PRODUCT BULLETIN

EPOTUF® 37-703

Cycloaliphatic Amine Curing Agent

DESCRIPTION

EPOTUF® 37-703 is a modified cycloaliphatic amine adduct designed to provide ultra low viscosity, good color, and color stability. It exhibits high gloss and superior carbamation resistance even in the adverse conditions of low temperature and high humidity. Low viscosity combined with a rapid reactivity make EPOTUF® 37-703 an ideal candidate in civil engineering and coatings markets for industrial applications requiring good color/color stability. EPOTUF® 37-703 is recommended for use in industrial applications wherein sporadic or short-term (ambient temperature) chemical resistance is required. Typical applications include topcoat sealers and 100% and/or high-solids industrial maintenance coatings.

FEATURES & BENEFITS

- Ultra-low viscosity
- Low color and high gloss
- Good color stability
- Rapid thin film set down to 40□F
- Superior blush / carbamation resistance
- Excellent compatibility with Bis-F, Bis A, and/or Multifunctional resin
- Good chemical resistance

PROPERTIES - LIQUID

Gardner Color	< 1
Percent Solids	100*
Viscosity at 25°C, cps	70
Density, Pounds per Gallon	8.5
Amine H Equivalent Weight	93
Recommended Use Level, phr	
EPOTUF 37-140 *(EEW=190)*	50
EPOTUF 37-127 *(Diluted Bis-A resin)*	47

** Reflects approximate weight percent in cured film per Method 24 / ASTM D 2369*

APPLICATIONS

- 100% solids / high-solids coatings
- Industrial maintenance
- Marine
- Rail
- Low color / color stable
- Self-leveling floors
- Top coat sealers
- Industrial grouts and mortars

SHELF LIFE & STORAGE

Store original sealed containers in a cool, dry place, preferably under 80°F to ensure a useful shelf life of at least one year.

SAFETY & WARRANTY

To receive a copy of our safety and warranty information, please email safetyandwarranty@polynt.com.

TYPICAL PERFORMANCE PROPERTIES

	EPOTUF 37-140	EPOTUF 37-127
Mixed Viscosity, cps	960	260
Color	<1	<1
Gel Time, 150g Mass at 25°C	32 Minutes	51 Minutes
Thin Film Set Time, Hours, 25°C / 5°C*	2.5 / 15	18-Apr
Hardness Development, Shore D at 25°C / 5°C		
6 Hours	45 / —	<5 / —
12 Hours	75 / —	37 / —
24 Hours	75 / 60	52 / 46
48 Hours	75 / 75	60 / 46
72 Hours	85 / 85	66 / 62

*TFST of a 10 mil film, tested with a 24-hour Gardner Dry Time Recorder

Physical Properties
Using EPOTUF 37-140

Heat Distortion Temperature, °C	45
Flex Strength, psi	12,296
Flex Modulus, psi ´ 10^5	4.84
Tensile Strength, psi	8,238
Tensile Modulus, psi ´ 10^5	4.62
Percent Elongation at Break	2.96
Compressive Strength, psi	10,883
Compressive Modulus, psi ´ 10^5	3.4
Water Absorption Percent Gain, *2-Hour Boil*	<1%

Gloss Retention

Gloss and gloss retention were measured on two systems cured with EPOTUF 37-703. The first system was based on EPOTUF 37-140, the second, EPOTUF 37-127. Three test panels were made of each system and initial gloss was taken following a seven-day ambient temperature cure. The panels were then placed in a QUV chamber containing A340 bulbs and measurements were taken after 100, 200, and 300 hours of exposure time. Initial 60° gloss for all panels was approximately 100.0 and results showed no significant variance for either system.

COMPARISON OF PERFORMANCE PROPERTIES

A. ULTRA-LOW VISCOSITY

At 80 centipoise, EPOTUF 37-703 offers the lowest viscosity of any cycloaliphatic in the EPOTUF product line. This ultra low viscosity, combined with good color stability and chemical resistance make 37-703 an ideal candidate for 100% / high solids coatings and civil engineering (topcoat, sealer) applications.

Figure 1
Viscosity Comparison

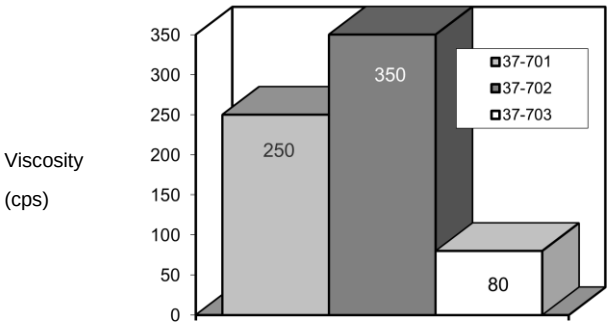
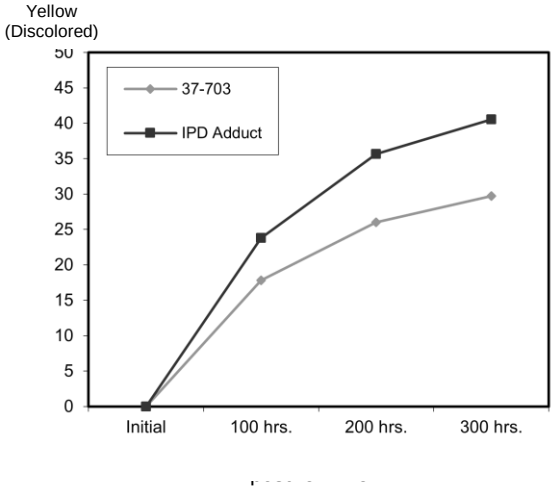


