilized after 3 seconds and remains a constant reading of Shore 65 or Shore 75.

Testing	Application	Gel	Re-coat Time Window	Dry	65 Shore "D"	75 Shore "D"					
Temperature	Procedure	Time	(In minutes from application time of	Time	Reading	Reading					
		Unit in minutes	previous coating pass)	Unit in minutes	Unit in min. except indicated	Unit in minutes except indicated					
	WAR	NING: UNDER 40°F (4°C)	COATING MIXTURE IS FROZ	EN AND NO CHEMICAL RE	ACTION WILL OCCUR.						
40 °F (4 °C)	Hand	MATERIAL IS TOO VISCOUS, I	FROZEN LIKE, HARD TO DIFFERENTI	AIE	72 hours (Passed Im	npact 1in-#/mil)					
	Spray		GELING AND DRYING.		72 hours (Passe	d Impact 1in-#/mil)					
50 °F (10 °C)	Hand	40	35th85th	180	9 hrs	12 hrs; 16 hours (Shore 78)					
	Spray	20	12th60th	135	7 hrs	10 hrs; 16 hours (Shore 82)					
60 °F (18 °C)	Hand	23	20th70th	103	216	273					
	Spray	13	10th50th	75	185	245					
70 °F (21 °C)	Hand	17	15th30th	40	104	122					
· · · ·	Spray	11	9th28th	38	90	100					
77 °F (25 °C)	Hand	12	10th27th	37	68	75					
· · · ·	Spray	10	8th17th	25	55	70					
80 °F (27 °C)	Hand	13	9th27th	35	68	75					
· · · ·	Spray	8	6th13-th	23	50	63					
90 °F (32 °C)	Hand	12	9th16th	30	56	69					
· · · ·	Spray	7	5th10th	14	22	34					
100 °F (38 °C)	Hand	11	8th14th	23	32	38					
, , , , ,	Spray	6	4th9th	16	26	36					
110 °F (43 °C)	Hand	10	7th12th	17	26	32					
, ,	Spray	5	3rd6th	9	17	20					

\* Coating hardness to be at 75 Shore D reading prior to handling. Coating temperatures lower than 77° F (25° C) will give a false hardness reading. Using a grinder with grinding disk, a cured coating will give out dust particles, while an uncured coating will melt like gum.







#### APPLICATION SPECIFICATION FOR PLANT OR FIELD APPLIED POWERCRETE R65/F1 OVER BARE STEEL

#### 1.0 Scope

- 1.1 This application guide details the spray application for coating the surface of bare steel pipe or over plant applied or main line coatings with Powercrete R-65/F1, a new generation of protective coating material.
- 1.2 Contactor shall furnish all labor, supervision, materials, equipment and related hardware required for completing and acceptable application.
- 1.3 Coating materials shall be plainly and permanently marked, stored, and applied in accordance with the manufacturer's specifications as directed by the Company's authorized representative.

#### 2.0 Definitions

- 2.1 Company-The acceptor of the finished Powercrete R-65/F1 coated pipe, its employees, contracted inspector or other authorized personnel.
- 2.2 Coating Applicator-the Company responsible for the application of Powercrete R-65/F1 coating.
- 2.3 Manufacturer-The supplier/manufacturer of the Powercrete R-65/F1 materials to be applied.

#### 3.0 Surface Preparation

- 3.1 The surface to be coated shall be cleaned of all coatings and fee of all contaminates. Following cleaning, the surface of the steel shall be particle-blasted (sand or other suitable material). The pipe surface shall not be burnished. Steel surface to be coated shall be cleaned to near-white, ISO-8501-1, NACENo.2, SA-2½, SSPS-SP-10 or better. Surface anchor profile to be 2.5–4mils (63.5–101.6 microns) with sharp angularity.
- 3.2 Before applying the Powercrete R-65/F1 coating, the surface shall be subject to inspection for appropriate surface preparation.
- 3.3 The surface of the existing coating will be overlapped, if present shall be tapered, cleaned and abraded.

#### **4.0 Coating Application**

- 4.1 Ensure that the surface is clean of grease, oil, salts and other contaminants. If necessary, use acetone, MEK or other suitable solvent. Perform cleaning when surface is 3°C (5°F) above dew point, with no surface moisture present. While not always necessary, preheating can be useful just prior to application. To eliminate moisture, preheat the area to approx.40°C(104°F). To accelerate curing, preheat the area to approximately 80°C(176°F).
- 4.2 The dry, clean surface shall be coated with in 4 hours of abrasion.

