BARTEC BENKE

BARTEC GROUP protects people and the environment by the safety of components, systems and plants.

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BARTEC BENKE

Process Analyzer

Viscosity Index Process Analyzer VI–4

Credible Solutions for the Oil and Gas Industry

Viscosity Index Process Analyzer VI–4

Process Analyzer

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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 index is a widely used and accepted measure of the variation in kinematic viscosity due to changes in the temperature of a petroleum product between 40 and 100°C. A higher viscosity index indicates a smaller decrease in kinematic viscosity with increasing temperature of the product.

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 viscosity index analyzer

Kinematic viscosities directly and continuously measured

Integral measurement of density

Integral calculation of viscosity index

Unparalleled temperature stability of ± 0.02 K

Hagenbach correction not necessary

No maintenance approach (no oil baths, no pumps)

Network and fieldbus communication

APPLICATION

The BARTEC BENKE Viscosity Index Process Analyzer VI-4 consists of two viscosity process analyzer units. One analyzer unit measures the kinematic viscosity at a temperature of 40°C and the other at a temperature of typically 100°C. These two values are used to calculate the VI according to ASTM D2270.

Due to the outstanding performance and sample temperature stability of ± 0.02 K the VI-4 is the best choice for highly accurate viscosity index measurements e.g. lube oil production and fuel oil blending. This high level of accuracy results in cost reduction while improving product quality. The VI-4 is suitable to handle samples with a viscosity of up to 800 cSt at measurement temperatures of up to 100°C.

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**

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 D2270**
- **ASTM D341**

oil ■ gas ■ refineries ■ petrochemistry ■ chemistry

Viscosity Index Process Analyzer VI–4

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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 viscosities at 40°C and 100°C, capillary-type
Method	compliant with: ASTM D445, ASTM D2270, ASTM D341, DIN EN ISO 3104, IP 71
Measuring range	viscosity index 80 to 120 (other temperatures on request)
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. 1000 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 800 cSt at the lowest temperature (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	50 to 60°C; changes ≤ 0,1 K/min

Utilities

■ **Instrument air**	
Consumption	
Purge	11 Nm³/h while purging (~16 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	viscosity index (others on request)
Digital outputs	Alarm, Ready/Valid
Digital inputs	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)

Important notice VI-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.

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