



REICHHOLD

Bringing Solutions to the Surface

EPOTUF[®] 37-685

Waterborne Epoxy Curing Agent

For industrial maintenance applications providing the corrosion protection of solventborne coatings with waterborne chemistry.

(800) 431-1920



Press Release

Reichhold Introduces Waterborne Epoxy Curing Agent for Industrial Maintenance Applications

EPOTUF® 37-685 -- Excellent Performance with Waterborne Chemistry

Reichhold has introduced a patented waterborne epoxy curing agent, EPOTUF® 37-685, for industrial maintenance applications providing the corrosion protection of solventborne coatings with waterborne chemistry.

Coatings based on this new curing agent and EPOTUF 37-143 epoxy resin aqueous dispersion perform well on metal substrates providing excellent corrosion resistance equivalent to many solventborne systems, but at lower VOC levels.

Where other waterborne epoxy systems tend to exhibit blistering and/or delamination when exposed to moisture, EPOTUF 37-685 produces coatings with exceptional adhesion to steel.

Description

EPOTUF 37-685 is an amine-functional dispersion which can be used to formulate two-component, waterborne epoxy systems with properties comparable to conventional solvent-based, two-component epoxy coatings. Coatings based on EPOTUF 37-685 are used in direct-to-metal applications with low VOC (volatile organic compounds), good corrosion resistance, high hardness, good adhesion in humid conditions and good chemical resistance. EPOTUF 37-143 epoxy resin aqueous dispersion is recommended as the coating epoxy component for optimum performance.

[\(more\)](#)



Applications

EPOTUF 37-685 is designed for industrial maintenance or “field applied” applications where customers require solventborne epoxy performance, but need to meet ever tightening VOC regulations. Applications based on EPOTUF 37-685 include spray, brush or roll-applied coatings such as:

- **Medium-Heavy Duty industrial maintenance primers**
- **Light-duty, direct-to-metal coatings**
- **Rail & transportation coatings**
- **Concrete sealers, primers & topcoats**

End-use applications for these EPOTUF 37-685 based coatings may include industrial maintenance of storage tanks, pipes, steel structures, rail cars, railings, gratings, and stairways among others.

Features & Benefits

“EPOTUF 37-685 provides excellent solvent and corrosion resistance, equal to or better than many solventborne systems,” explains Business Development Representative **Tim Takas**. “The fast drying times exhibited by coatings based on EPOTUF 37-685 allow for early return to service in the field,” Takas continues. “Its stable performance over a four-hour pot life provides more user-friendly coatings that yield better job consistency and far less wasted paint.”

“The adhesion to steel substrates of these coatings after exposure to humid conditions is far better than any water system I’ve seen in my twenty years developing and applying epoxy coatings,” concluded Takas.

Meeting VOC Regulations

Primers based on EPOTUF 37-685 and EPOTUF 37-143 meet the new SCAQMD requirements in California by exhibiting VOC levels of 100 grams per liter or less. EPOTUF 37-685 can be used to produce both primers and topcoats that meet VOC limits anywhere in the United States.

[\(more\)](#)



Lower Applied Cost

“Another strong point of EPOTUF 37-685 is that it will allow end-users of coatings based upon this curing agent to apply thinner ‘film builds’ at low VOC,” explains Reichhold Specialty Resins Business Manager **Bob Gilliam**.

“The low application viscosity allows a coating DFT of 2.0 mils with good corrosion protection for light-medium duty applications and up to 8-10 mils for heavy duty applications. The lower film build can result in reduced applied cost for coatings based on this product.”

“Reichhold customers who have formulated coatings using this product have enjoyed great success with it,” Gilliam says, “gaining the best of both worlds in that they are getting solvent-like performance in a waterborne epoxy curing agent, something other suppliers have found difficult to deliver.”

