



# Global EcoTechnologies, inc.

## ENDURA-FLEX<sup>®</sup> RBU POLYURETHANE PROTECTIVE PIPE COATING SYSTEM

### PRODUCT DATA

#### PRODUCT DESCRIPTION

ENDURA-FLEX<sup>®</sup> REACTION BONDED URETHANE (“*RBU*”) IS A PRODUCT OF THE *ECOSYSTEM*<sup>®</sup> PATENTED GAS INJECTION PROCESS RESULTING IN VERIFIABLY IMPROVED PERFORMANCE PROPERTIES WHICH HAS SHOWN TO HAVE SUPERIOR BARRIER PERFORMANCE CHARACTERISTICS WHEN COMPARED TO POLYMER FILMS PROVIDED FROM OTHER METHODS. *RBU* IS FLUID APPLIED, RAPID SETTING, SOLVENTLESS POLYURETHANE COATING (BASED UPON THE INDUSTRY RECOGNIZED ENDURA-FLEX<sup>®</sup>1988 CHEMISTRY) FOR ITS’ SUPERIOR HYDROLYTIC STABILITY AND TOUGH YET FLEXIBLE PROTECTIVE BARRIER FILM PROPERTIES WHICH CAN BE USED ON THE EXTERIOR OR INTERIOR SURFACES OF STEEL OR CONCRETE PIPE.

*RBU* IS NOT A NEW FORMULATED PRODUCT NOR IS THE PRODUCT’S TECHNOLOGY NEW BUT THE RESULT OF A COMBINATION OF TWO TRIED AND PROVEN TECHNOLOGIES COUPLED WITH SPECIFIC PROCEDURAL MODIFICATIONS RESULTING IN OVERALL ENHANCED PRODUCT PROPERTIES AVAILABLE THROUGH THE GET LICENSEES.

#### TYPICAL USE AREAS

EF-RBU IS DESIGNED FOR LONG TERM PROTECTION OF BURIED OR IMMersed STEEL PIPE. WHILE *RBU* MAY BE ADJUSTED FOR APPLIED FILMS DIRECT-TO-STEEL AT TRADITIONAL PIPE MILL THIN FILM THICKNESSES FOR “GENERAL USE”, IT IS ALSO VERSATILE ENOUGH FOR APPLICATION AT MUCH THICKER FILMS WHEN SERVICE REQUIREMENTS ARE MORE DEMANDING AS MIGHT BE FOUND IN ROUGH TERRAIN, MARSHY AREAS, SUB-SEA INSTALLATIONS, FREEZE-THAW EXPOSURES, TIDAL ZONES AND SLIP BORE APPLICATIONS. EF-RBU ALSO SHOWS EXCELLENT ADHESION TO FUSION BONDED EPOXY OFFERING ECONOMICAL “EXTRA THICKNESS” FOR THOSE SYSTEMS WHEN IN AGGRESSIVE BACK FILL OR SLIP BORE OPERATIONS. *RBU* APPLICATION VERSATILITY ALLOWS FOR APPLICATION EITHER IN PLANT OR IN SITU WITH THE RESPECTIVE ECONOMIES AVAILABLE FROM EACH METHOD. QUALITY CONSCIOUS WELD JOINT COATING AND FIELD REPAIR METHODS ARE AVAILABLE FOR CONTINUOUS “SAME SYSTEM” USE FROM BEGINNING TO END OF PROJECT. FINALLY, *RBU* CAN ALSO BE USED AS AN EFFECTIVE CORROSION BARRIER ON THE INTERIOR OF PIPE AS A LINER FOR WASTEWATER WATER OR SALT WATER APPLICATIONS.