Girth Welds / Rehabilitation



Liquid Epoxy Coating with Quick Application and Long Term Corrosion Protection of Bare Steel

#### 4.3 Spray Application

- 4.3.1 The Powercrete R-65/F1 components shall be adequately mixed with no air using a shut off valve manifold and 4 x 1/8" mixers connected by "L" bolts or equivalent, with a short whip hose and a 1-M airless gun.
- 4.3.2 Powercrete R-65/F1 shall be spray applied to the abraded, dried, cleaned surface, using adequate atomization.
- 4.3.3 Powercrete R-65/F1 shall be sprayed over the entire bare metal surface to a thin layer of 4-6 mils (101.6–152.4 microns) for better penetration, then shall be built up to the desired thickness.
- 4.3.4 Existing coating shall be overlapped at least 5cm (2").
- 4.3.5 Coated surface shall not be touched for at least 2 hours if ambient temperature is above 21°C (70°F), 4 hours at 16-21°C (60-70°F). This curing time can be reduced by applying heat with a heat gun or shrink sleeve torch. Do not raise the temperature in excess of 71°C (160°F). If torch or heat gun is used, keep it moving to avoid scorching the coating.
- 4.3.6 The wet coating shall not be contaminated with particles such as blowing sand, back fill, insects or other foreign materials.
- 4.3.7 Under no circumstances shall the pipe be installed before the Powercrete R-65/F1 coating has reached a minimum Shore D hardness of 75.

#### 5.0 Inspection

- 5.1 All work done shall be subject to inspection and acceptance by the Company's inspector.
- 5.2 The Coating Applicator's quality control inspector shall advise the Applicator's foreman when conditions exist which adversely affect the coating operation with respect to cleaning, application, or material performance, so that immediate corrective measures can be taken.
- 5.3 Holiday checks shall be made using a hot spark detector. The total voltage used for holiday checks will be 125 volts per mil and holidays found shall be patched as per Section 6 of this guide. The patched holidays shall be retested.
- 5.4 Coating thickness checks shall be made at an ambient temperature with a magnetic pull-off film thickness gauge (orother) that has been calibrated within the previous 24 hours, or immediately if mishandled, using a U.S. Bureau of Standard scertified coating calibration standard. The thickness of the calibration standard shall be at the upper and lower end of the specified thickness range. Thickness measurements shall be made in accordance with SSPC-PA2, Section 2. The thickness measurements shall be taken a long the length of each joint of Powercrete R65/F1 coated pipe at the 12 o'clock and 6 o'clock positions.
- 5.5 Coating hardness checks shall be made at an ambient temperature with a Shore D Durometer (ASTMD2240), lab calibrated within the previous sixty (60) days and verified daily, in good working condition and with no obvious damage. The checks shall be made at the 12 o'clock and 6 o'clock positions on the surface.

GirthWelds / Rehabilitation



Liquid Epoxy Coating with Quick Application and Long Term Corrosion Protection of Bare Steel

#### 6.0 Repairs

- 6.1 All damage detected by visual an delectrical inspection shall be repaired by the Applicator. Company approved coating mixtures shall be used for patching holidays and damaged coating.
- 6.2 Any areas requiring patching shall be cleaned by coating by hand or power tools. Steel surface area should be dry, cleaned, and patched with Powercrete R-65/F1 (see manual / kit application guide).
- 6.3 Patches shall overlap the surround in gun damaged coating by a minimum of 19mm (3/4").
- 6.4 Repairs shall be subject to re-inspection at the discretion of the Company inspector.
- 6.5 Areas not meeting the hardness requirement shall be removed using a method that will not damage the pipe.

#### 7.0 Storage

For optimum performance, store Powercrete<sup>®</sup> epoxy products in a dry, well-ventilated area. Maintain products in original packaging and sealed until just before use. Avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental conditions or contaminants.

NOTE: Avoid prolonged storage at temperatures above 40°C (104°F) or below 5°C(40°F).

#### **Safety Guidelines**

**Important:** Read the MSDS prior to using the products. Product installation should be done in a well-ventilated area and in accordance with local health and safety regulations. These application guidelines are intended as a guide for standard products. Consult your Berry Plastics representative for specific projects or unique applications.