Figure 2
Yellowness Index



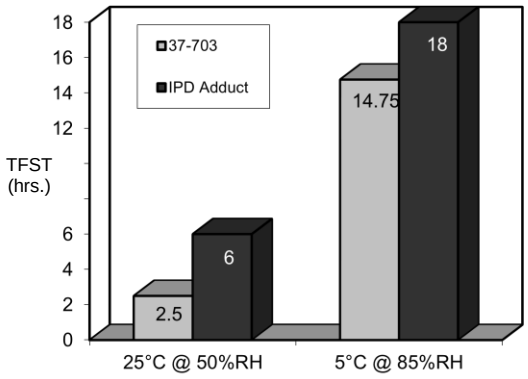
B. GOOD COLOR / COLOR STABILITY

Figure 2 compares the color change of EPOTUF 37-703 versus a competitive low viscosity/color stable IPD adduct after exposure to QUV A340 bulbs for periods of 100, 200 and 300 hours. Both products exhibit good initial color (<1), however, the graph illustrates that 37-703 ultimately retains its original color better than the competitive product. This superior color stability combined with good gloss retention further demonstrates EPOTUF 37-703's suitability for industrial flooring and topcoat sealer applications.

C. FAST REACTIVITY

Figure 3 compares the thin film set time (TFST) of EPOTUF 37-703 versus a competitive low viscosity IPD adduct at both ambient and low temperatures. As the graph illustrates, at 25°C EPOTUF 37-703 has a TFST over twice as fast as the competitive product. At 5°C, EPOTUF 37-703 is 3 hours faster. This improved reactivity allows for application and optimal cure under a broad range of environments.

Figure 3
Thin Film Set Time



TFST of a 10 mil film, tested with a 24-hour Gardner Dry Time Recorder

CHEMICAL RESISTANCE

EPOTUF 37-703 is recommended for use in industrial applications wherein sporadic or short-term (ambient temperature) chemical resistance is required *(For optimum chemical resistance to aggressive chemical environments EPOTUF 37-701 is recommended.)* EPOTUF 37-703's good chemical resistance combined with a low viscosity make it well suited for both civil engineering topcoats and 100% and/or high solids industrial maintenance coatings. Table 1 shows the results of chemical resistance testing performed on a system cured with EPOTUF 37-703.

Table 1: **Chemical Immersion and Hardness Retention Data** *(using EPOTUF 37-140)*
(Sample cured at room temperature for 7 days prior to immersion)

Reagent	Immersion Time	EPOTUF 37-703 % Wt. Gain	EPOTUF 37-703 Hardness
10% Acetic Acid	1 day	2.1	80
	3 days	3.7	80
	7 days	5.3	77
	14 days	7.0	74
70% H_2SO_4	1 day	0.6	86
	3 days	0.4	87
	7 days	0.5	87
	14 days	0.6	87
10% H_2SO_4	1 day	0.8	85
	3 days	1.1	86
	7 days	2.3	86
	14 days	3.5	85
10% NaOH	1 day	0.2	86
	3 days	0.5	87
	7 days	0.6	86
	14 days	1.0	86
D.I. Water	1 day	0.2	86
	3 days	0.5	86
	7 days	0.7	86
	14 days	1.1	85
10% HCl	1 day	0.3	86
	3 days	0.7	87
	7 days	1.0	86
	14 days	1.6	86
Xylene	1 day	12.8	45
	3 days	destroyed	destroyed
	7 days		
	14 days		
Butyl Cellosolve	1 day	0.8	85
	3 days	1.6	81
	7 days	1.5	81
	14 days	1.7	74
Methanol	1 day	7.3	46
	3 days	destroyed	destroyed
	7 days		
	14 days		

SUGGESTED FORMULATION

EPOTUF 37-703 curing agent can be used to develop systems with low viscosity, excellent color and color stability and broad-based chemical resistance. This makes it ideal for high performance coating and civil engineering applications.

The following starting point formulations demonstrate some of the typical uses for EPOTUF 37-703.

High Gloss Epoxy Topcoat
Starting Point Formula 703-HGT
EPOTUF 95-406
Cured with EPOTUF 37-703

Part A	Pounds	Gallons	Field Mix
EPOTUF 95-406	548.27	57.72	
Benzyl Alcohol	31.65	3.78	
BYK-A 530[1]	1.50	0.03	
Total A	581.42	61.53	2.0 Gallons

Part B	Pounds	Gallons	Field Mix
EPOTUF 37-703	261.54	30.77	1.0 Gallon

Part C	Pounds	Gallons	Field Mix
Hüls 844 Colorant Line[2]	123.20	7.70	1.0 Quart

Total Mixed	966.16	100.00	

A 1-quart colorpack is required for applications below 10 mils, 1 pint for 15-25 mil. applications.

