

## PRODUCT DATASHEET

# LP™ 111

For High Performance in Crude Oil

## Background

LP™ 111 Flow Improver is part of the Lubrizol Specialty Products, Inc. (LSPI) range of innovative and technologically superior Flow Improver Solutions. As part of the portfolio, LP™ 111 Flow Improver provides the answer to systems facing challenging needs.

## Characteristics

LP™ 111 Flow Improver has been designed for both multiphase pipelines and applications where the logistical costs of transportation and shipping products can be high. This is often the case for offshore applications.

LP™ 111 Flow Improver has a higher concentration of active polymer in the product, allowing high performance using fewer gallons.

### Benefits

Great performance:

- Provides additional buffering from shear effects.
- 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.
- Lower injection rates than other drag reducers.
- Faster dissolution rates than other drag reducers.
- Reduces internal corrosion rate by up to 40%.
- Reduces crude heat loss.
- DRA of choice for multiphase systems.
- Multiphase modeling and performance forecasting available.

The polymer technology developed by Lubrizol Specialty Products, Inc. allows greater amounts of active polymer to be deployed in a fixed amount of product while improving the dissolution dynamics. The polymer of choice shows excellent hydrocarbon affinity and is able to attain elevated levels of drag reduction under varied operating scenarios. The nature of the polymer provides additional buffering from shear affects.

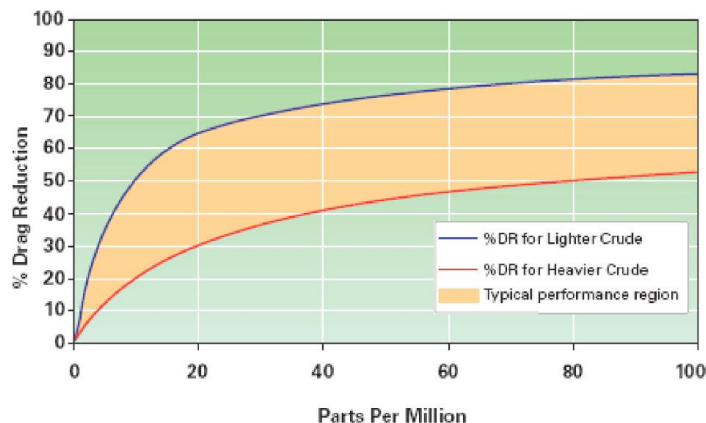
Similar to the other LP™ Flow Improver products, LP™ 111 dissolves into flowing product without coating pipeline walls and increases throughput while reducing internal corrosion rates.

## Handling

LP™ 111 Flow Improver is easy to handle, store and clean up. It flows easily and does not require nitrogen pressurized storage tanks.

*See back page for product properties.*

Performance Graph



The performance curve shows the performance range in which LP™ 111 Flow Improver operates in 100% crude oil, depending on pipeline and crude conditions.

# LP™ 111

## Product Properties

### GENERAL

Designed for use on	Petroleum crude oil and multiphase applications
Flow Improver type	Suspension
Carrier/Solvent	Water

### PERFORMANCE

Maximum drag reduction	Greater than 80% in 100% crude oil
Typical concentration	5 to 50 ppm

### TYPICAL PROPERTIES

Color	White
Density	8.0 lbs/gal (0.96 g/cm <sup>3</sup> )
Flash Point	Not applicable
Viscosity	375 cP @ 511s <sup>-1</sup> (Non-Newtonian) @ 77°F/25°C
Freezing Point	32°F (0°C)
Boiling Point	212°F (100°C)
Vapor Pressure	0.46 psia (23.8 mm Hg) @ 77°F/25°C

### HANDLING

Operating range	32°F to 110°F (0°C to 43.3°C)
Product stability	Stable emulsion Intermittent agitation required
Pressure	No nitrogen or pressurized vessels required
Heating	Heating tracing and heating required under freezing conditions 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 (per U.S. OSHA)	Nonflammable; Nonhazardous Low toxicity. Conventional protection equipment
Environmental (per U.S. EPA)	Not classified as hazardous waste