Liquid Epoxy Coating With Quick Application and Long Term Corrosion Protection of Bare Steel

# **Theoretical Usage Rates**

	Pounds Per Linear Foot									
OD 3120	20 mils	25 mils	30 mils	35 mils	40 mils	45 mils	50 mils	55 mils	60 mils	
2" 3/8	0.19	0.22	0.25	0.28	0.31	0.34	0.37	0.40	0.44	
2" 7/8	0.23	0.26	0.30	0.34	0.38	0.41	0.45	0.49	0.53	
3" 1/2	0.27	0.32	0.37	0.41	0.46	0.50	0.55	0.60	0.64	
4" 1/2	0.35	0.41	0.47	0.53	0.59	0.65	0.71	0.77	0.82	
6" 5/8	0.52	0.61	0.69	0.78	0.87	0.95	1.04	1.13	1.21	
8" 5/8	0.68	0.79	0.90	1.02	1.13	1.24	1.35	1.47	1.58	
10" 3/4	0.84	0.99	1.13	1.27	1.41	1.55	1.69	1.83	1.97	
12" 3/4	1.00	1.17	1.34	1.50	1.67	1.84	2.00	2.17	2.34	
14"	1.10	1.28	1.47	1.65	1.83	2.02	2.20	2.38	2.57	
16"	1.26	1.47	1.68	1.88	2.09	2.30	2.51	2.72	2.93	
18"	1.41	1.65	1.88	2.12	2.36	2.59	2.83	3.06	3.30	
20"	1.57	1.83	2.09	2.36	2.62	2.88	3.14	3.40	3.67	
22"	1.73	2.02	2.30	2.59	2.88	3.17	3.46	3.74	4.03	
24"	1.88	2.20	2.51	2.83	3.14	3.46	3.77	4.08	4.40	
26"	2.04	2.38	2.72	3.06	3.40	3.74	4.08	4.42	4.76	
30"	2.36	2.75	3.14	3.53	3.93	4.32	4.71	5.11	5.50	
36"	2.83	3.30	3.77	4.24	4.71	5.18	5.65	6.13	6.60	
42"	3.30	3.85	4.40	4.95	5.50	6.05	6.60	7.15	7.70	
48"	3.77	4.40	5.03	5.65	6.28	6.91	7.54	8.17	8.80	
54"	4.24	4.95	5.65	6.36	7.07	7.78	8.48	9.19	9.90	
60"	4.71	5.50	6.28	7.07	7.85	8.64	9.42	10.21	11.00	
	Add Waste Factor: 10 % for Kits; 35% for 2"-12" pipe; 25% for 20" pipe and above									

#### A. Pounds Per Linear Foot Usage at Different Thicknesses and Pipe Diameters (No Waste Included)

#### B. Liters Needed to Coat Different Girth Weld Sizes at 25 mils (No Waste Included)

	Girth Weld Lengh (cut back + overlap)						
Pipe diameter	6"	8"	10"	12"	14"		
6"	0.05	0.07	0.09	0.11	0.12		
12"	0.10	0.14	0.17	0.21	0.24		
20"	0.16	0.22	0.27	0.32	0.38		
24"	0.19	0.26	0.32	0.39	0.45		
30"	0.24	0.32	0.40	0.48	0.56		
36"	0.29	0.39	0.48	0.58	0.68		
42"	0.34	0.45	0.56	0.68	0.79		
48"	0.39	0.52	0.65	0.77	0.90		

#### C. Theoretical Coverage in Sq. Ft. Per Package Size at Different Thicknesses (No Waste Included)

Packago Sizo	Coverage in sq. ft. at:							
Fackage Size	20 mils	25 mils	30 mils	35 mils	40 mils	45 mils	50 mils	
0.5 L Kit	10.1	8.1	6.7	5.8	5.1	4.5	4.0	
1L Kit	20.3	16.2	13.5	11.6	10.1	9.0	8.1	
2.5L Kit	50.8	40.6	33.8	29.0	25.4	22.6	20.3	
Mixed 1 Drum Part A and 0.5 Drum Part B	4769.4	3815.5	3179.6	2725.4	2384.7	2119.7	1907.8	



AND SUBSIDIARIES

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Dery relates warants and the products) represented within comonly to instruct and the products of the physical description and is appropriate for the use as stated on the respective technical data sheet when used in compliance with Berry Plastics written instructions. Since many installation factors are beyond the control of Berry Plastics, the user is obligated to determine the suitability of the products for the intended use and assume all risks and liabilities in connection herewith. Berry Plastics liability

is stated in the standard terms and conditions of sale. Berry Plastics makes no other warranty either expressed or implied. All information contained in the respective technical data sheet(s) should be

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# MATERIAL SAFETY DATA SHEET Powercrete R65/F1 Part A