For more on Reichhold’s coatings industry products, visit our website at www.Reichhold.com/Coatings

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About Reichhold

Founded in 1927, Reichhold will celebrate 80 years in business in 2007. With its world headquarters and technology center in Research Triangle Park, North Carolina, USA, Reichhold is the world’s largest manufacturer of unsaturated polyester resins and a leading supplier of coating resins for a wide variety of markets. Reichhold has manufacturing operations throughout North America, Latin America, the Middle East and Europe.



Product Description

- EPOTUF[®] 37-685 is a patented amine-functional dispersion that is used to formulate two-component, waterborne epoxy coatings with properties comparable to conventional solvent-based two-component epoxy coatings.
- It is used with EPOTUF 37-143 epoxy dispersion.
- Coatings containing 37-685 are used in direct to metal applications with low VOC, good corrosion resistance, high hardness and good chemical resistance. These coatings maintain adhesion after exposure to salt fog, prohesion and condensing humidity.



Typical Resin Properties

Viscosity, cps, 25°C	50
Appearance	Milky white emulsion
Pounds per Gallon	8.9
Amine Hydrogen Equivalent Weight, as supplied	320
Percent Solids, by weight	50%
Percent Solids, by volume	46%
Volatiles	7% PM glycol ether, water



Typical Coating Properties

Dry Time, Gardner, set / thru / hard	45 min / 4.5 hr / 7.0 hr
VOC, primer	<100 g/l
Pot Life	4 hours
Hardness	>3H pencil, 97 König, 14 Sward
Corrosion Resistance Salt Fog 1000 hrs, 2.0 mil DFT, CRS	Field blistering 8MD Scribe Creep <3 mm
Chemical Resistance	Excellent



Feature - Benefits

Feature	Benefit
Excellent corrosion resistance	Performance comparable to solventborne systems
Excellent metal adhesion	Film maintains adhesion in high humidity environments
Low VOC, <100 g/l primer	Meets new SCAQMD regulations for IM coatings
Fast dry time	Early return to service
Stable film performance over 4 hr pot life	User friendly, better job consistency, reduced paint waste
Low Odor	Better worker environment
Non-HAPS	Regulatory compliant
Good in-can coating stability	Longer shelf life, performance consistency
Freeze-thaw stable	Simpler shipping and longer storage



End Use Applications

Application	Comment
Medium - Heavy Duty Industrial Maintenance Primers for non-immersion service	Waterborne primers with excellent corrosion resistance and good metal adhesion @ <100 g/l VOC
Light Duty Direct-to-Metal Coatings	Waterborne coatings for railings, gratings, stairways, etc., brush and roller applied
Concrete Sealers, Primers and Topcoats	Easy application, good wetting and adhesion to concrete
Rail & Transportation Coatings	Good corrosion protection in exterior primer applications



Performance vs Solventborne Benchmark

The EPOTUF 37-685/37-143 system gives

- Comparable corrosion resistance
- Faster tack free dry time
- Faster recoat time with 2K SB urethane
- Better pencil hardness
- Better MEK resistance (double rubs)
- Better xylene and gasoline resistance in spot tests



Performance vs Competitive WB and Commercial SB Coatings

System:	EPOTUF® 37-685				Competitive WB				Commercial SB			
VOC at Application (lb/gal & g/L)	0.77 lb/gal or 92 g/L				0.84 lb/gal or 100 g/L				3.2 lb/gal or 384g/L			
Gardner Dry Time (set / thru / hard)	45 min / 4.5 hr / 7.5 hr				30 min / 1.5 hr / 6 hr				1 hr / 3.5 hr / 5 hr			
Zapon Tack Free (250g/500g, minutes)	65 min / 100 min				100 min / 120 min				180 min / 205 min			
Crosslink Properties, Days	1	3	7	14	1	3	7	14	1	3	7	14
König Hardness	84	98	97	114	59	83	97	95	29	67	88	100
Sward Hardness	11	13	14	13	10	12	13	12	9	11	13	13
Pencil Hardness	2H	3H	6H	6H	HB	2H	2H	3H	HB	HB	HB	HB
Impact Resistance (D/R)	40 / <5				50 / <5				30 / <5			
Cross-Hatch Adhesion	5B				5B				5B			
MEK Double Rubs (to film break)	83	292	>1000	>1000	104	378	654	935	34	100	191	395
Average DFT, mils:	2.35	2.33	2.28	2.25	2.18	2.35	2.20	2.25	2.33	2.35	2.12	2.17



