Quality Control of Drag Reducing Agents

with the

Friction Flow Loop

Characteristics

- Tests DRA efficiency
- Compact laboratory size
- Different Reynolds numbers can be analyzed within one test
- Minimized shear forces, no edges, constant acceleration
- Different line sizes usable

Timesaving research on DRA

The Friction Flow Loop provided by PSL Systemtechnik is a fully automated Turbulence Rheometer in laboratory size for analysis of fluid behavior in pipelines.
Applications of the device are research on efficiency and optimization of drag reducing agents (DRA).
The instrument offers a time saving operation of the necessary tests in a compact design. An integrated PC and associated software allow an easy handling, monitoring and data logging of experiment runs.

Mode of operation

The principle of the Friction Flow Loop is a huge hydraulic driven injection system. A hydraulic piston is driving a sample piston. Thus, any contact of hydraulic oil and sample can be eliminated.
The sample is pumped through a test line with small diameter. This way, experiments can be executed with a variable flow rate and a wide range of Reynolds numbers.

Small sample volumes

Only a small volume of 3 litres and a test duration of 90 seconds are needed to run Reynolds number ramps of 6,000 to 80,000. This saves approximate one month compared to other test methods.

Controlled measurements

By measurement of the absolute pressure or calculation of the differential pressure loss

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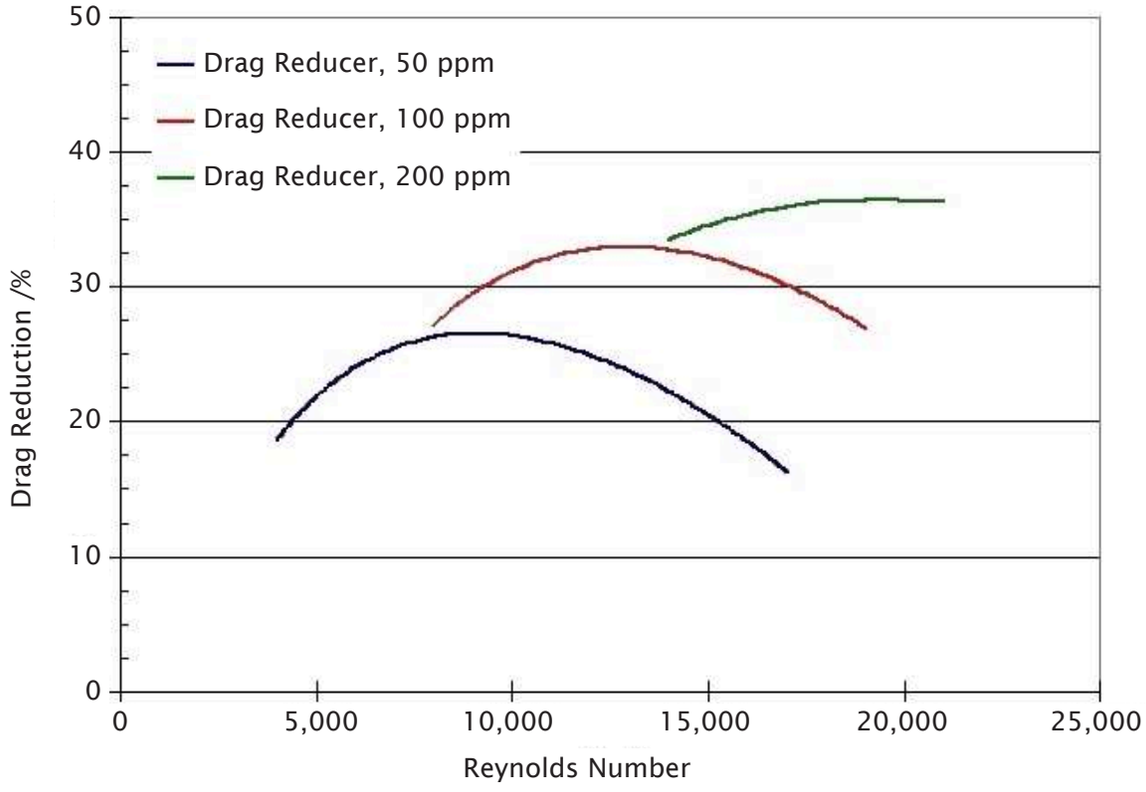
for each line segment the drag effect can be monitored.
By comparison of the pressure losses with and without DRA the efficiency of the agents can be calculated easily. Using a flow rate ramp, different Reynolds numbers can be analyzed within one test. Repetitive tests enable check on long-term stability of the DRAs.

Without any sharp edges
To ensure best measurement results, the Friction Flow Loop is specially designed without any sharp edges or diameter changes. The special shape of sample piston and cylinder head assures constant acceleration at the line inlet to minimize shear forces.

Pneumatic pressure
Charging and discharging steps are done by pneumatic pressure. Thus, no pumps are necessary. Test line, specimen cylinder and sample vessel are double-jacket temperature controlled. Different line sizes can be used depending on sample viscosity.

The Friction Flow Loop can be adapted to your requirements.



Comparison of drag reducer efficiency for different concentrations

Specifications:

Reynolds number:	80,000 (with 5mm line, water)
Temperature range:	-10 °C ... +80 °C (+14 °F ... +176 °F)
Pressure range:	0 ... 35 bar (0 ... 507.6 psi)
Line diameter / length:	3 mm, 5 mm/ 3.5 m
Sample volume:	0.5 l ... 3 l
Pneumatic input:	6 bar (87 psi), 1 l/min
Power consumption:	max. 6,000 W
Voltage input:	380 V~ / 16 A
Weight:	250 kg
Dimensions (WxDxH):	180 x 80 x 175 cm

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