**CORROSION PROTECTION GROUP** 

#### **IDENTIFICATION OF THE SUBSTANCE/PREPARATIONS AND OF THE COMPANY UNDERTAKING** 1.

Product Name	POWERCRETE R65/F1 PART A
Product Description	Pipe Coating
Manufacturer/Supplier	Berry Plastics Corporation, Tapes and Coatings Division
Address	11010 Wallisville Rd.
	Houston, TX 77013
Phone Number	(713) 676-0085 (Monday – Friday 8:00 am to 5:00 pm)
Chemtrec Number	(800) 424-9300
Revision Date:	October 09, 2009
MSDS Date:	June 16, 2008
Safety Data Sheet according to EC directiv	e 2001/58/EC and OSHA's Hazcom Standard (29 CFR 1910.1200)

#### **HAZARDS IDENTIFICATION** 2.

#### **EU Main Hazards**

R36/38 Irritating to eyes and skin. R43 May cause sensitization by skin contact. R51/53 Toxic to aquatic organisms may cause long-term adverse effects in the aquatic environment. Routes of Entry

- Eye contact - Skin contact - Inhalation (if aerosolized)

#### **Carcinogenic Status**

Considered carcinogenic by IARC (Titanium Dioxide)

#### **Target Organs**

Skin - Eye - Respiratory System (if aerosolized)

#### **Health Effects - Eyes**

Liquid, mist or vapor may cause pain, transient irritation and superficial corneal effects.

#### **Health Effects - Skin**

Repeated exposure may cause skin irritation. May cause skin sensitization.

#### **Health Effects - Ingestion**

If swallowed, may cause mild irritation to the GI tract.

#### **Health Effects - Inhalation**

Prolonged repeated exposure may cause irritation.

#### 3. **COMPOSITION/INFORMATION ON INGREDIENTS**

Component Name	CAS#/Codes	Concentration	R Phrases	Classification
Bisphenol A, epichlorohydrin polymer	28068-38-6 500-033-5	<45%	R36/38, R43, R51/53	Xi; N
Titanium Dioxide	13463-67-7 236-675-5	<2%	None	None
Inorganic compounds	proprietary	>50%	None	None

#### 4. FIRST AID MEASURES

#### Eyes

Immediately flood the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.

#### Skin

Immediately flood the skin with large quantities of water for at least 15 minutes, preferably under a shower. Remove contaminated clothing and continue washing. Contaminated clothing should be washed or dry-cleaned before re-use. Obtain medical attention if blistering occurs or redness persists.

#### Ingestion

Do not induce vomiting. Have victim drink 1-3 glasses of water to dilute stomach contents. If there is difficulty in breathing, give oxygen. Obtain medical attention immediately.

#### Inhalation

Remove from exposure. If there is difficulty in breathing, give oxygen. Obtain medical attention immediately.

#### 5. FIRE - FIGHTING MEASURES

#### **Extinguishing Media**

Use foam, dry chemical or carbon dioxide.

#### Unusual Fire and Explosion Hazards

Decomposition and combustion products may be toxic.

#### **Protective Equipment for Fire-Fighting**

Wear full protective clothing and self-contained breathing apparatus.

#### 6. ACCIDENTAL RELEASE MEASURES

Contain and absorb using earth, sand or other insert material. Transfer into suitable containers for recovery or disposal. Wear appropriate protective clothing. Prevent the material from entering drains or watercourses. Notify authorities if spill has entered watercourse or sewer or has contaminated soil or vegetation. Dispose in accordance with federal, state and local regulations.

#### 7. HANDLING AND STORAGE

Use in well ventilated area. Use local exhaust ventilation. Use appropriate protective clothing. If this product is sprayed, aerosolized or applied to hot surfaces, wear appropriate protective clothing to prevent contact with skin, eyes and respiratory system. Consider the use of respiratory protection, especially during application to hot surfaces. Avoid contact with eyes, skin and clothing. Keep container tightly closed when not in use.

Storage area should be: - cool - dry - well ventilated - away from incompatible materials - out of direct sunlight – away form sources of ignition

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Occupational Exposure Standards

Exposure limits are listed below, if they exist. **Titanium Dioxide** ACGIH TLV: 10 mg/m<sup>3</sup> TWA OSHA PEL: 15 mg/m<sup>3</sup> TWA (Total dust) **Bisphenol A, epichlorohydrin polymer** None established. **Engineering Control Measures** 

Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### **Respiratory Protection**

Wear respiratory protection if there is a risk of exposure to high vapor concentrations, aerosols or if applied to hot surfaces. The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.

#### Hand Protection

Butyl gloves are recommended.