Chemical Resistance

System:	EPOTUF [®] 37-685	Competitive WB	Commercial SB
Chemical Resistance	7 day cure		
10% Acetic Acid	1	1	2.5
10% HCl Acid	2	1	5
10% H ₂ SO ₄	1	1	4.5
10% NaOH	5	5	5
2% Nitric Acid	3.5	3.5	4.5
Acetone	4.5	4.5	4.5
Xylene	4	4	2
Methanol	4.5	4.5	4.5
Ethanol	4.5	4.5	4.5
Isopropanol	4.5	4.5	4.5
Gasoline	4	4.5	2.5
Skydrol	4.5	4.5	4
Deionized H ₂ O	5	5	5
Total (out of 65):	48	47.5	53

24 hour spot test, covered

1 = destroyed, 5 = no effect



Prohesion 900 Hours

EPOTUF® 37-685



Competitive WB



Commercial SB



Tape pull, scribed before exposure, 2 mil DFT, CRS

Salt Fog 1000 Hours

EPOTUF[®] 37-685



Competitive WB



Commercial SB



Tape pull, scribed before exposure, crosshatched after exposure, 2 mil DFT, CRS



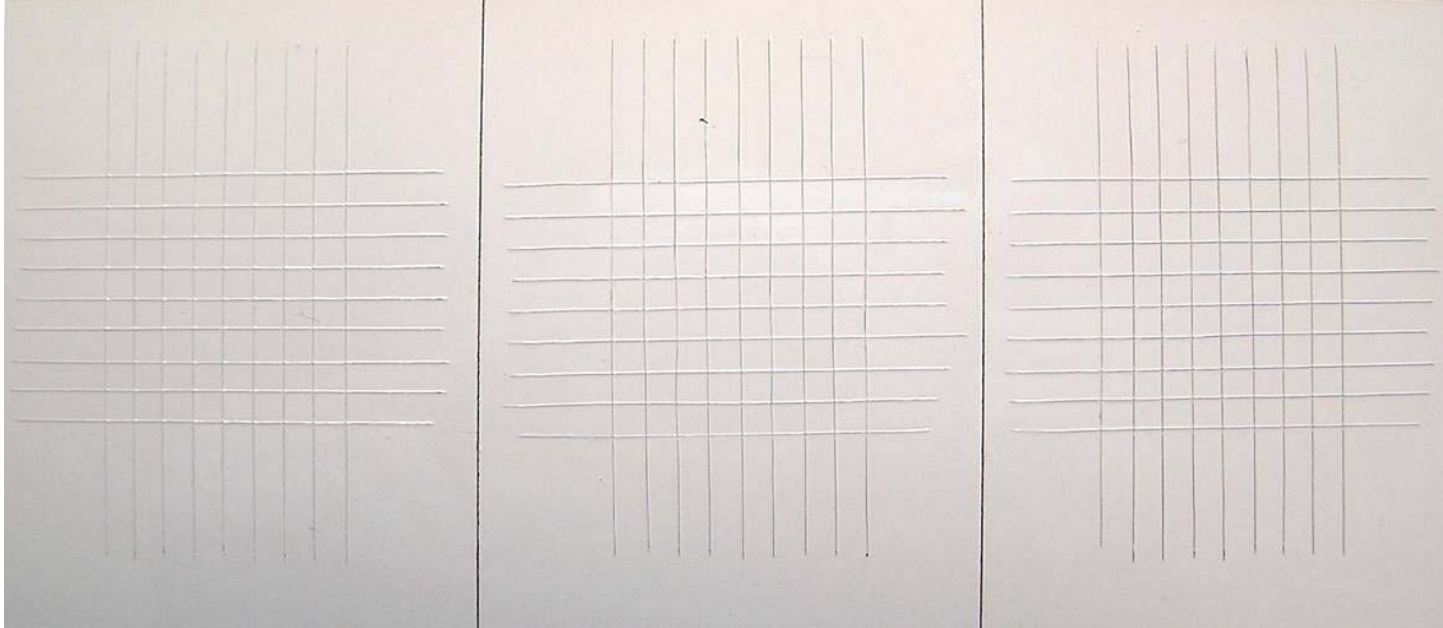
Recoat Window – 2K SB Urethane Topcoat

- Top-coating does not damage primer after 1 hour dry – fast recoat time
- Top-coating at 43 days shows excellent adhesion although the primer is very hard – long recoat window

1 Hour

1 Day

43 Days





Epoxy Dispersion or LER in 37-685 systems

- **EPOTUF 37-685 + EPOTUF 37-143**
 - EPOTUF 37-143 is an aqueous dispersion of liquid epoxy resin supplied at 78% NV
 - EPOTUF 37-685 was designed to be used with 37-143 and this system gives the lowest VOC with primers at <100 g/l
 - We recommend that customers use 37-143 as the epoxy component
- **EPOTUF 37-685 + EPOTUF 37-140 (LER)**
 - EPOTUF 37-685 is compatible with water soluble solvent cuts of EPOTUF 37-140 standard liquid epoxy resin
 - This system could be lower raw material cost but higher VOC with primers <250 g/l
 - We do not have a complete starting point formula to offer at this time



Red Iron Oxide Primer at 38 PVC, <100 g/l VOC

• **COMPONENT A**

