

EP™ 2000

For Heavy Crude Oil

Background

EP™ 2000 Flow Improver is a part of the LiquidPower Specialty Products Inc. (LSPI) range of innovative and technologically superior Flow Improver solutions. This pioneering product provides the answer for flow improvement in heavy crude petroleum pipeline applications.

Historically, heavy crude oil has been a challenge for existing commercially available drag reducing agents (DRA). As crude oil gravities fall below ~23° API, traditional DRA becomes ineffective. LSPI developed a new class of advanced DRA technology to address this need. EP™ 2000 Flow Improver is proven to increase deliveries of produced heavy crude oil to market.

Characteristics

EP™ 2000 Flow Improver is an aqueous dispersion. Its robust characteristics make it a high-performing drag reducer for many heavy crude oil pipeline applications. EP™ 2000 is the industry performance standard for reliable heavy oil drag reduction.

This innovative product can provide up to 50% drag reduction, depending on crude oil characteristics and level of turbulence. EP™ 2000 allows pipelines to increase throughput, decrease pressure or shut down pumps to manage crude oil temperatures.

Benefits

Great Performance:

- Achieves 50% drag reduction under certain conditions
- Increases flow rate while maintaining pipeline pressure
- Maintains flow rate while reducing pipeline pressure
- Allows shutting down of intermediate pump stations

Superior Technology:

- Improves pipeline capacity without capital investment
- Enables crude thermal management activities

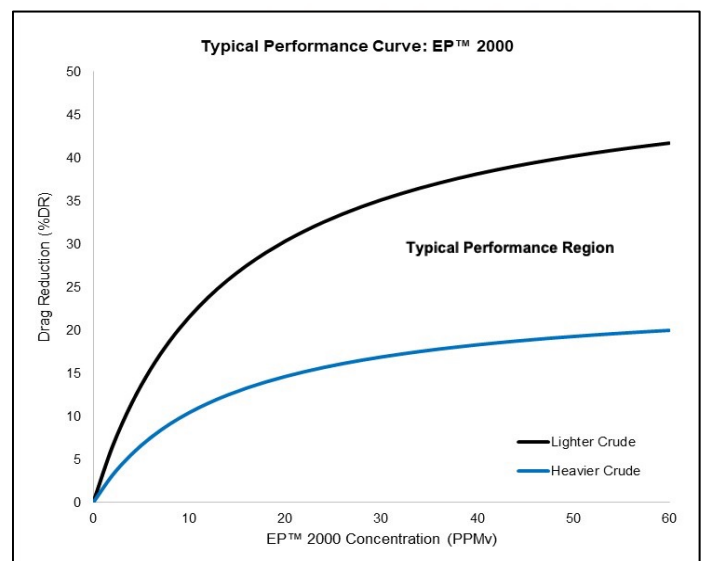
EP™ 2000 is formulated to provide reliable, continuous field performance, minimizing costly injection downtime.

The successful application of EP™ 2000 Flow Improver requires transition or turbulent flow regime in a portion of the pipeline system, heavy crude oil/DRA polymer affinity, and a suitable pipeline system configuration.

The polymer technology developed by LSPI allows greater amounts of active polymer to be deployed in a fixed amount of product. The polymer of choice shows excellent heavy oil 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. EP™ 2000 Flow Improver dissolves into flowing product without coating pipeline walls.

Handling

EP™ 2000 Flow Improver is easy to handle, store and clean up. It is nonflammable, flows easily, and does not require nitrogen pressurized storage tanks.



This performance curve demonstrates the range in which EP™ 2000 Flow Improver can operate, depending on pipeline and fluid conditions.

EP™ 2000

Product Properties



GENERAL

Application	Heavy petroleum crude oil
Flow Improver Type	Dispersion
Carrier	Water and glycol mixture

PERFORMANCE

Maximum Drag Reduction	Up to 50%
Typical Concentration	5 to 100 ppm

TYPICAL PROPERTIES

Color	White
Density	8.1 – 8.6 lbs/gal (0.97 – 1.03 g/cm ³)
Typical Density	8.4 lbs/gal (1.01 g/cm ³)
Flash Point	> 200 °F (> 93.3 °C)
Viscosity	90 cP @ 511s-1 (Non-Newtonian) @ 77 °F/25 °C
Freezing Point	-9 °F (-23 °C)
Boiling Point	222 °F (106 °C)
Vapor Pressure	0.46 psia (24 mm Hg) @ 77 °F/25 °C

HANDLING

Operating Range	-9 °F to 140 °F (-23 °C to 60 °C)
Product Stability	Stable dispersion No agitation required
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	Available

SAFETY AND ENVIRONMENTAL

Reference country specific Safety Data Sheet for local requirements

Safety & Health	Nonflammable. This material is classified as hazardous under the criteria of the U.S. OSHA Hazard Communication Standard 29 CFR 1910.1200.
Environmental	Uncontaminated waste product is non-hazardous as defined by U.S. EPA.

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