#### Eye Protection

Chemical goggles or safety glasses with side shields

#### **Body Protection**

If there is danger of splashing, wear: - overall or apron

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Viscous Liquid
Color	Off white
Odor	Slight
рН	Not applicable
Specific Gravity	1.92 +/- 0.03
Boiling Range/Point (°C/F)	>260°C/500°F
Melting Point (°C/F)	Not determined
Flash Point (PMCC) (°C/F)	Approx. 251°C/484°F (Pensky-Martens)
Vapor Pressure	Approx. 0.03 mbar at 77°C/171°F
Evaporation Rate	Not determined
Solubility in Water	Negligible
Vapor Density (Air = 1)	Not Applicable
Viscosity (cSt)	Not determined
VOC (g/l)	Not determined

#### 10. STABILITY AND REACTIVITY

#### Stability

Stable under normal conditions.

#### **Conditions to Avoid**

- Heat, sparks, flames - contact with incompatibles

#### Materials to Avoid

Strong oxidizing agents – strong Lewis or mineral acids – strong mineral and organic bases – avoid contact with water

#### Hazardous Polymerization

Will not occur.

# Hazardous Decomposition Products

oxides of carbon - aldehydes

#### 11. TOXICOLOGICAL INFORMATION

#### Acute Toxicity

Low order of acute toxicity.

#### Chronic Toxicity/Carcinogenicity

Titanium Dioxide: IARC Overall Evaluation is 2B (Possibly carcinogenic to humans)

#### 11. TOXICOLOGICAL INFORMATION

#### Genotoxicity

This product is not expected to cause any mutagenic effects.

#### Reproductive/Developmental Toxicity

This product is not expected to cause adverse reproductive effects.

#### 12. ECOLOGICAL INFORMATION

#### Mobility

No relevant studies identified. **Persistence/Degradability** No relevant studies identified.

#### **Bio-accumulation**

No relevant studies identified.

#### Ecotoxicity

No data available.

#### 13. DISPOSAL

For disposal of residual product, mix (by volume) 2 parts Powercrete R65/F1 Part A with 1 part Powercrete R65/F1 Part B and allow to solidify in well ventilated area. Dispose of in accordance with all applicable local and national regulations. Labels should not be removed from containers until they have been cleaned. Empty containers may contain hazardous residues. Dispose of containers with care.

#### 14. TRANSPORT INFORMATION

DOT CFR 172.101 Data	Not Regulated
UN Proper Shipping Name	Not Regulated
UN Class	None.
UN Number	None.
UN Packaging Group	None.
Classification for AIR Transportation (IATA)	Consult current IATA Regulations prior to shipping by air.

#### 15. **REGULATORY INFORMATION**

#### EU Label Information

Classification and labelling have been performed according to EU directives 67/548/EEC and 99/45/EC including amendments(2001/60/EC and 2006/8/EC)

#### EU Hazard Symbol and Indication of Danger

Xi, N: Irritant and Dangerous to the Environment

#### R phrases

R36/38 – Irritating to eyes and skin

R43 – May cause sensitization by skin contact

R51/53 – Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

#### S phrases

S(02) - Keep out of reach of children.

S24 – Avoid contact with skin.

S28 – After contact with skin, wash immediately with plenty of water and soap.

S37/39 – Wear suitable gloves and eye/face protection

S(46) – (If swallowed, seek medical advice immediately and show this container or label)

S61 – Avoid release to the environment.

#### 15. **REGULATORY INFORMATION**

# US REGULATIONS (Federal, State) and INTERNATIONAL CHEMICAL REGISTRATION LAWS

All ingredients have been verified for inclusion on the EPA Toxic Substance Control Act Chemical Substance Inventory.

#### EINECS Listing

All ingredients in this product have been verified for inclusion on the European Inventory of Existing Commercial Chemical Substances (EINECS) or specifically exempted.

#### DSL (Canadian) Listing

All ingredients in this product have been verified for inclusion on the Domestic Substance List (DSL).

#### **California Proposition 65**

This product contains materials which the State of California has found to cause cancer, birth defects or other reproductive harm: Crystalline silica (14808-60-7) 0.004% - Phenyl glycidyl ether (122-60-1)<6 ppm

#### SARA Title III Sect. 311/312 Categorization

Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard

#### SARA Title III Sect. 313

This product does not contain any chemicals that are listed in Section 313 at or above de minimis concentrations.

