DRAG REDUCER ADDITIVES

Drag reduction additives (DRAs) improve flow in pipelines by reducing turbulence. They can dramatically increase flow using minimal additional energy, or they can sustain a given flow rate using less energy.

In most petroleum pipelines, flow is turbulent. Non-linear currents and friction cause much of the energy applied to move the fluids to be wasted. Drag Reducers are long-chain hydrocarbon polymers that reduce friction near the pipeline wall and within the turbulent core, dampening rotational flow and thereby decreasing energy loss.
PROPIPE is a company established in 2002 chartered with the international distribution of gas, oil and petrochemical derivative products. Our aim is to offer the highest standards of customer service and total quality processes that our customers require from our operations and our products. PROPIPE started to develop commercial activities in the Mediterranean region countries. Building on the initial success, today we have reached a global dimension and extended our capabilities covering the entire world with our operations.

Amongst our regular customers, there are crude and refined oil transport and distribution companies which in the current climate of increasing oil demand have a requirement for increased pipelines capacity. PROPIPE supplies amongst others, best in class ‘Drag Reducer Agent’ (DRA) additives for pipelines. This product acts by decreasing the pressure inside the pipeline without any negative effect in the system performance parameters. It is recommended not only for pipeline networks with potential corrosion issues but also for pipeline transportation systems that could potentially be optimized to increase their output capacity.

Drag Reducers are erroneously also known as ‘Flow Improvers’ which is not an accurate definition as the additive for pipelines acts specifically by reducing the internal pipe pressure. The capacity of the system to transport increased volumes will be determined above all by the capacity of the line Compression Stations together with the rating of the pump units and the system intake capacity. PROPIPE engineering consultancy department offers technical applications support that enable the integral assessment of the pipeline system capacity and present recommendations with the improvements that would be required in order to increase the pipeline output volumes.
1 Drag Reducer Agents (DRA)

DRA benefits flow to the bottom line
ProFlo flow improvers have reduced drag up to 80% and have increased flow up to 100% and the results were immediate. Performance depends largely on the properties of the fluid being transported and the condition of the pipeline. Drag Reducers can bring substantial improvement to your bottom-line profit by maximizing the flow potential and throughput capacity of your pipelines, saving energy, and giving your operations greater flexibility.

How much DRA is needed?
Highly efficient ProFlo flow improvers are used in very small concentrations (parts per million). The dosage that will optimize flow in a pipeline is dependent on a number of factors, including petroleum composition and viscosity, pipeline diameter and condition, fluid velocity, and temperature. The typical cost to use our Drag Reducer is pennies per barrel per pipeline segment.
Propipe specialists will work with you to determine the best solution based upon your particular situation and objectives. Propipe ensures optimization of each application by:
  - Predicting ProFlo product performance
  - Thoroughly evaluating your pipeline system and operating objectives
  - Conducting field trials to confirm efficiency estimates
  - Assisting with equipment installation and commissioning

A field trial is required to determine the precise Drag Reducer dosage to optimize a specific flow-improvement
Increase flow, reduce energy, or both
ProFlo flow improvers reduce pressure in the pipeline to let you increase flow rates or use less energy. Or you may opt to do both. Our Drag Reducers are the answer if you need to lower your operating pressure for safety reasons, but you can’t afford to reduce throughput capacity.

Use your flexibility to avoid capital expansion
The optimized throughput you achieve with ProFlo Drag Reducers may enable you to bypass existing pump stations or avoid adding intermediate stations. You can also use our flow improvers to eliminate bottlenecks without having to upgrade equipment.

Use your flexibility to accommodate temporary conditions
You needn’t gamble on getting the return you want from high-dollar capital improvements in uncertain markets. ProFlo Drag Reducer provide a cost-effective means for achieving high throughput today that may not be required tomorrow. Increased short-term and seasonal demands can be handled efficiently and very cost effectively.
ProFlo-X101

DESCRIPTION
Propipe ProFlo-X101 is a slurry composed of long chain poly alpha olefin in vegetable oil.

