

ASTM compliance

Cloud Point detection possible

Customized solutions

ATEX, CSA, GOST certified

Network and Fieldbus communication



Process Analyzer

Freezing Point Process Analyzer FRP-4

Freezing Point Process Analyzer **FRP-4**

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.

Application

The BARTEC BENKE Freezing Point Process Analyzer (FRP-4) is a system for the fully automatic determination of the freezing point (FR) of liquid, transparent mineral oil products. The FRP-4 operates online and is capable of handling up to two separate streams and a validation input. It serves to monitor / maintain product quality for the in-spec production of aviation turbine fuels and aviation gasoline.

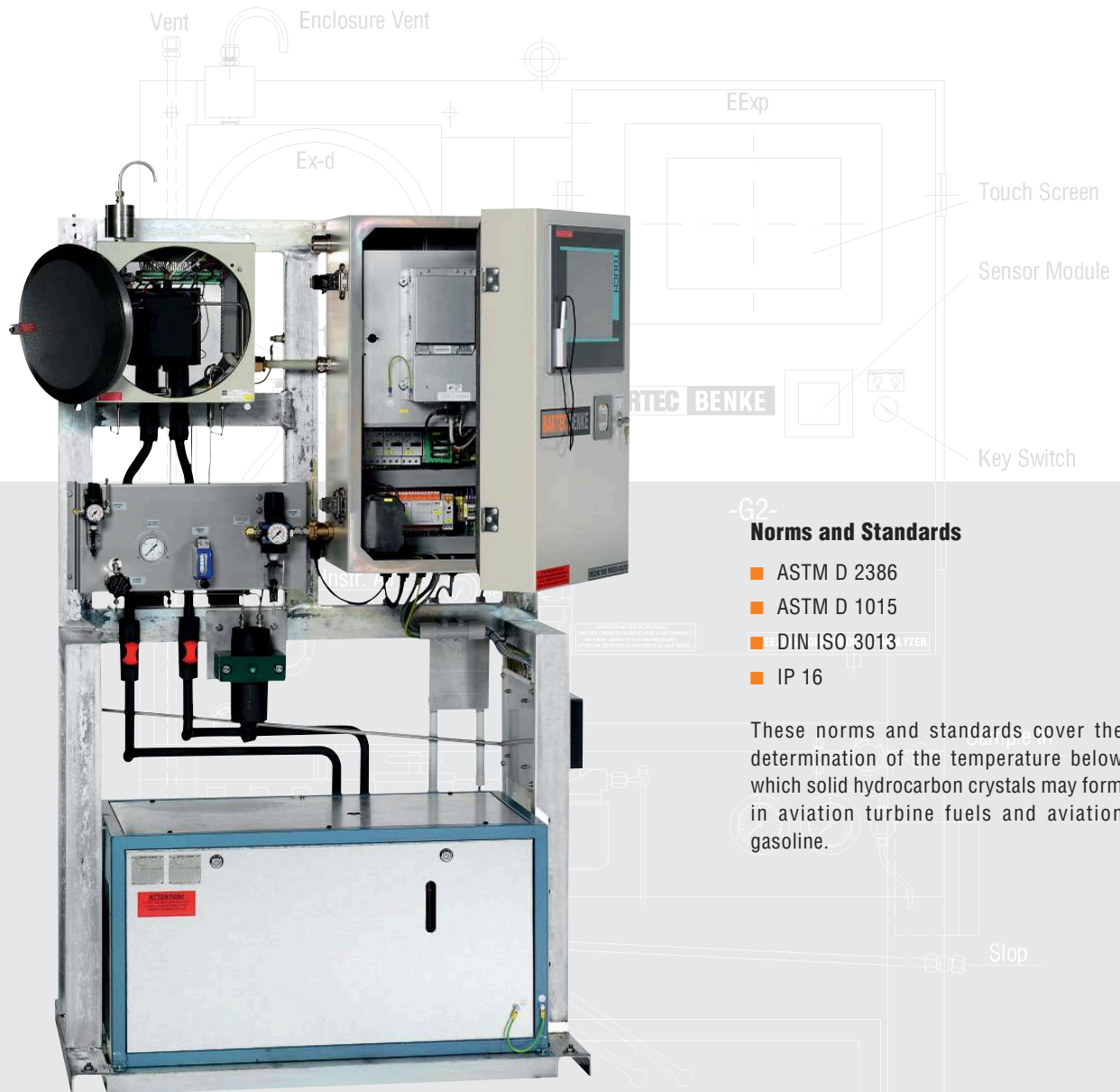
Special Features

- Cloud Point also determinable
- Rugged design of measuring cell
- Optimized assembly – easy removal of complete cell
- Integrated failure diagnosis and self monitoring
- Available communication interfaces:
 - Modbus /RTU, Modbus/TCP
 - Remote Access via modem, ISDN, LAN, VPN
- Multi-stream capability