<u>Lbs.</u>	<u>Gals.</u>	<u>Material</u>
195.33	22.05	EPOTUF® 37-685
11.45	1.43	EPOTUF® 37-640
1.81	0.24	Patcote 841
28.92	3.85	2-Butoxy Ethanol
90.36	10.83	Deionized Water
• <i>Mix until uniform, then add:</i>		
62.12	1.45	Red Iron Oxide R5098D
521.46	21.55	Wollastocoat 10 AS
• <i>High speed disperse to 5 Hegman, then add:</i>		
64.91	7.33	EPOTUF® 37-685
13.93	1.81	PM solvent
990.29	70.38	Total, Component A

• **COMPONENT B**

259.86	29.46	EPOTUF® 37-143
259.86	29.46	Total, Component B
1250.15	100.00	A & B TOTAL

ANALYSIS:

74.3	Percent Solids, Weight
60.8	Percent Solids, Volume
12.5	Weight/Gallon, Pounds
1.7/1	Pigment to Binder, Weight Ratio
38.0	Pigment Volume Concentration, %
0.77	VOC, Lbs/Gal
92.32	VOC, Grams/Liter
• Patcote 841 is a defoamer from Hydrite	
• Red Iron Oxide R5098D is from Elementis	
• Wollastocoat 10 AS is an extender pigment from NYCO Mineral Inc	



Shelf Life Stability – EPOTUF 37-685

- >3 months at 120°F on neat resin
- 1 year room temperature
- Checked for particle size, phase separation
- ASTM D2243-95 Freeze–Thaw Test
 - Passes 5 cycles
 - Doesn't freeze at 0° F
 - Freezing point has not been determined



EPOTUF 37-685 Value to Customer Summary

- Performance is comparable to solventborne epoxy coatings for broad use in metal protection
- Primer VOC meets all the U.S. regulations including SCAQMD in California
- Coating producer can make one paint for sale in all regions reducing manufacturing and inventory costs
- Thinner films can be applied than with high solids solventborne for reduced cost-in-use in light-medium duty applications
- Thinning and clean up with water is simpler/cheaper for the coating contractor



**For More Information,
Contact Reichhold at:**

(800) 431-1920

www.Reichhold.com/Coatings