#### TECHNICAL DATA

**COMPONENTS:** A: ACTIVATOR, B: BASE  
**VOLUME OF SOLIDS:** 100%  
**V.O.C. CONTENT:** NONE

**THINNER:** NONE REQUIRED  
(CLEAN UP: M.E.K.)

**SHELF LIFE:** ONE YEAR @ 75<sup>0</sup>F IN SEALED, UNOPENED CONTAINERS

**POT LIFE:** < 15 SEC. @ 100<sup>0</sup> F  
**MIX RATIO:** 2:1 BY VOLUME

**PACKAGING:** 3 DRUM KIT (2 PARTS B & 1 PART A)  
(48 GAL. EACH DRUM)

**COVERAGE:** 1604 FT<sup>2</sup>/MIL/GALLON  
**SAG RESISTANCE:** EXCELLENT  
**FLASHPOINT:** > 300<sup>0</sup> F

**COLOR:** STANDARD OFF WHITE  
SIDE A: AMBER/SIDE B: WHITE

**DRY TIME @ 70<sup>0</sup> F:**  
**TO TOUCH:** 15 SECONDS  
**TO HANDLE:** <5 MINUTES  
**TO BURY:** 10 MINUTES

**FILM THICKNESS:** 20 – 200  
**FILM SHRINKAGE:** -0- (WET TO DRY)  
**EDGE-HANG:** EXCELLENT

**MAX. RECOAT:** 24 HOURS - AFTER 24 HOURS SURFACE MUST BE ABRADED BEFORE RECOATING

**HUMIDITY TOLERANCE ON APPLICATION:** < 85%  
**PRIMER:** SELF PRIMING FOR ADHESION

**MINIMUM SUBSTRATE TEMPERATURE ABOVE DEW POINT ON APPLICATION:** 5<sup>0</sup>F  
**SERVICE TEMPERATURE RESISTANCE:** IMMERSION: 120 F  
DRY: 200<sup>0</sup> F  
**MATERIAL TEMPERATURE REQUIREMENT FOR APPLICATION:** ACTIVATOR: 95 TO 120<sup>0</sup> F, BASE: 95 TO 105<sup>0</sup> F  
**ALLOWABLE AMBIENT AIR TEMPERATURE MAXIMUM:** 120<sup>0</sup> F  
**MINIMUM:** -25<sup>0</sup> F

**NOTE:** GET<sup>®</sup>, ENDURA-FLEX<sup>®</sup>, ENDURA-TUF<sup>®</sup>, ECOSYSTEM<sup>®</sup>, ARE TRADEMARKS OF GLOBAL ECOTECHNOLOGIES, INC

All recommendations, statements, and technical data contained herein are based on tests we believe to be reliable and correct, but accuracy and completeness of said tests are not guaranteed and are not to be construed as a warranty, either expressed or implied. User shall rely on his own information and tests to determine suitability of the product for the intended use and user assumes all risk and liability resulting from his use of the product. Seller's and manufacturers sole responsibility shall be to replace that portion of the product of this manufacturer, which proves to be defective. Neither seller nor manufacturer shall be liable to the buyer or any third person for any injury, loss, or damage directly or indirectly resulting from use of, or inability to use, the product. Recommendations or statements other than those contained in a written agreement signed by an officer of the manufacturer shall not be binding upon the manufacturer or seller. Manufacturer reserves the right to modify all data without prior notification or liability.



# Global Eco Technologies, inc.

## ENDURA-FLEX® RBU POLYURETHANE PROTECTIVE PIPE COATING SYSTEM

### PHYSICAL PROPERTY DATA

<u>PHYSICAL TEST</u>	<u>TEST METHOD</u>	<u>RESULT</u>
<b>Durometer Hardness @ 75° F</b>	ASTM D2240	65D - 70D Shore D
<b>Percent Elongation:</b> @ 60 mils	ASTM D638	65% 41%
<b>Abrasion Resistance:</b> 1000 cycles; 1000 gms; CS-17	ASTM D4060	1330 mg loss/ft <sup>2</sup> @ 1 mil
<b>Impact Resistance:</b> @ 65 mils	CAN/CSA-Z245.20-M92 Clause 12.2 Pass @ 1.5j (13.275 in/lbs.) 2 inch dia. pipe	
<b>Weight per gallon:</b> A-Activator B-Base	ASTM D1475	10.33 lbs./gal. 8.71 lbs./gal.
<b>Viscosity: CPS @ 72°F.</b> A-Activator B-Base	ASTM D445 Brookfield	400 700
<b>Cathodic Disbondment:</b> 92 Day Exposure @ 60 mils Expanded	ASTM G8	.38 Average Disbonded Equivalent Circle Diameter (inches)
<b>Cathodic Disbondment:</b> @ 25 mils Expanded	ASTM G95 Modified	4.00mm (Radius)
<b>Atlas Cell:</b> 150° F. Deionized Water @ 125 mils Expanded	NACE STANDARD TM-01-74 Test procedure A	12 Months, No Effect
<b>Elcometer Adhesion:</b> Steel; no primer; SSPC SP-5	ASTM D4541	1500 Solid 1200 Expanded
<b>Accelerated Weathering (QUV):</b>	ASTM G 23	Slight chalk/color change
<b>Accelerated Weatherometer:</b>	ASTM D2565 (89) Modified	330 Days, Moderate chalk/color change
<b>Thermal Shock:</b> @ 60 mils	-50° F. to 200° F. Eight Cycles	Pass - No Effect
<b>High Humidity:</b> @ 60 mils	ASTM B117 (90) Modified 124 Days	Pass - No Effect
<b>Immersion:</b> @ 60 mils	ASTM D870 (87) Modified 630 Days	Pass - No Effect Finished/filtered/raw/softened waters
<b>Salt Fog:</b> @ 60 mils	ASTM B117 (90) 112 Days	Pass - No Effect
<b>Flexibility:</b>	ASTM D522	180° over 4" mandrel
<b>Electrical Inspection:</b>	NACE RP-0188	Yes

**EQUIPMENT RECOMMENDATIONS:** Plural Component metering and mixing equipment. Refer to Endura-Flex® RBU "Material Conditioning and Equipment Requirements." Consult your Representative for specific recommendation.

**SAFETY REQUIREMENTS:** Please refer to the Material Safety Data Sheets for safety information and requirements. Always wear the appropriate respiratory protection. Avoid skin contact with materials being applied. Always wear the appropriate head protection, gloves, long sleeve coveralls, and foot protection.

**SURFACE PREPARATION AND APPLICATION PROCEDURE:** Consult your Representative for specific recommendations to each individual project.



