

# LP Winter

*For Crude Oil in Cold Climates*

## Background

LP Winter Flow Improver is part of ConocoPhillips Specialty Products' range of innovative and technologically superior Flow Improver Solutions. As part of the portfolio, LP Winter Flow Improver has been designed for use in colder environments.

## Characteristics

LP Winter Flow Improver is an aqueous suspension product with freeze protection, suitable for use in cold, winter environments. Like our other LP Flow Improvers, it can provide greater than 80% drag reduction.

### *Benefits*

#### *Great performance*

- Drag reduction with freeze protection
- Suitable for use in cold, winter environments
- Greater than 80% drag reduction
- Increases flow rates while maintaining current pipeline pressures
- Maintains flow while reducing pipeline pressures
- Allows shutting down of intermediate pump stations

#### *Superior technology*

- Improves pipeline capacity without capital investment
- Less polymer required to achieve a given performance
- Lower injection rates than other drag reducers
- Faster dissolution rates than other drag reducers
- Reduces internal corrosion rate by 40%
- Reduces crude heat loss

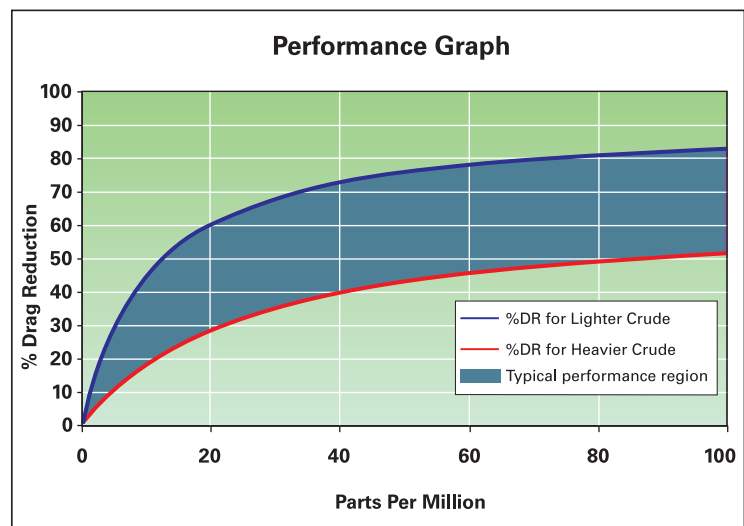
LP Winter Flow Improver allows companies to strategically reduce pipeline operating costs, increase throughput, decrease pressure or shut down intermediate pump stations.

LP Winter Flow Improver offers the same advanced polymer technology as other LP Flow Improvers. It dissolves into flowing product without coating pipeline walls, and increases throughput while reducing internal corrosion rates. It allows greater amounts of active polymer to be deployed in a fixed amount of product while improving dissolution dynamics. The polymer of choice offers excellent hydrocarbon affinity, and is able to attain elevated levels of drag reduction under varied operating scenarios. It also has the strength to effectively endure shear forces.

## Handling

LP Winter Flow Improver is easy to handle, store and clean up. It is environmentally friendly and non-flammable. It flows easily and does not require nitrogen pressurized storage tanks.

*See back page for product properties*



The performance curve shows the performance range in which LP Winter Flow Improver operates, depending on pipeline and crude conditions.

**Contact us at [www.LiquidPower.com](http://www.LiquidPower.com)**

## PRODUCT PROPERTIES

GENERAL	
<b>Designed for use on</b>	Petroleum Crude Oil in cold environments
<b>Flow Improver type</b>	Suspension
<b>Carrier/Solvent</b>	Water-glycol mixture
PERFORMANCE	
<b>Maximum drag reduction</b>	Greater than 80%
<b>Typical concentration</b>	5 to 50 ppm
TYPICAL PROPERTIES	
<b>Color</b>	White
<b>Density</b>	8.0 lbs/gal (0.96 g/cm <sup>3</sup> )
<b>Flash Point</b>	Not applicable
<b>Viscosity</b>	400 cP @ 511s <sup>-1</sup> (Non-Newtonian)
<b>Freezing Point</b>	14°F (-10°C)
<b>Boiling Point</b>	212°F (100°C)
<b>Vapor Pressure</b>	0.95 lb/in <sup>2</sup> (24 mm Hg @ 25°C)
HANDLING	
<b>Operating range</b>	14°F to 110°F (-10°C to 32°C)
<b>Product stability</b>	Stable suspension Intermittent agitation recommended
<b>Pressure</b>	No nitrogen or pressurized vessels required
<b>Heating</b>	Climate control environment available
INJECTION EQUIPMENT	
<b>Pumps</b>	Various designs available for different injection range and environments
<b>Range</b>	5 to 2,500 gal/day (20 to 9,500 L/day)
<b>Flow meter</b>	Mass (Coriolis)
<b>Automation</b>	Available
SAFETY AND ENVIRONMENTAL (See Material Safety Data Sheet)	
<b>Safety</b>	Non-hazardous, non-flammable
<b>Health</b>	Low toxicity. Conventional protection equipment
<b>Environmental</b>	Very low aquatic toxicity

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