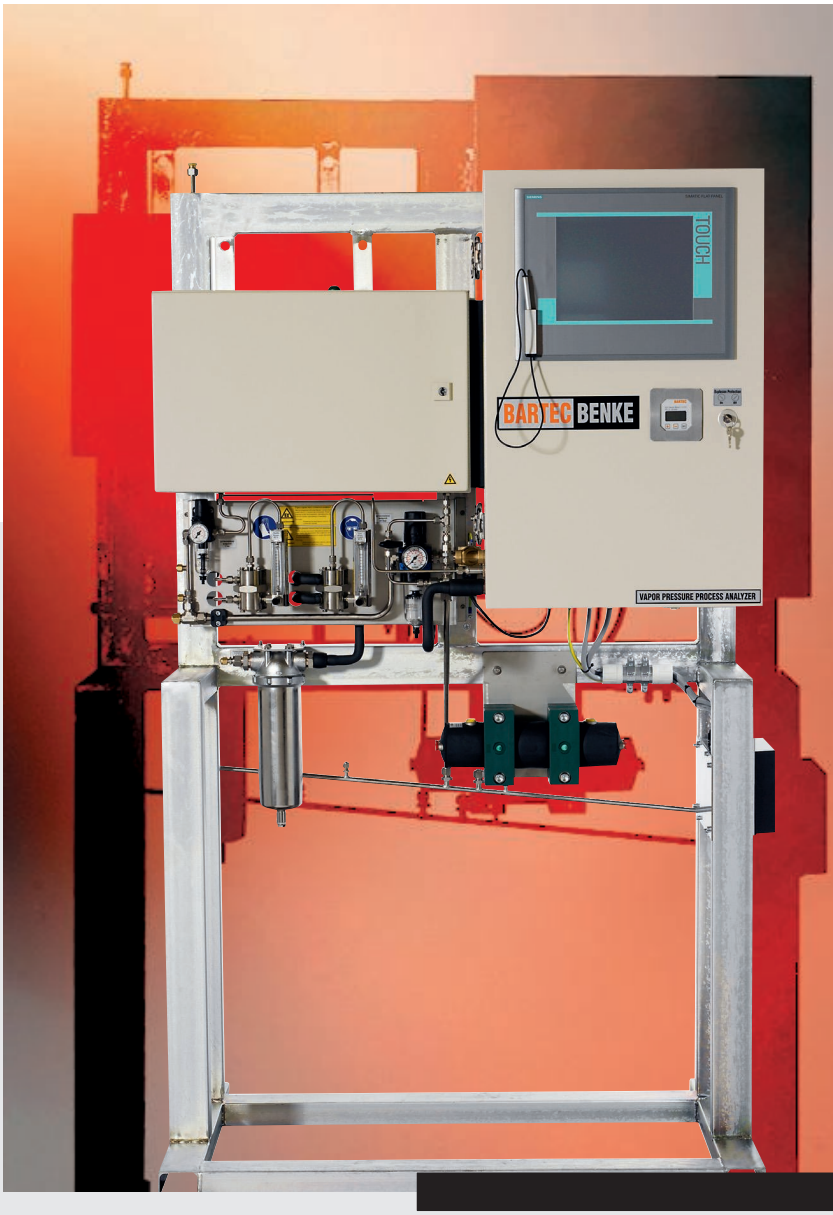
BARTEC BENKE



- ASTM compliance
- Customized solutions
- ATEX, CSA, GOST certified
- Dry measuring cell
- Resistant to wear
- Network and Fieldbus communication

Process Analyzer

Vapor Pressure Process Analyzer RVP-4

Vapor Pressure Process Analyzer **RVP-4**

Application

The BARTEC BENKE Vapor Pressure Process Analyzer (RVP-4) measures the vapor pressure of petroleum products, hydrocarbons, chemical products and components online and fully automatic. Three layouts are available:

- **Fuels** as gasoline or similar products
- **HiVisc** for high viscosity liquids
- **LPG** Liquefied petroleum gases and similar products

others on request

BARTEC BENKE

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

- Rugged design of measuring cell
- High precision and maximized performance due to optimized assembly of measuring cell
- Short reaction times due to integrated temperature control unit
- Dry measuring cell: Due to advanced temperature control capability oil bath has been avoided
- Wide range of inlet temperatures.
  No need for additional temperature pre-conditioning in most applications
- Also applicable for highly viscous samples
- Low sample consumption
- Re-cooling of peltier device (TEM) by either product or coolant
- Available communication interfaces:
  - Modbus /RTU, Modbus/TCP
  - Remote Access via modem, ISDN, LAN, VPN
- Integrated failure diagnosis and self monitoring
- Heat tracing if required
- Additional cooling for the control unit housing if required

