

LP™ Winter

For Crude Oil in Cold Climates

Background

LP™ Winter Flow Improver is part of the LiquidPower Specialty Products Inc. (LSPI) 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.

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 LiquidPower® Flow Improvers. It dissolves into flowing product without coating pipeline walls. LP™ Winter also 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 flows easily and does not require nitrogen pressurized storage tanks.

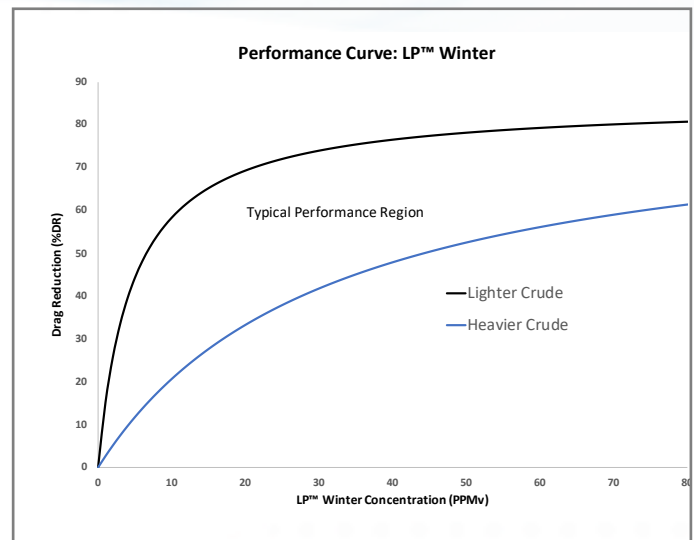
Benefits

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 crude heat loss



This performance curve demonstrates the range in which LP™ Winter Flow Improver can operate, depending on pipeline and fluid conditions.

LP™ Winter

Product Properties



GENERAL

Application	Light and medium petroleum crude oil
Flow Improver Type	Suspension
Carrier	Water-glycol mixture

PERFORMANCE

Maximum Drag Reduction	Greater than 80%
Typical Concentration	5 to 50 ppm

TYPICAL PROPERTIES

Color	White
Density	7.0 – 8.1 lbs/gal (0.84 – 0.97 g/cm ³)
Typical Density	8.09 lbs/gal (0.97 g/cm ³)
Flash Point	Not applicable
Viscosity	50 – 200 cP @ 511s ⁻¹ (Non-Newtonian) @ 77 °F/25 °C
Freezing Point	14 °F (-10 °C)
Boiling Point	221 °F (105 °C)
Vapor Pressure	0.46 psia (23.8 mm Hg) @ 77 °F/25 °C

HANDLING

Operating Range	14 °F to 110 °F (-10 °C to 43 °C)
Product Stability	Stable suspension Intermittent agitation recommended
Pressure and Heating	No nitrogen or pressurized vessels required Climate control environment available

INJECTION EQUIPMENT

Pumps	Various designs available for different injection range and environments
Range	5 to 2,500 gal/day (20 to 9,500 L/day)
Flow Meter	Mass (Coriolis)
Automation	Standard

SAFETY AND ENVIRONMENTAL

Reference country specific Safety Data Sheet for local requirements

Safety & Health	Nonflammable. This material is not classified as hazardous under the criteria of the U.S. OSHA Hazard Communication Standard 29 CFR 1910.1200.
Environmental	Not classified as an environmental hazard per GHS. Uncontaminated waste product is non-hazardous as defined by U.S. RCRA.

The data presented is based on test results and experiences that LiquidPower Specialty Products Inc. (LSPI) believes reliable and are supplied for informational purposes only. LSPI disclaims any liability, damage or injury that results from the use of this data, and nothing contained herein shall constitute a guarantee, warranty or representation (including freedom from patent liability) by LSPI with respect to the data, the products described or their use for any specific purpose, even if that purpose is known to LSPI.

© 2020 LiquidPower Specialty Products Inc. All rights reserved. Patent information can be found on www.LiquidPower.com.



A Berkshire Hathaway Company

North America, Latin America
LiquidPower Specialty Products Inc.
2000 W. Sam Houston Pkwy S.
Fourth Floor, Suite 400
Houston, TX 77042 USA
Tel: +1 713 339 8703
+1 800 897 2774 (USA toll free)

Europe, Middle East, Africa and Asia Pacific
Medialaan 50
1800 Vilvoorde (Brussels)
Belgium
Tel: +32 2 263 0520
Fax: +32 2 267 5176

Russia and CIS
LiquidPower Specialty Products Inc.
Zemlyanoy Val, bld. 9
BC Citydel, 4th floor, office 4003
Moscow, Russia, 105064
Tel: +7 495 9679335
Fax: +7 495 9679373