Quality Control of Drag Reducing Agents

with the

Turbulence Rheometer

Characteristics

- Compact laboratory size
- Different Reynolds numbers can be analysed within one test
- Minimised shear forces, no edges, constant acceleration
- Different line sizes usable
- Custom design available

Timesaving research on DRA

The Turbulence Rheometer TR provided by PSL Systemtechnik is a fully automated test instrument in laboratory size for analysis of fluid behaviour in pipelines.
Applications of the device are research on efficiency and optimisation 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 Turbulence Rheometer 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 litre 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.

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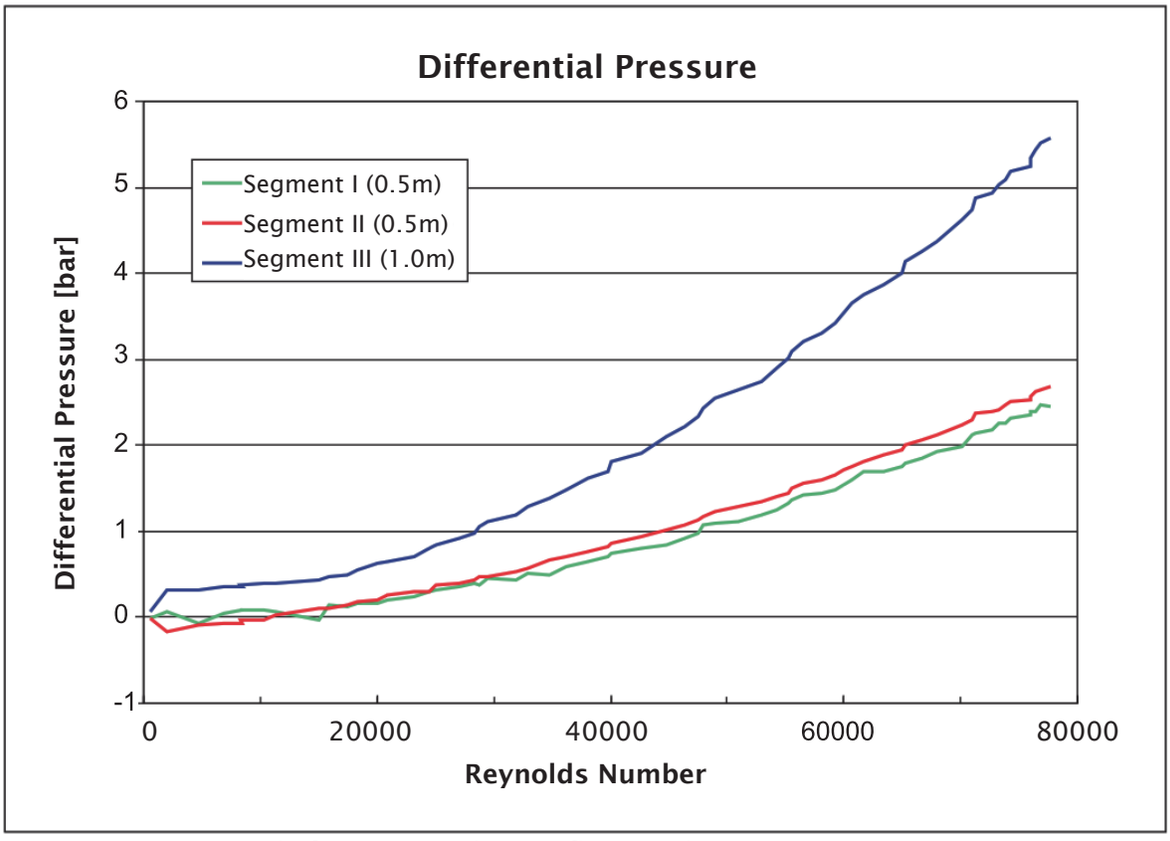
Controlled measurements
By measurement of the absolute pressure or calculation of the differential pressure loss for each line segment the drag effect can be monitored.
By comparison of the pressure losses with and without DRA the efficiency of the agents can be calculated easily. Using a flow rate ramp,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

Without any sharp edges
To ensure best measurement results, the TR 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 minimise 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 Turbulence Rheometer can be adapted to your requirements.



Measurement example for pressure loss to flow conditions

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 cm x 80 cm x 175 cm

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