



# Eco Flow® System



## PRODUCT DESCRIPTION

Eco Flow is a two component, single dosing system specifically designed for pipelines carrying water or a mixture of hydrocarbon and water. The Eco Flow system is a combination of chemicals formulated for optimal benefit of prime additives for water treatment, blended in well determined concentrations to obtain maximum performance.

The formulation of Eco Flow is a combination of vapor phase, neutralizing, and film-forming corrosion inhibitors to combat the broadest range of corrosive attack from moisture and condensation, oxygen, carbon dioxide, hydrogen sulfide, and other corrosive contaminants. These formulations offer the benefits of filming inhibitors that form a tenacious protective film on metal surfaces, neutralizing inhibitors that combat corrosive fluid formation, and vapor phase inhibitors that reach areas inaccessible by direct contact to protect areas subject to varying flow ratios. In addition, Eco Flow contains an antisclant agent.

Eco Flow has been designed specifically to be effective in pipelines carrying either fresh water, seawater, produced water, or multiphase systems with a water continuous phase. Eco Flow offers an effective solution to pipeline bottleneck problems, without mechanical expansion. In many aging oil fields the basic sediment and water (BS&W) increases over time to the point where a water soluble drag reducer is needed instead of an oil soluble drag reducer. It is an effective way to cope with pressure and/or capacity limitations due to increased water production in existing fields. It can increase throughput while reducing internal corrosion rates. Eco Flow is also a highly effective polymer for use in water flooding applications. Eco Flow increases movement of the residual oil to a producing well by reducing the tendency of water to "finger" or form channels, which bypass much of the residual oil. The high molecular weight makes Eco Flow more effective at lower concentrations than other water-soluble polymers. The lower concentration results in much less formation damage than other polymers.

Additionally, the small amount of damage that is inevitable with polymer flooding is completely reversible with Eco Flow.

## FEATURES

### Eco Flow Inhibitor

- Effective for a wide range of systems and corrosive conditions
- Provides maximum control over long distances for highly corrosive systems having a high ratio of water-to-hydrocarbons, including low areas in systems where water collects and extreme corrosive attack occurs
- Form an adsorbed, protective layer that protects ferrous and non-ferrous metals
- Effective against water, corrosive gases, and halogens
- Vapor phase action provides protection from atmospheric conditions and moisture condensation to areas not accessible by filming inhibitors
- Combines anti-corrosion and antisclant properties
- Resists biological attacks
- Environmentally friendly
- Does not contain heavy metals, chlorinated hydrocarbons, or volatile amines

### Eco Flow Enhancer

- More than 60% drag reduction depending on conditions and systems
- Increased flow rates while maintaining current operating pressures
- Maintains flow while reducing operating pressures
- Less polymer is required to achieve a given performance
- Lower injections rates than traditional drag reducers
- Faster dissolution rates than traditional drag reducers
- Reduces potential internal corrosion through erosion
- Can be used in two-or-three-phase systems
- Drag reduction achieved in water-oil systems with over 50 % oil

## PERFORMANCE of ECO FLOW Inhibitor

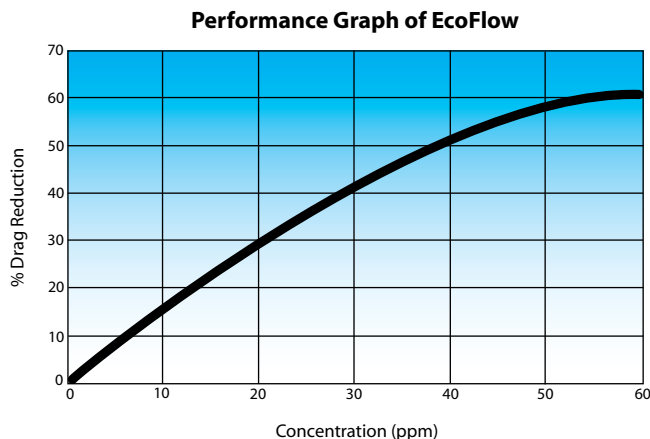
|                                       | Z**, Protec-<br>tion |
|---------------------------------------|----------------------|
| <b>Wheel Test</b>                     |                      |
| Film Persistency, 500-1000 ppm        | 90+                  |
| Continuous Treatment, 15-25 ppm       | 90+                  |
| <b>Rotating Cylinder Electrode***</b> |                      |
| 20-50 ppm                             | 95+                  |



\* Test performed by Dixie Testing and Products, Inc. Corrosion Wheel test in 90% NACE recommended electrolyte (-NaCl - 73,300 ppm, CaCl<sub>2</sub> - 7,534 ppm, MgCl<sub>2</sub> - 1,000 ppm) + 10% Depolarized Kerosen containing 500 ppm H<sub>2</sub>S saturated with CO<sub>2</sub> at 150°F (65°C).

\*\*  $Z = 100\% (CR_c - CR_i) / CR_c$ , where CR<sub>c</sub> - corrosion rate in electrolyte without inhibitor, CR<sub>i</sub> - corrosion rate in electrolyte with inhibitor

\*\*\* Data for Eco Flow. Test was performed in accordance to ASTM G 170-01, a Standard Guide for Evaluating and Qualifying Oilfield and Refinery Corrosion Inhibitors in the Laboratory.



**FOR INDUSTRIAL USE ONLY**  
**KEEP OUT OF REACH OF CHILDREN**  
**KEEP CONTAINER TIGHTLY CLOSED**  
**NOT FOR INTERNAL CONSUMPTION**  
**CONSULT SAFETY DATA SHEET FOR MORE INFORMATION**

#### LIMITED WARRANTY

All statements, technical information and recommendations contained herein are based on tests Cortec Corporation believes to be reliable, but the accuracy or completeness thereof is not guaranteed.

Cortec Corporation warrants Cortec® products will be free from defects when shipped to customer. Cortec Corporation's obligation under this warranty shall be limited to replacement of product that proves to be defective. To obtain replacement product under this warranty, the customer must notify Cortec Corporation of the claimed defect within six months after shipment of product to customer. All freight charges for replacement products shall be paid by customer.

Cortec Corporation shall have no liability for any injury, loss or damage arising out of the use of or the inability to use the products.

#### APPLICATION

This 2 part system will be applied separately by 2 pumps through the same line as continuous treatment. Contact technical services for exact dosage.

#### SYSTEM PROPERTIES

| Application        | Water and Water-Hydrocarbon Blends |                                      |
|--------------------|------------------------------------|--------------------------------------|
| TYPICAL PROPERTIES |                                    |                                      |
|                    | Eco Flow Inhibitor                 | Eco Flow Enhancer                    |
| Color              | Amber to dark green/brown liquid   | Milky white viscous liquid           |
| Flashpoint         | N.A.                               | Does not flash                       |
| Viscosity          | N.A.                               | 2500 cP                              |
| Freezing point     | N.A.                               | 14°F (-10°C)                         |
| Boiling point      | N.A.                               | 212°F (100°C)                        |
| pH                 | 8-9 (1% in water)                  | N.A.                                 |
| Vapor pressure     | N.A.                               | 0.000387 lb/in²<br>0.002 mm Hg@ 25°C |
| NVC                | 50-55%                             | N.A.                                 |

#### STORAGE/PACKAGING

Eco Flow system will be supplied as a 2 component system, both components are available in 5 gallon (19 liter) pails, 55 gallon (208 liter) metal drums, liquid totes 275 gal (1040 liter), and bulk. Products should be stored in tightly closed containers in heated warehouse to avoid freezing.



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