#### 16. OTHER INFORMATION

#### **NFPA** Ratings

NFPA Code for Flammability - 0 NFPA Code for Health - 1 NFPA Code for Reactivity - 0 NFPA Code for Special Hazards – None

#### **HMIS Ratings**

HMIS Code for Flammability - 0 HMIS Code for Health - 1 HMIS Code for Reactivity - 0 HMIS Code for Personal Protection - See Section 8

#### Abbreviations

N/A: Denotes no applicable information found or available CAS#: Chemical Abstracts Service Number ACGIH: American Conference of Governmental Industrial Hygienists OSHA: Occupational Safety and Health Administration TLV: Threshold Limit Value PEL: Permissible Exposure Limit STEL: Short Term Exposure Limit NTP: National Toxicology Program IARC: International Agency for Research on Cancer R: Risk S: Safety

#### For further Information email: msdstechnical@berryplastics.com

**Prepared By:** 

EnviroNet LLC.

#### 16. OTHER INFORMATION

The information and recommendations presented in this MSDS are based on sources believed to be accurate. Berry Plastics Corporation, Tapes and Coatings Division assumes no liability for the accuracy or completeness of this information. It is the user's responsibility to determine the suitability of the **material** for their particular purposes. In particular, we make NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, with respect to such information, and we assume no liability resulting from its use. Users should ensure that any use **or disposal** of the material is in accordance with applicable Federal, State, and local laws and regulations.

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**CORROSION PROTECTION GROUP** 

**Phone Number** 

**Revision Date:** 

MSDS Date:

**Chemtrec Number** 

#### PRODUCT AND COMPANY IDENTIFICATION 1.

**Product Name** Manufacturer/Supplier Address

POWERCRETE R65/F1 PART B Berry Plastics Corporation, Tapes and Coatings Division 11010 Wallisville Rd. Houston, TX 77013 (713) 676-0085 (Monday - Friday 8:00 am to 5:00 pm) (800) 424-9300 October 09, 2009 June 16, 2008 This MSDS has been compiled in accordance with - EC Directive 91/155/EC - OSHA's Hazcom Standard (29 CFR 1910.1200)

#### 2. COMPOSITION/INFORMATION ON THE COMPONENTS

Component Name Alkyl Amine	CAS#/Codes Proprietary	Concentration 20-65%	<b>R Phrases</b> R20/21/22 R34.R43.R68	<b>Classification</b> C
Inorganic compounds	Proprietary	20-55%	None	None
Nitrate Compound	Proprietary	<3%	None	None
Ethanol	64-17-5 200-578-6	<3%	R11	F
Dye Compound	Proprietary	<3%	None	None

#### 3. HAZARD IDENTIFICATION

#### **EU Main Hazards**

R20/21/22 Harmful by inhalation, in contact with skin and if swallowed R34 Causes burns. R43 May cause sensitization by skin contact. R68 - Possible risk of irreversible effects.

#### **Routes of Entry**

- Eye contact - Ingestion - Skin contact - Inhalation - Absorption

#### **Carcinogenic Status**

Not considered carcinogenic by NTP, IARC, and OSHA.

#### **Target Organs**

Skin --- Eye --- Respiratory System -- Nervous System - Liver

#### **Health Effects - Eyes**

Contact may cause burning, redness and severe damage including blindness. Vapors may be irritating.

#### Health Effects - Skin

Contact may cause severe irritation, dermatitis and chemical burns. May cause allergic skin reaction. Allergies, eczema and skin conditions may be aggravated by exposure to this product.



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# MATERIAL SAFETY DATA SHEET POWERCRETE R65/F1 PART B

# 3. HAZARD IDENTIFICATION

#### Health Effects - Ingestion

Swallowing may cause severe burns and permanent damage to the mouth, throat and stomach. May be moderately toxic if swallowed. May cause central nervous system effects such as headache, nausea dizziness, and confusion and breathing difficulties. Chronic exposure can result in liver damage.

#### **Health Effects - Inhalation**

Inhalation of vapors may be severely irritating and may cause chemical burns to the respiratory tract. Repeated exposure may cause lung damage. May be toxic if inhaled. May cause central nervous system effects such as headache, nausea, dizziness, and confusion and breathing difficulties.

# 4. FIRST AID MEASURES

#### Eyes

Immediately flood the eye with plenty of water for at least 20 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.

#### Skin

Immediately flood the skin with large quantities of water for at least 20 minutes, preferably under a shower. Remove contaminated clothing and continue washing. Contaminated clothing should be washed or dry-cleaned before re-use. Obtain medical attention if blistering occurs or redness persists.

