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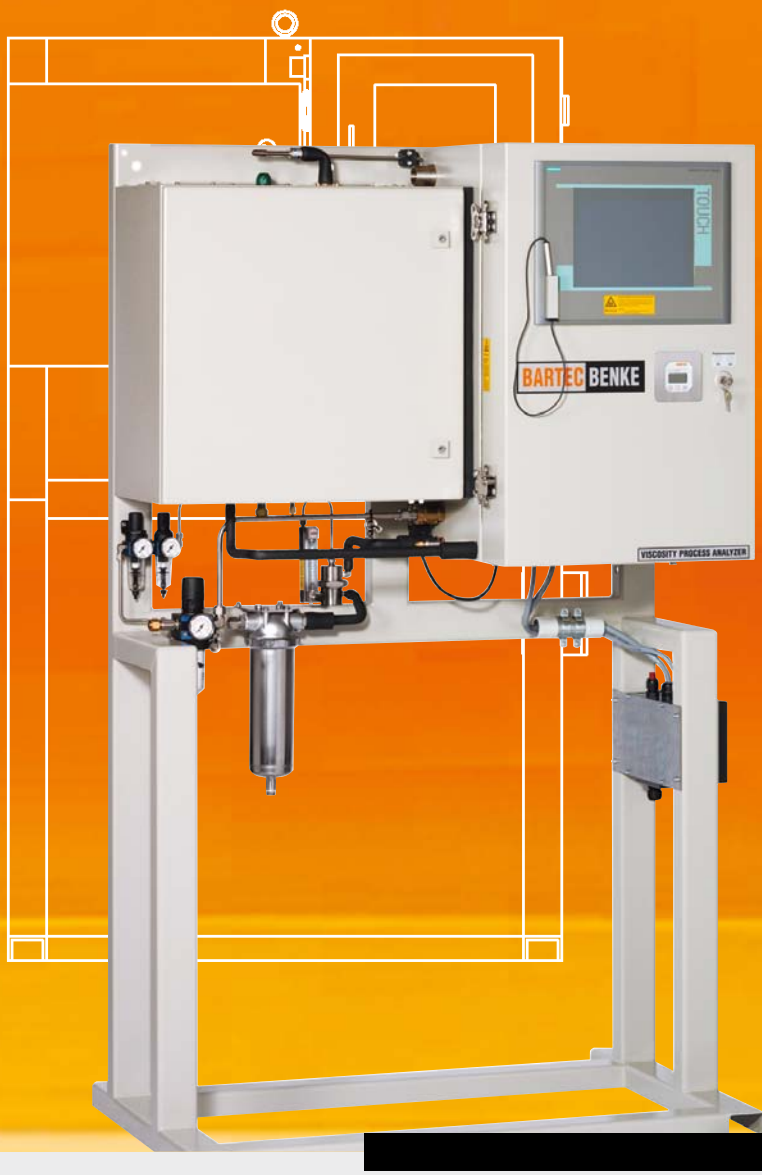

- ASTM compliance
- Capillary type viscometer
- Kinematic viscosity directly measured
- Calculation of dynamic viscosity
- Hagenbach correction not necessary
- ATEX certified
- Customized solutions
- Network and Fieldbus communication

Process Analyzer

Viscosity Process Analyzer VISC-4

Viscosity Process Analyzer **VISC-4**

Application

The BARTEC BENKE Viscosity Process Analyzer (VISC-4) is a **continuously** kinematic viscosity measuring capillary analyzer suited to measure the viscosity of a product. The VISC-4 operates online. It serves to monitor/maintain product quality for the in-spec production of mineral oil products.

Three basic variants are available:

measuring temperature 20 to 60°C (68 to 140°F)
measuring temperature 41 to 60°C (106 to 140°F)
measuring temperature 61 to 100°C (142 to 212°F)

Each variant available with following measuring ranges:

viscosity 0.7 to 30 cSt
viscosity 10 to 500 cSt
viscosity 200 to 1000 cSt

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YOUR competent partner for safe plants

The specialists from BARTEC BENKE have many years of experience in plant safety. They create solutions which you can rely on: economical, reliable and for the future.

