



Process Analyzer
Viscosity Process Analyzer VISC-4

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Process Analyzer

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**



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 $\pm 0,02$ 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 \leq DIN EN/ASTM
 formulated oils typ. 0.03 cSt at 100°C (212°F)

Reproducibility \leq DIN EN/ASTM

Measuring cycle continuous

Product streams 2 x sample, 1 x validation
 (additional hardware required)

■ Electrical data

Nominal voltage 230 VAC $\pm 10\%$, 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 μ m, bubble-free
 v filtered 50 μ m, 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:
 $T_M^* - 35 \text{ K} < T_{\text{INLET}}^{**} < T_M^* + 5 \text{ K}$
 for H Versions:
 $T_M^* - 40 \text{ K} < T_{\text{INLET}}^{**} < T_M^* - 5 \text{ K}$
 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 μ m

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.