#### Ingestion

Do not induce vomiting unless directed to do so my medical personnel. Have victim drink 1-3 glasses of water to dilute stomach contents. If there is difficulty in breathing, give oxygen. Obtain medical attention immediately.

#### Inhalation

Remove from exposure. If there is difficulty in breathing, give oxygen. Obtain medical attention immediately.

# 5. FIRE FIGHTING MEASURES

#### **Extinguishing Media**

Use foam, dry chemical or carbon dioxide.

#### **Unusual Fire and Explosion Hazards**

Decomposition and combustion products may be toxic.

#### **Protective Equipment for Fire-Fighting**

Wear full protective clothing and self-contained breathing apparatus.

# 6. ACCIDENTAL RELEASE MEASURES

Contain and absorb using earth, sand or other inert material. Transfer into suitable containers for recovery or disposal. Wear appropriate protective clothing. Prevent the material from entering drains or watercourses. Notify authorities if spill has entered watercourse or sewer or has contaminated soil or vegetation. Dispose in accordance with federal, state and local regulations.



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# 7. HANDLING AND STORAGE

Use in well ventilated area. Use local exhaust ventilation. Use appropriate protective clothing. If this product is sprayed, aerosolized or applied to hot surfaces, wear appropriate protective clothing to prevent contact with skin, eyes and respiratory system. Consider the use of respiratory protection, especially during application to hot surfaces as volatile organic chemicals may be released. Avoid contact with eyes, skin and clothing. Keep container tightly closed when not in use.

Storage area should be: - cool - dry - well ventilated - away from incompatible materials - out of direct sunlight – away form sources of ignition

# 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### **Occupational Exposure Standards**

Exposure limits are listed below, if they exist Alkyl Amine None established. Ethanol ACGIH: TLV 1000 ppm (1880 mg/m<sup>3</sup>) ) 8 hr TWA OSHA :PEL 1000 ppm (1900 mg/m<sup>3</sup>) ) 8 hr TWA

#### **Engineering Control Measures**

Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions.

#### **Respiratory Protection**

Wear respiratory protection if there is a risk of exposure to high vapor concentrations, aerosols or if applied to hot surfaces. A NIOSH approved full face respirator may be worn. The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.

#### **Hand Protection**

Butyl gloves are recommended.

#### **Eye Protection**

Chemical goggles or safety glasses with side shields. Consider the use of a face shield if splashing is possible.

#### **Body Protection**

If there is danger of splashing, wear: - overall or apron

# 9. PHYSICAL AND CHEMICAL PROPERTIES

**Physical State** Viscous liquid Color Green Odor Amine odor pН Alkaline **Specific Gravity** 1.38 +/-0.03 Boiling Range/Point (°C/F) Not determined Melting Point (°C/F) Not determined Flash Point (PMCC) (°C/F) > 200/392 Vapor Pressure(mm HG)at (°C/F) < 1 mm Hg at 20/68



# 9. PHYSICAL AND CHEMICAL PROPERTIES

Evaporation Rate Solubility in Water Vapor Density (Air = 1) VOC (g/l) Not determined Slightly miscible Heavier than air. Not determined

# 10. STABILITY AND REACTIVITY

#### Stability

Stable under normal conditions.

#### **Conditions to Avoid**

- Heat, sparks, flames - contact with incompatible chemicals

#### Materials to Avoid

- strong oxidizing agents - acids

#### **Hazardous Polymerization**

Will not occur.

#### Hazardous Decomposition Products

- oxides of carbon - aldehydes - nitrogen oxides - organic compounds

# 11. TOXICOLOGICAL INFORMATION

#### Acute Toxicity

Alkyl amine: Oral LD50(rat): 400 <LD50<u><</u>2000 mg/kg Dermal LD50: >2000 mg/kg Inhalation LC50: 1< LC50 <u><</u>5 mg/l

#### **Chronic Toxicity/Carcinogenicity**

Not expected to cause long term adverse health effects.

#### Genotoxicity

This product is not expected to cause any mutagenic effects.

#### **Reproductive/Developmental Toxicity**

This product is not expected to cause adverse reproductive effects.