Special Features

- Direct and continuous measurement of kinematic viscosity
- Direct comparison with laboratory results without any need for conversion
- Integral measurement of the density
- Calculation and display of the dynamic viscosity
- Temperature control and insulating system without oil bath/pumps
- Minimized maintenance requirements
- Compliance of the temperature stability (0.02 K) as defined in standard ASTM D 445
- Necessity of Hagenbach correction is elminated
- Multi-stream capability
- Automatic rinsing and draining facility
- Integrated failure diagnosis and self monitoring
- No atmospheric drain required, backpressure at analyzer outlet permitted
- Single-Phase Power Supply
- Wide range of acceptable sample- and coolant temperature at analyzer inlet
- Available communication interfaces:
  - Modbus/RTU, Modbus/TCP (bidirectional)
  - Remote Access via modem, ISDN, LAN, VPN

Make your decision for a strong partner!

Choose BARTEC BENKE also for

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

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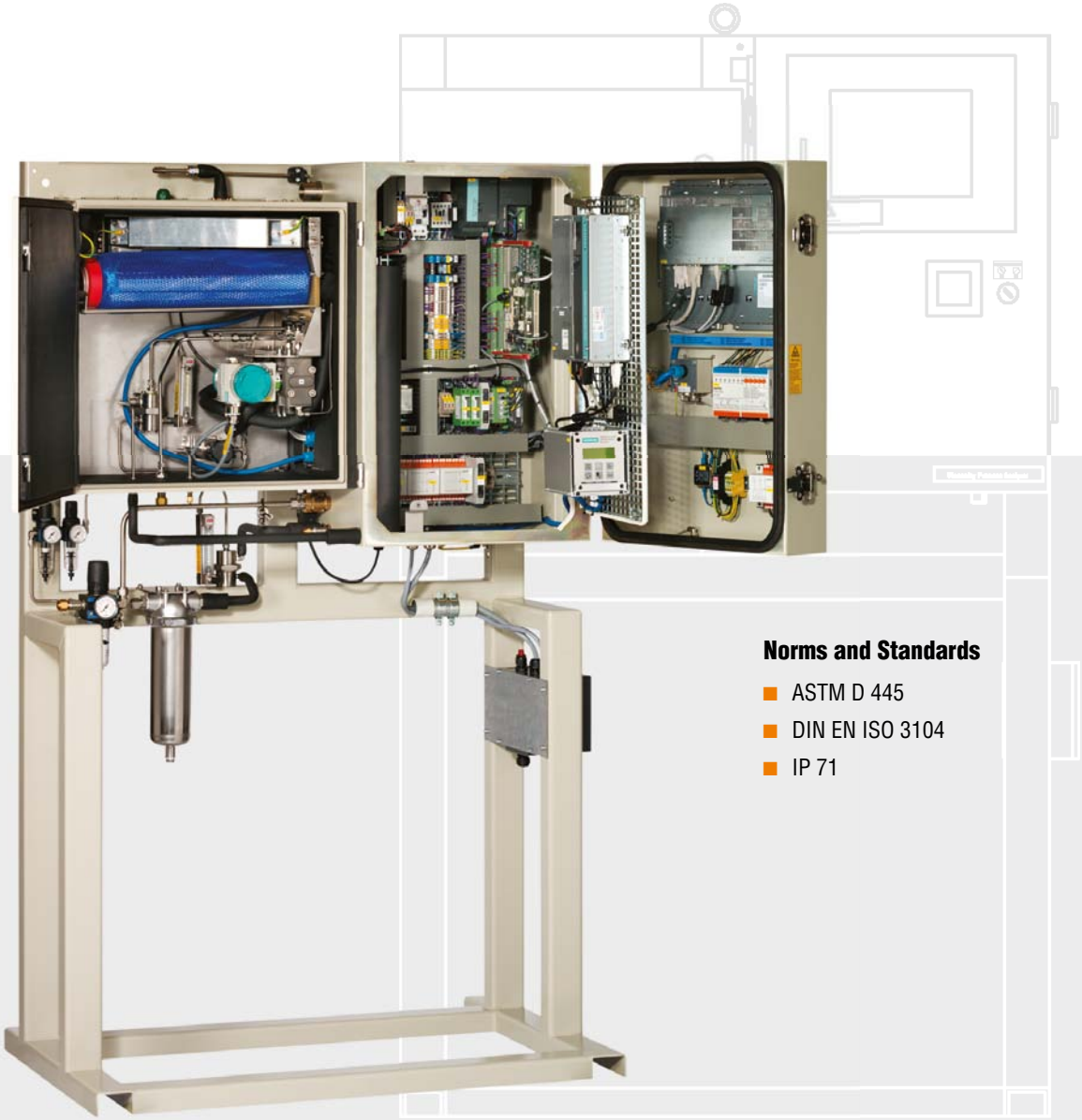

