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

Freezing Point Process Analyzer FRP–4

Credible Solutions for the Oil and Gas Industry

Freezing Point Process Analyzer FRP–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 directly important quality properties in the process.

The freezing point is an important cold property of jet fuels and aviation gasolines. It is the temperature at which paraffin crystals disappear when warming the sample after previously reaching the cloud point temperature.

BARTEC BENKE

Your partner for innovative system solutions.

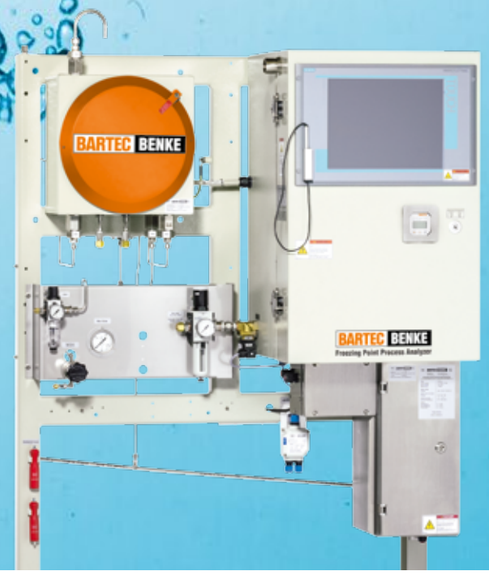
The BARTEC BENKE specialists have many years of experience. They create system solutions that you can rely on: efficient and dependable for decades to come.

ASTM compliant optical measurement

Suitable to also measure cloud point temperature

Typically no chiller required for cloud point applications

Network and fieldbus communication



Special Features:

- **Cloud Point also measurable**
- **Rugged design of measuring cell**
- **Optimized assembly –** easy removal of complete cell
- **Available communication interfaces:**
  - Modbus/RTU, Modbus/TCP (bidirectional)
  - Remote access via Ethernet (VDSL or FOC is)
- **Integrated failure diagnosis and self monitoring**
- **Validation report for quality assurance**
- **Freely programmable digital and analog inputs**

Norms and Standards:

Compliant with:

- **ASTM D2386**
- **ASTM D2500**
- **ASTM D1015**
- **DIN ISO 3013**
- **IP 16**

APPLICATION

The BARTEC BENKE Freezing Point Process Analyzer FRP-4 is a system for the fully automatic determination of the freezing point temperature of aviation fuels. The FRP-4 can be used for both determination of cloud point temperature and freezing point temperature of the sample.

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**

oil ■ gas ■ refineries ■ petrochemistry ■ chemistry

Freezing Point Process Analyzer FRP–4

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EXPLOSION PROTECTION

Marking	ATEX: II 2 G IIB (or IIC) T4 Gb NEC 500: Class I, Div. 2, Groups B, C and D NEC 505: Class I, Zone 1, AEx d e ib px IIB or IIB+H2

TECHNICAL DATA

Technology	optical turbidity detection
Method	compliant with: ASTM D2386, ASTM D1015, DIN ISO 3013, ASTM D7153-05, ASTM D7154-05, ASTM D2500
Measuring range	down to -40°C (-40°F)* down to -70°C (-94°F) optional: down to -80°C (-112°F)
Repeatability	≤ DIN EN/ASTM e.g. kerosene typ. 0.2°C at -50°C (-58°F)
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	discontinuous, cycle time 8 to 20 min depends on freezing point temperature cycle time 4 to 10 min depends on cloud point temperature*
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	filtered 50 µm, free of suspended water (≤ 37 cSt at inlet temperature)
Consumption	approx. 5 to 30 l/h
Pressure at inlet	2 to 3 bar (29 to 43.5 psi)
Temperature at inlet	5 to 15°C (41 to 59°F) min. 15 K above expected cloud point*

Utilities

■ **Instrument air**	
Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 1 Nm³/h
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	humidity class 2 or better acc. to ISO 8573.1
■ **Coolant**	
Consumption*	60 to 100 l/h
Temperature	20 to 40°C (68 to 104°F)
Pressure at inlet	1 to 3 bar (15 to 44 psi)
Quality	filtered 50 µm

Signal outputs and inputs

Analog outputs	freezing point temperature, cloud point temperature (others on request)
Digital outputs	Alarm, Ready signal, see options
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
Analog intputs	4 to 20 mA; 160 Ω
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. 1140 x 1900 x 710 mm
Space requirements	right: 500 mm / left: 500 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)

* FRP-4 measures only cloud point

Important notice FRP-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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