Suppliers:

1) BYK Additives & Instruments	2) Huls

TYPICAL PERFORMANCE DATA

Viscosity, cps	450
Pot Life 150g Mass	27.5
Impact, Direct/Reverse, Pounds	150/120
Taber CS-17/1000g Load/1000 Cycles	56

Chemical Resistance

Rating System: [5 = No effect; 4 = Slight Softening/blistering; 3 = Moderate softening/blistering; 2 = Severe softening/blistering; 1 = Film destroyed]
(24-hour spot test)

MEK	5	50% Sulfuric	5
Methanol	5	28% Ammonium Hydroxide	5
Acetone	5	20% Sodium Hydroxide	5
Ethyl Acetate	5	20% Acetic Acid	2
36% Hydrochloric Acid	2	Butyl Cellosolve	5
50% Nitric Acid	3	Ethylene Glycol	5
50% Phosphoric	5		

SUGGESTED FORMULATION

High Solids Epoxy Build Coat (3:1)
Starting Point Formula 703-HSB
EPOTUF 37-140
Cured with EPOTUF 37-703

Part A	Pounds	Gallons
Xylene	86.53	12.00
Bentone 27[1]	3.99	0.28

Mix for 5 to 10 minutes. Then add:

N-Butanol	13.69	2.03
EPOTUF 37-140	333.00	34.33
Nuosperse 657[1]	4.04	0.51
Disparlon 6500[2]	2.39	0.28
Red Oxide 5098D[1]	53.68	1.25
Cimbar UF[3]	357.75	9.76
Nytal 400[4]	209.94	9.13
Imsil A-15[5]	119.86	5.43
Total A	**1184.87**	**75.00**

Part B	Pounds	Gallons
EPOTUF 37-703	167.50	19.71
Xylene	38.19	5.29
Total B	**205.69**	**25.00**

Total Mixed	**1390.54**	**100.00**

Suppliers:

1) Elementis	4) R. T. Vanderbilt
2) King Industries	5) Unimin Corporation
3) Cimbar Performance Materials	

TYPICAL PERFORMANCE DATA

Pounds per Gallon	13.91	Gel Time, Minutes 200g, 25°C	265.3
Percent Non-Volatile, Weight	90.0	Through Dry	4
Percent Non-Volatile, Volume	80.5	Pencil Hardness	5H
Mix by Weight	85.2% / 14.8%	Sward / Pendulum Hardness	
Mix by Volume	75.0% / 25.0%	1 Day	25 / 35
VOC, Pounds per Gallon	1.39	3 Day	34 / 61
PVC	42.5%	7 Day	34 / 98
Mixed Viscosity, ku	94	Impact Resistance, Direct/Reverse	160 / 60
Base Viscosity, cps	16,000		

Chemical Resistance

Rating System: [5 = No effect; 4 = Slight Softening/blistering; 3 = Moderate softening/blistering; 2 = Severe softening/blistering; 1 = Film destroyed]
(24-hour spot test)

10% Acetic Acid	1	IPA	5
2% Nitric Acid	2	Gasoline	5
10% Sulfuric Acid	1	Methanol	5
10% Sodium Hydroxide	1	Ethanol	5
10% Hydrochloric Acid	1	1:1 Ethanol/Water	5
Acetone	5	Skydrol	5
Xylene	5		

SUGGESTED FORMULATION

CLEAR WATERBORNE CONCRETE COATING FOR 'WET-LOOK'

PART A – Curing Agent Component

Pounds	Gallons	Ingredients
123.20	14.49	EPOTUF 37-703
1.23	0.12	Lactic Acid (88%)
124.43	**14.61**	**TOTAL**

Analysis:

8.88	Weight/Gallon, Pounds
55.4	Weight Solids, Percent
0.0	VOC, Pounds per Gallon

PART B – Epoxy Resin Component

Pounds	Gallons	Ingredients
616.0	67.69	EPOTUF 37-147
147.9	17.78	Deionized Water
8.6	0.99	Lodyne S107B
1.8	0.28	Drewplus L405
774.3	**86.70**	**TOTAL**

TYPICAL PERFORMANCE DATA

Performance Data

3 Mil Wet Film, 7-Day Cure at 25°C

Dry Time, Hours, 25°C, 50% RH	4
Pencil Hardness	2H
Impact, Direct/Reverse, Inch-Pounds	80/10
Flexibility, 1/8" Mandrel	Pass
Taber Abrasion, mg, Loss	77
CS-17/1000g/1000 Cycles	
Hot Tire Pick-Up	Very Good

Chemical Resistance

20% Sodium Hydroxide	Excellent
10% Hydrochloric Acid	Excellent
10% Ammonium Hydroxide	Excellent
Water	Excellent
10% Acetic Acid	Excellent
Ethylene Glycol	Very Good
2% Nitric Acid	Excellent
Butyl Cellosolve	Excellent
10% Sulfuric Acid	Excellent
Xylene	Excellent