TYPICAL PROPERTIES
Appearance: White free flowing liquid
Physical State: Polymer suspension
• Odor: Slight hydrocarbon
• Water Content (Wt. %): <0.01
• Specific Gravity: 0.88-0.92
• Vapor Density (Air = 1): 1.1
• Vapor Pressure: 97 @ 20C (68F)
• Boiling Point: 147F (64.5C)
• Melting Point: -4F (-20C)
• Flash Point: >142F (61C) TCC
• Solubility: Hydrocarbon soluble, water insoluble
• % Volatiles by Weight @ 70F (21C): <1 %

PRODUCT APPLICATIONS
ProFlo-X101 may be injected into pipelines by means of positive displacement pumps.
ProFlo-X101 can be used in either crude or finished products pipelines. The use rate may vary and should always be used in accordance to the feed rate recommended by Propipe.

SHIPPING & HANDLING
ProFlo-X101 is a non-hazardous material and can be shipped accordingly. The product is very slippery and spills should be cleaned up immediately to avoid potential injury. Product should be kept in covered areas, with no exposure to direct sunlight.
**DESCRIPTION**

*ProFlo-X410* is a slurry composed of long chain poly-alpha-olefin in an liquid carrier (water/glycol), designed for cold weather applications.

**TYPICAL PROPERTIES**

**Appearance:** Cream to white, free flowing  
**Physical State:** Liquid  
  - **Odor:** Slight hydrocarbon  
  - **Specific Gravity:** 0.95 - 0.99  
  - **Boiling Point:** > 100C  
  - **Freezing Point:** -51C  
  - **Flash Point:** Not Applicable  
  - **Operating Range:** -40C to 60C  
  - **Solubility:** Miscible in Hydrocarbons  
  - **Carrier:** Water/Glycol mix

**PRODUCT APPLICATIONS**

*ProFlo-X410* is utilized in crude oil pipelines to decrease operating pressure and increase pipeline flow rate. *ProFlo-X410* is injected via industry standard chemical injection systems recommended and designed by Propipe. Consultation with a Propipe representative is recommended to ensure the proper Propipe solution.

**SHIPPING & HANDLING**

*ProFlo-X410* is a non-hazardous material and can be shipped accordingly. Product should be kept in covered areas, without exposure to direct sunlight. *ProFlo-X410* should be homogeneously mixed before injection.
2 Chemical Injection Skids

Injection metering pump systems can be configured for any ProFlo pipeline application.

- Onshore or offshore
- At pressures to 2,500 psi
- At volumes to 1,500 gallons per day
- Fully compliant with international standards
- Explosion proof, Division 1 or 2
- For 190/380 VAC – 50 Hz or 240/480 VAC – 60 Hz

Dosage is metered by an onboard programmable logic controller that can be set and adjusted locally or remotely. The controller also operates the spare pump that is included with each system for 100% backup capacity. Special equipment designs are no problem. All units are pre-wired and thoroughly tested to ensure faultless startup and operation.

Propipe customizes skids to the size and level of automation that suit your requirements.

A totally redundant PLC-operated injection system can be controlled remotely or locally.
3 Injection Point

The injection point should be located after launcher & Receiver Traps as the product cannot go thru bends or partial open valves.

Instruction to install the injection point:

1. Install a 2" propipe Thread-O-Ring Fitting at desired ProFlo injection location,
2. Tapping the pipeline to an opening diameter of 1-½“ or 2" by a Series 1000 TM.

To contract Hottap fittings or operations contact propipe Hottap division.
4 Vessel

Mamor tote is an UN IBC which features a lock-collar butterfly valve with NPT threads assembled on a steel pallet. Mamor stacks up to three high in the warehouse and up to two high transporting.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Normal Capacity</td>
<td>275 gallon (1,040 L)</td>
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<tr>
<td>Normal Length</td>
<td>40&quot; (1,000 mm)</td>
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<tr>
<td>Normal Width</td>
<td>48&quot; (1,200 mm)</td>
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<tr>
<td>Normal Height</td>
<td>45.8&quot; (1,143 mm)</td>
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<tr>
<td>Approx. Tare Weight</td>
<td>137 Lbs (62 Kg)</td>
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<tr>
<td>Max Gross Weight</td>
<td>4,490 Lbs (2,037 Kg)</td>
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<tr>
<td>Design Code</td>
<td>UN marking certifies UN31HA1 design</td>
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</tbody>
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DRA in Algerian Desert

France - Trapil

DRA for ExxonMobil Italy

2000 USG Vessel - Spain

Middle East Region

Injection Skid