BARTEC BENKE

Process Analyzer

Viscosity Process Analyzer VISC–4

Credible Solutions for the Oil and Gas Industry

Viscosity Process Analyzer VISC–4

To remain competitive, today's refiners must employ all optimization and product control techniques available. The use of online physical property analyzers is one of the key features to reach those objectives because they measure important quality properties in the process directly.

All fluids that fulfil the conditions of Newton's friction law are referred to as Newtonian fluids. Their viscosity is a material constant, which is only dependent on pressure and temperature. The viscosity for incompressible and Newtonian fluids can be derived from the so called Hagen-Poiseuille law. The fluid is assumed to flow under laminar conditions.

BARTEC BENKE

Your partner for innovative system solutions.

The BARTEC BENKE specialists have many years of experience. They create system solutions that you can rely on: efficient and dependable for decades to come.

- **The only ASTM compliant capillary type viscometer**
- **Kinematic viscosity directly and continuously measured**
- **Integral measurement of density**
- **Calculation of dynamic viscosity**
- **Unparalleled temperature stability of ± 0.02 K**
- **Hagenbach correction not necessary**
- **No maintenance approach (no oil bath, no pump)**
- **Network and fieldbus communication**

APPLICATION

The BARTEC BENKE Viscosity Process Analyzer VISC-4 continuously measures the kinematic viscosity of a product via the capillary method.

Due to the outstanding performance and sample temperature stability of ± 0.02 K the VISC-4 is the best choice for highly accurate viscosity measurements e.g. lube oil production and fuel oil blending. This high level of accuracy results in cost reduction while improving product quality. The VISC-4 is suitable to handle samples with a viscosity of up to 1000 cSt at measurement temperatures of up to 100 °C.

Special Features:

- **Direct and continuous measurement of kinematic viscosity** therefore direct comparison with laboratory results without any need for conversion

- **Integral measurement of the density** therefore calculation and display of the dynamic viscosity

- **Minimized maintenance requirements** due to temperature control and insulating system without oil bath/pumps

- **Compliance of the temperature stability (±0.02 K)** as defined in standard ASTM D445

- **Necessity of Hagenbach correction is eliminated**

- **Multi−stream capability**

- **Automatic rinsing and draining option**

- **Integrated failure diagnosis and self monitoring**

- **No atmospheric drain required,** backpressure at analyzer outlet permitted (depends on application)

- **Available communication interfaces:**
  - Modbus/RTU, Modbus/TCP (bidirectional)
  - Remote access via Ethernet (VDSL or FOC is)

- **Validation report for quality assurance**

- **Freely programmable digital and analog inputs**

Norms and Standards:

Compliant with:
- **ASTM D445**
- **DIN EN ISO 3104**
- **IP 71**

Make your decision for a strong partner!

Choose BARTEC GROUP also for:

- **Fast Loop Systems**
- **Sample Conditioning Systems**
- **Validation Systems**
- **Recovery Systems**
- **Chillers**
- **Air Conditioning Systems/HVAC**
- **Pre Commissioned Analyzer Shelters/ Turn−Key Solutions**

Viscosity Process Analyzer VISC–4

BARTEC BENKE

EXPLOSION PROTECTION

Marking	ATEX: II 2 G IIC T4 or T3 Gb NEC 500: Class I, Div. 2, Groups B, C, D, T4 or T3 NEC 505: Class I, Zone 1, AEx IIB+H2 T4 or T3 CEC Sec. 18: Class I, Zone 1, Ex IIB+H2 T4 or T3 TR CU Certification available

TECHNICAL DATA

Technology	continuously analyzing kinematic viscosity, capillary-type temperature stability ± 0,02 K
Method	compliant with: ASTM D445, DIN EN ISO 3104, IP 71
Measuring ranges and temperatures	L T_M*: 20 to 60°C (68 to 140°F) M T_M*: 40 to 60°C (106 to 140°F) H T_M*: 50 to 100°C (122 to 212°F) t viscosity 0.7 to 30 cSt v viscosity 10 to 500 cSt/200 to 1000 cSt
Repeatability	≤ DIN EN/ASTM formulated oils typ. 0.03 cSt at 100°C (212°F)
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	continuous
Product streams	2 x sample, 1 x validation (additional hardware required)

■ **Electrical data**

Nominal voltage	230 VAC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 500 W
■ **Protection class**	IP 54 (NEMA 13)

■ **Ambient conditions**

Ambient temperature	operation 5 to 40°C (41 to 104°F) storage 0 to 60°C (32 to 140°F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive

Sample

Quality	t filtered 10 μm, bubble-free v filtered 50 μm, bubble-free max. viscosity = end of measuring range (technical clarification required) (sample as coolant ≤ 10 cSt)
Consumption	3.8 to 10 l/h (depends on variant)
Pressure at inlet	3 to 14 bar (43.5 to 203 psi)
Temperature at inlet	for L + M Versions: T_M*- 35 K < T_{INLET}** < T_M*+ 5 K for H Versions: T_M*- 40 K < T_{INLET}** < T_M*- 5 K depends on application

Utilities

■ **Instrument air**

Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 1 Nm³/h
Pressure at inlet	3 to 7 bar (43.5 to 101.5 psi)
Quality	humidity class 2 or better acc. to ISO 8573.1

■ **Coolant**

Consumption	sample as coolant: 20 to 40 l/h or plant cooling water: 10 to 30 l/h for re-cooling of peltier device
Temperature	5 to 50°C (41 to 122°F)
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	filtered 50 μm

Signal outputs and inputs

Analog outputs	kinematic viscosity (others on request)
Digital outputs	Alarm, Ready / Valid
Digital inputs	Stream Selection, Validation Request, Reset

Electrical data of signal outputs and inputs

Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Digital outputs	24 VDC; max. 0.5 A
Digital inputs	high: 15 to 28 VDC / low: 0 to 4 VDC
Auxiliary power supply output	24 VDC; max. 0.8 A

Control unit

Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS

User interfaces

Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function

Connections

Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere backpressure on request

Weight and dimensions

Weight	approx. 250 kg
Dimensions (W x H x D)	approx. 1190 x 1930 x 710 mm
Space requirements	right: 150 mm / left: 100 mm

Optional interfaces

Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

*T_M = Measuring Temperature / ** T_{INLET} = Sample Inlet Temperature

Important notice VISC-4 is subject to continuous product improvement, specifications are preliminary and may be subject to change without notice. If your technical data do not comply with existing data, please contact us for technical clarification.