Norms and Standards

- ASTM D 445
- DIN EN ISO 3104
- IP 71

Method

The value of kinematic viscosity results from the product of the measured passage time and the device constant of the capillary: v = C * t. As viscosity is highly dependent on the temperature, the temperature of the liquid during the measurement has to be regulated precisely with minimum variation (0.02 K in accordance with ASTM D 445). For a continuous determination of the viscosity of a liquid during the production process the liquid is controlled in viscometers through a capillary. From the mass flow rate through the capillary and from the pressure drop over the length of the capillary, the current value of the kinematic viscosity of the liquid is ascertained by applying the law of Hagen-Poiseuille.

Note: Illustrations of this brochure show an exemplary VISC-4 analyzer.

Viscosity Process Analyzer VISC-4

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Explosion protection

Ex protection type	Ⓔx II 2G IIC T3 or T4 depending on T_M*
Certification	TÜV 09 ATEX 554794
CSA certificate no.	pending

Technical data

Type and method	continuously analyzing kinematic viscosity, capillary-type according to ASTM D 445, DIN EN ISO 3104, IP 71
Measuring temperatures and ranges (variants)	L T_M : 20 to 60 °C (68 to 140 °F) M T_M : 41 to 60 °C (106 to 140 °F) H T_M : 61 to 100 °C (142 to 212 °F) t viscosity 0.7 to 30 cSt v viscosity 10 to 500 cSt/200 to 1000 cSt
Repeatability	formulated oils: typ. 0.03 cSt at 100 °C
Reproducibility	≤ DIN EN/ASTM
Product streams	2 x sample, 1 x validation (additional hardware required)

■ Electrical data

Nominal voltage	AC 230 V ± 10 %, 1 phase; 50 Hz other ratings on request
Maximum power consumption	approx. 500 W
Protection class	IP 54, (NEMA 12)

■ Ambient conditions

Ambient temperature	operation 5 to 40 °C (41 to 104 °F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive

Sample

Quality	filtered 10 µm, bubble-free
Consumption/ flow rate	3.8 to 10 l/h (depending on variant)
Pressure at inlet	min. 3 to max. 14 bar (depending on variant)
Temperature at inlet	typically above T_M - 40K below T_M + 10K depending on application

Utilities

■ Instrument air

Consumption	min. 1.4 Nm³ per flushing cycle during start-up (7x housing volume) ≈ 1 Nm³/h in normal operating mode
Pressure at inlet	3 to 6 bar
Quality	class 2 or better according to ISO 8573-1

Signal outputs and inputs/harwired interface

various analog and digital signals available;
to be specified, see options

Electrical data of signal outputs and inputs

Analog outputs	2 x 4 to 20 mA 800 Ω out; active isolated on request
Digital outputs	DC 24 V; max. 0.5 A
Digital inputs	high DC 15 to 28 V low DC 0 to 4 V
Auxiliary power supply output	DC 24 V, max. 0.8 A

Control unit

Central control unit	Industrial PC
Operating system	Windows XP®
Control software	PACS

User interfaces

Display	TFT display with touch function 800 x 600 pixels
Keyboard	virtual keyboard, controlled via TFT display with touch function

Connections

Pipe fittings	Swagelok® 6 mm/12 mm other fittings on request

Weight and dimensions

Weight	approx. 250 kg (without options)
Dimensions (W x H x D)	approx. 1190 x 1930 x 710 mm
Space requirement	right: 150mm/left: 100mm

Optional signal outputs and inputs

Digital outputs	alarm, ready, indication of active stream, indication of validation cycle, indication of rinsing/draining cycle
Digital inputs	activation of a stream, activation of a validation cycle, analyzer reset
Analog outputs	max. 3 of the following process variables can be selected: kinematic viscosity, dynamic viscosity, density, measuring temperature, mass flow rate, differential pressure
MODBUS interface	MODBUS/RTU via RS485 or RS422 or fiber optic cable MODBUS/TCP via fiber optic cable
Remote access	via modem, ISDN, Ethernet via fiber optical or VPN

*T_M = measuring temperature

Important notice VISC-4 is subject to continuous product improvement, specifications are preliminary and may be subject to change without notice.

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