# ENDURA-FLEX<sup>®</sup> RBU

## POLYURETHANE PIPE PROTECTION SYSTEM

### CHEMICAL EXPOSURE DATA SHEET

The following chemical resistance data is offered as a guide as to performance to be expected from a 70-75 mil film of EF-RBU immersed in each substance listed at 75-78°F. As is true for all materials, EF-RBU has chemical and temperature limitations. Testing must be completed for substance applications other than those listed herein. Consult your representative.

**CHEMICAL**

**KEY CODE**

**ACIDS**

SULFURIC ACID, 60%	S
SULFURIC ACID, 30%	S
HYDROCHLORIC ACID, 37%	S
PHOSPHORIC ACID, 85%	S
ACETIC ACID, 60%	D
GLACIAL ACETIC	D
FERROUS CHLORIDE	S
FERRIC CHLORIDE	S
CHLORINE	A

**KEY CODES:**

- A = EXCELLENT**
- B = GOOD**
- C = FAIR**
- D = NOT RECOMMENDED**
- S = SATISFACTORY FOR SPLASH,  
SPILLAGE, AND SECONDARY  
CONTAINMENT (96 HOURS)**

**ALKALIES**

AMMONIUM HYDROXIDE, 30%	S
AMMONIUM HYDROXIDE, (CONC.)	S
SODIUM HYDROXIDE, (>50 Y.)	S

**ALIPHATIC HYDROCARBONS**

DIESEL	A
KEROSENE	S
UNLEADED GASOLINE	S
HYDRAULIC OIL	A
MOTOR OIL	A
CRUDE/SOUR CRUDE	A

**AROMATICS, KEYTONES, & CHLORINATED SOLVENTS**

ALCOHOL, GRAIN, 76.5%	S
HEXANE	D
XYLENE	D
MIBK	S
MEK	D
MAK	D
N-BUTANOL	D
IPA	D
TOLUENE	D

**MISCELLANEOUS**

SEWAGE	A
H <sub>2</sub> S GAS	A
RAW WATER	A
SALT WATER	A
DE-IONIZED WATER	A
03	A

All recommendations, statements, and technical data contained herein are based on tests we believe to be reliable and correct, but accuracy and completeness of said tests are not guaranteed and are not to be construed as a warranty, either expressed or implied. User shall rely on his own information and tests to determine suitability of the product for the intended use and user assumes all risk and liability resulting from his use of the product. Seller's and manufacturer's sole responsibility shall be to replace that portion of the product of this manufacturer which proves to be defective. Neither seller nor manufacturer shall be liable to the buyer or any third person for any injury, loss, or damage directly or indirectly resulting from use of, or inability to use, the product. Recommendations or statements other than those contained in a written agreement signed by an officer of the manufacturer shall not be binding upon the manufacturer or seller. Manufacturer reserves the right to modify all data without prior notification or liability.



# *Global EcoTechnologies, inc.*

## **ENDURA-FLEX<sup>®</sup> RBU** **POLYURETHANE PIPE PROTECTION SYSTEM** **MATERIAL CONDITIONING AND EQUIPMENT REQUIREMENTS**

---

The following describes material "conditioning," mixing, and minimum equipment requirements and capabilities which have offered repeatable results to meet manufacturers published physical properties for over ten years. Differences in substrate temperature and film thickness during application have been shown to effect the rate at which applied film thicknesses reach the stated physical properties independent of the information listed below. Equipment lists are available for application equipment systems capable of meeting these requirements according to job production needs. Consult your Representative for specific equipment recommendations.

- Each liquid component material shall be conditioned for use by heating to 80° F. to 90° F. Band heaters may not be used.
- The base "B" component material shall be mixed using a power mixer prior to use and mixed at least once daily.
- ENDURA-FLEX<sup>®</sup> RBU is a two-component (2:1 mix by volume) chemically reactive product and shall be applied using a heated "plural component" proportioning equipment system
- designed for high-pressure airless spray (minimum 2500 psi) for a minimum distance from the proportioner to meet job conditions.
- The equipment system used shall be capable of heating and maintaining individual components to in a range of 95° F. to 110° F. to reduce (band heaters are not permissible for heating the materials) viscosities to spray consistency, pumping individual components simultaneously in precise metered quantities and mixing those materials during application in the required volume mix ratio to affect the degree of cure and physical properties stated by the most recent published product data sheet.
- The conditioned materials shall be supplied to the proportioning equipment at a flowable, pumpable viscosity, and in such volume delivery to assure full supply for each pump stroke.
- No solvent thinning of the materials is permitted.  
A solvent flush system will be necessary to clean mixed material from the spray gun at times when spraying stops for periods exceeding the material pot life.

---

*Global EcoTechnologies, inc.*

*"creative solutions for environmental concerns"*

P.O. Box 2205 Antioch, CA 94531

Telephone: (925) 473-9250 \*\*\* Fax: (925) 432-0853

Email: [www.getmail@getcoatings.com](mailto:www.getmail@getcoatings.com) \*\*\* Website: [www.getcoatings.com](http://www.getcoatings.com)