# 12. ECOLOGICAL INFORMATION

#### Mobility

No relevant studies identified. **Persistence/Degradability** Alkyl amine: Expected to be not readily biodegradable. **Bio-accumulation** Alkyl amine: Not expected to bioaccumulate significantly. **Ecotoxicity** 

#### Alkyl amine: Toxicity to fish: 10< LC/EC/IC 50 < 100 mg/l Toxicity to algae: 10< LC/EC/IC 50 < 100 mg/l Acute toxicity- in vertebrates: 10< LC/EC/IC 50 < 100 mg/l



# 13. DISPOSAL

For disposal of residual product, mix (by volume) 2 parts Powercrete R65/F1 Part A with 1 part Powercrete R65/F1 Part B and allow to solidify in well ventilated area. Dispose of in accordance with all applicable local and national regulations. Labels should not be removed from containers until they have been cleaned. Empty containers may contain hazardous residues. Dispose of containers with care.

# 14. TRANSPORT INFORMATION

DOT CFR 172.101 Data	Polyamines, liquid, corrosive, n.o.s. (polyalkyl amine) (8) UN2735, PGIII
UN Proper Shipping Name	Polyamines, liquid, corrosive, n.o.s. (polyalkyl amine)
UN Class	8 (corrosive)
UN Number	UN2735
UN Packaging Group	III
Classification for AIR Transportation (IATA)	Consult current IATA Regulations prior to shipping by air.

# 15. REGULATORY INFORMATION

#### EU Label Information

Classification and labelling have been performed according to EU directives 67/548/EEC and 99/45/EC including amendments.

#### EU Hazard Symbol and Indication of Danger

# C - Corrosive

R phrases

R20/21/22 Harmful by inhalation, in contact with skin and if swallowed

R34 Causes burns.

R43 May cause sensitization by skin contact.

R68 – Possible risk of irreversible effects.

#### S phrases

S23 Do not breather vapour.

S26In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/38 Wear suitable protective clothing, gloves and eye/face protection. S45 In case of accident or if you feel unwell, seek medical advice.

#### US REGULATIONS (Federal, State) and INTERNATIONAL CHEMICAL REGISTRATION LAWS

#### TSCA Listing

All ingredients have been verified for inclusion on the EPA Toxic Substance Control Act Chemical Substance Inventory.

#### **EINECS** Listing

All ingredients in this product have not been verified for inclusion on the European Inventory of Existing Commercial Chemical Substances (EINECS).

#### DSL (Canadian) Listing

All ingredients in this product have not been verified for inclusion on the Domestic Substance List



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#### (DSL).

# 15. REGULATORY INFORMATION

#### **California Proposition 65**

This product contains materials which the State of California has found to cause cancer, birth defects or other reproductive harm - Crystalline silica (14808-60-7) 0.003%

#### SARA Title III Sect. 302 (EHS)

The following chemicals have reportable quantities : None

#### SARA Title III Sect. 304

This product does not contain any chemicals subject to SARA Title III Section 304.

#### SARA Title III Sect. 311/312 Categorization

Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard

#### SARA Title III Sect. 313

This product contains a chemical that is listed in Section 313 at or above de minimis concentrations. The following listed chemicals are present: None

# 16. OTHER INFORMATION

#### **NFPA Ratings**

NFPA Code for Flammability - 1 NFPA Code for Health - 3 NFPA Code for Reactivity - 0 NFPA Code for Special Hazards – None

#### **HMIS Ratings**

HMIS Code for Flammability - 1 HMIS Code for Health - 3 HMIS Code for Reactivity - 0 HMIS Code for Personal Protection - See Section 8

#### Abbreviations

N/A: Denotes no applicable information found or available
CAS#: Chemical Abstracts Service Number
ACGIH: American Conference of Governmental Industrial Hygienists
OSHA: Occupational Safety and Health Administration
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
STEL: Short Term Exposure Limit
NTP: National Toxicology Program
IARC: International Agency for Research on Cancer
R: Risk
R11: Highly Flammable
F: Highly Flammable
S: Safety



# 16. OTHER INFORMATION

For further Information email: msdstechnical@berryplastics.com

**Prepared By:** 

EnviroNet LLC.

The information and recommendations presented in this MSDS are based on sources believed to be accurate. Berry Plastics assumes no liability for the accuracy or completeness of this information. It is the user's responsibility to determine the suitability of the **material** for their particular purposes. In particular, we make NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, with respect to such information, and we assume no liability resulting from its use. Users should ensure that any use **or disposal** of the material is in accordance with applicable Federal, State, and local laws and regulations.

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# Distributors for Powercrete R-65/F-1



# Powercrete<sup>®</sup> R-65/F-1 Girth Welds / Rehabilitation

Liquid Epoxy Coating For Fast Application and Long Term Corrosion Protection of Bare Steel

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Liquid Epoxy Coating For Fast Application and Long Term Corrosion Protection of Bare Steel

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Berry Plastics Corrosion Protection Group Locations



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