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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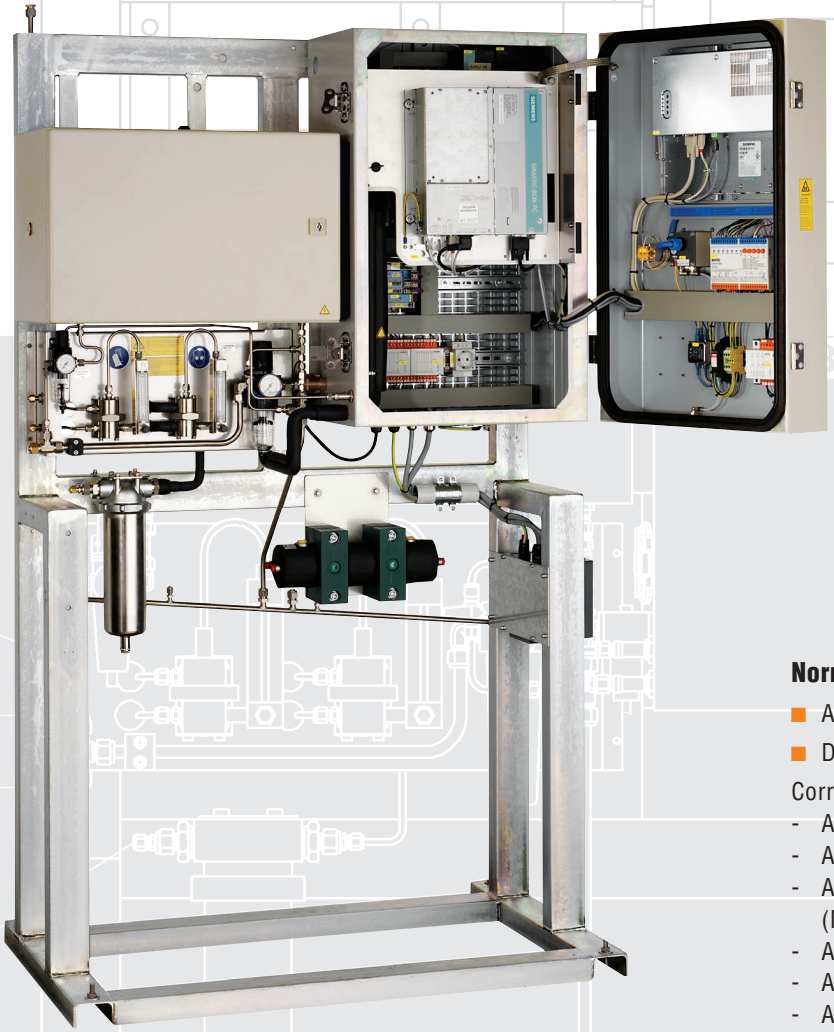

Norms and Standards

- ASTM D 5191
- DIN EN ISO 13016-1

Correlates with:

- ASTM D 4953 (DVP)
- ASTM D 323 (RVP)
- ASTM D 5482 (Mini Method Atmospheric)
- ASTM D 6377 (VPCR)
- ASTM D 1267 (LP Gas)
- ASTM D 6897 (LPG Expansion)

Method

The vapor pressure detection of the RVP-4 is based on the single expansion method.

A piston is moved backwards drawing a sample of known volume into a temperature-controlled chamber. After sealing the chamber the volume is expanded by further piston movement until liquid and vapor volume have a ratio of 1 : 4. As soon as the pressure in the chamber has stabilized the measurement cycle is completed. From the measured air saturated vapor pressure various equivalents can be calculated, e.g. RVPE (original method: ASTM D 323), DVPE (original method: ASTM D 4953).

Note: Illustrations of this brochure show a typical RVP-4 Analyzer with the optional application specific heat exchanger.

Oil and Gas Refineries **Petrochemistry** Chemistry

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Explosion protection

Ex protection type (Europe)	Ⓔx II 2G EEx IIC T4
Certification	TÜV 07 ATEX 553225
Classification (USA and CAN)	CSA Class I Div. 2 and Zone 1 optional available

Technical data

Technique	Expansion with piston
Method	ASTM D 5191, DIN EN 13016-1 correlates with ASTM D 4953*; D 323; D 5482; D 6377 (Crude Oil); D 1267; D 6897 * calculation of DVPE is standardized in ASTM D 5191
Measuring range	standard: up to 1.6 bar optional: up to 16 bar
Repeatability	standard: typ. 1.5 mbar
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	discontinuous, cycle time 7 min typically, depending on sample composition
Product streams	2 x sample, 1 x validation (additional hardware required)
Measuring temperature	37.8 °C (100 °F), up to 60 °C (140 °F) optional

■ Electrical data

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

■ 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, moisture content max. 500 ppm
Consumption	approx. 5 to 10 l/h approx. 30 l/h for re-cooling of peltier device (not required if suitable coolant is available)
Pressure at inlet	min. 2 bar above measuring range standard: up to 8 bar optional: up to 18 bar
Temperature at inlet	min.: T_M (measuring temperature) -40 K max. allowed: a) 45 °C (113 °F) for T_M < 45 °C (113 °F) b) T_M + 5 K for T_M > 45 °C (113 °F) variation of temperature should not exceed 0.2 K/min
Outlet	min. 1 bar below inlet pressure (depending on viscosity)

Utilities

■ Instrument air

Consumption	min. 1.4 Nm³ per flushing cycle during start-up (7 x housing volume) ~ 1 Nm³/h in normal operating mode
Pressure at inlet	4.7 to 6 bar
Quality	humidity class 2 or better according to ISO 8573.1

■ Coolant

Consumption	approx. 20 - 40 l/h for re-cooling of peltier device (not needed if sample can be used as coolant)
Temperature	5 to 50 °C (41 to 122 °F) variation of coolant should not exceed 1.0 K/min
Pressure at inlet	2 to 7 bar
Quality	filtered 50 µm

Signal outputs and inputs

Analog outputs	vapor pressure additional process variable (selectable)
Digital outputs	system alarm, ready signal, see options

Electrical data of signal outputs and inputs

Analog outputs	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 pixel
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
Dimensions (W x H x D)	approx. 1190 x 1930 x 710 mm

Optional signal outputs and inputs

Digital outputs	identification of a validation cycle identification of active stream warning/low-priority error
Digital inputs	stream selection (1/2) enable/disable automatic stream switching request for a validation cycle
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

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

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