



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
 compliant with:
 ASTM D445, DIN EN ISO 3104, IP 71

Method

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 ± 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:
 $T_M^* - 35$ 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
 Operation

8 Nm³/h while purging (~12 min)
 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)

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* 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.