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 2386
- ASTM D 1015
- DIN ISO 3013
- IP 16

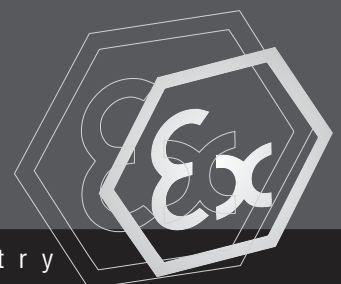
These norms and standards cover the determination of the temperature below which solid hydrocarbon crystals may form in aviation turbine fuels and aviation gasoline.

Method

The product sample is cooled down under specified conditions and its turbidity is observed. The temperature at which a cloud of paraffin crystals first appears (known as cloud point) causes the FRP-4 to stop the cooling.

The freezing point of the product sample is the temperature at which the solid hydrocarbon crystals, formed on cooling, completely disappear when the temperature of the sample is allowed to rise.

Note: Illustrations of this brochure show a typical FRP-4 Analyzer with the optional application specific sample conditioning system.



➔ Explosion protection

Ex protection type (Europe)	⊕ II 2G Ex (IIB; IIB+H ₂) T4
Certification	TÜV 04 ATEX 2505
Optional available classification (USA and CAN)	Class I, Div. 2, Groups B, C and D Class I, Zone 1, Groups IIB or IIB+H ₂ Protection type depending on application
CSA certificate no.	1524800

➔ Technical data

Method	ASTM D 2386, ASTM D 1015, ISO 3013, IP 16
Limit of range	-70 °C (-94 °F); optional -80 °C (-112 °F) the lowest detectable freezing point temperature depends on the actual cloud point temperature which must be above the mentioned limit
Repeatability	≤ DIN EN/ASTM
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	discontinuous (according to standard procedure) cycle time 8 to 20 min
Product streams	2 x sample, 1 x validation (additional hardware required)
■ Electrical data	
Nominal voltage	AC 230 V ± 10 %, 1 phase; 50 Hz other rating on request AC 400 V / 50 Hz; 3 phases (for chiller)
Maximum power consumption	approx. 600 W approx. 1100 W (for chiller)
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 and free of water according to applicable norms
Consumption	5 to 30 l/h
Pressure at inlet	2 to 3 bar
Temperature at inlet	5 to 15 °C (41 to 59 °F)
Outlet/Vent	open to atmosphere
Utilities	
■ Instrument air	
Consumption	min. 1.4 Nm ³ per flushing cycle during start-up ~ 0.8 Nm ³ /h in normal operating mode only for leak compensation

Pressure at inlet	2 to 5 bar
Quality	dew point ≤ -40 °C (-40 °F) humidity class 2 or better according to ISO8573.1
■ Purging gas (drying the EEx d enclosure)	
Consumption	approx. 12 NI/h
Pressure at inlet	2 to 5 bar
Quality	instrument air or Nitrogen (dry and oil free)
■ Coolant	controlled and supplied by chiller

Signal outputs and inputs

Analog outputs	freezing point, selectable
Digital outputs	sum alarm, ready signal, see options
Digital inputs	reset, 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 pixels
Keyboard	virtual keyboard, controlled via TFT display

Connections

Pipe fittings	Swagelok® 6 mm/12 mm other fittings on request
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Weight and dimensions

Weight	approx. 380 kg
Dimensions (W x H x D)	approx. 1140 x 1900 x 710 mm

Optional signal outputs and inputs

Digital outputs	identification of a validation cycle identification of a stream
Digital inputs	stream selection enable/disable automatic stream switching request for a validation cycle
Analog outputs	cloud point
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 FRP-4 is subject to continuous product improvement, specifications may be subject to change without notice.