



Measurement technology | METPOINT® OCV compact

METPOINT® OCV compact: Continuous oil vapour measuring for more process safety

Oil is an often underestimated risk in the processing of compressed air

Oil occurs in many places in the compressed air system in the form of oil vapour or aerosols and can lead to significant quality problems.

Using the METPOINT® OCV compact you can check your compressed air for residual oil vapour content permanently, precisely also meet the prescribed standards. Thus meeting your customers' trust with responsibility.

Reliable measuring via innovative technology

The METPOINT® OCV compact has been specially developed for the measuring of hydrocarbon vapours and gases in compressed air applications. The detection levels are as low as one thousandth of a mg/m^3 of residual oil content and are executed continuously in ongoing operation. Shortened measuring intervals enable the rapid and reliable display of even the smallest deviations.

Documenting compressed air quality and identifying problems

The measurement data can be utilised for documenting the compressed air quality and for identifying contamination sources. The values to be evaluated for accurate measuring are compensated for temperature and pressure. The requirements of ISO 8573 are thus fulfilled. The reference gas is generated internally via an integrated catalytic converter and ensures reproducible results.

› Safe

- › Reproducible accuracy of the measurement values thanks to integrated reference gas generation
- › Automatic monitoring for the reference gas and sensor electronics
- › Issuing and transferring of alarm signal messages

› Reliable

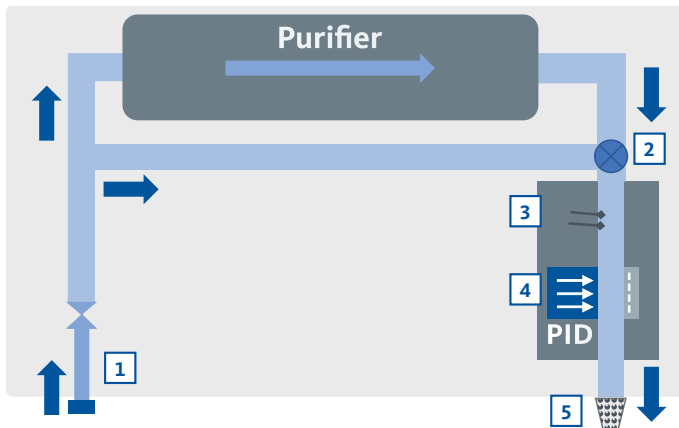
- › Measuring range from ≤ 0.01 to $2.5 \text{ mg}/\text{m}^3$
- › Pressure range from 3 to 50 bar(g) (from 16 bar(g) onwards a separately available additional pressure reducer must be installed upstream)
- › Continual and permanent monitoring of the oil vapour content
- › Data transfer to data logger and control centre with customary communication methods
- › 10-point calibration

› User-friendly

- › Intuitive user interface
- › Easily legible display of oil vapour content
- › Robust industrial housing
- › Flexible installation



Precision as a benchmark: the operating principle of oil vapour measurement in the METPOINT® OCV compact



- 1 Gas inlet with integrated pressure limiter set for OCV operating conditions
- 2 Valve for interchanging between current compressed air sample and reference gas from the purifier
- 3 Measuring cell, monitored with temperature and pressure sensors
- 4 Photo-ionisation detector PID (UV lamp and detector)
- 5 Gas outlet with silencer

Additional information about METPOINT® OCV compact measuring technology can also be found in our YouTube video.

The compressed air reduced by a pressure reducer **1** to the working pressure of the METPOINT® OCV compact is divided into two partial flows. One part flows directly in the direction of the measuring cell. The other part flows into the heated purifier, where a catalytic cracking process converts all hydrocarbons into water (H₂O) and carbon dioxide (CO₂). The air which is now purified of hydrocarbons is then available as a reference gas for the measuring cell **3**. This purifies the measuring chamber of any possibly adhering hydrocarbons and the photo-ionisation detector (PID) determines a new zero value on the basis of the reference gas.

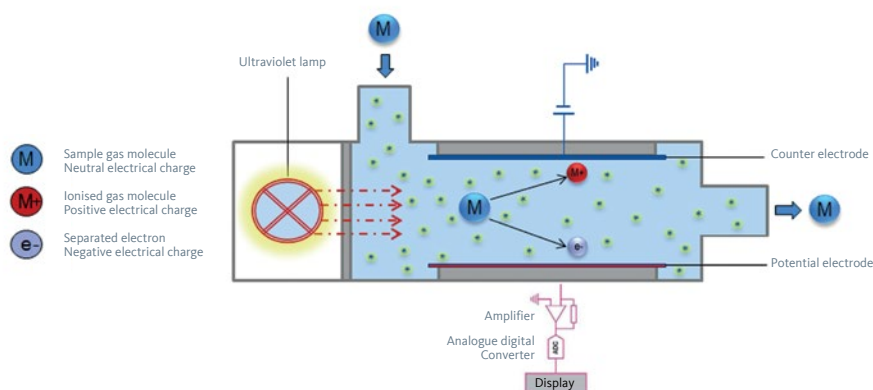
The valve **2** routes both partial flows into the measuring chamber alternatively. Sensors monitor the pressure and temperature here **3**. Subsequently the highly sensitive photo-ionisation detector (PID) **4** determines the respective oil vapour content before the measured air leaves the measuring chamber via a nozzle with a silencer **5** into the ambient air. The compressed air flow via the purifier and the measuring chamber is 1.2 standard litres / minute (1 bar(a), 20 °C).

The operating principle of the photo-ionisation detector (PID)

The photo-ionisation detector (PID) measures the hydrocarbon content by exposing the air flow to UV radiation. The UV radiation ionises the hydrocarbon molecules that pass through the beam, making them conductive. This ionisation flow is measured precisely and appears on the display.

The UV lamp installed in the PID can react rapidly to changes and is always ready for operation again even after higher oil loads e.g. with a filter perforation.

This measuring technology, which has been utilised for many years, provides you with the assurance of reliable measurements.



Internal reference gas generation by means of a purifier

Integrated reference gas generation

The METPOINT® OCV compact has integrated reference gas treatment by means of a patented catalytic converter. The compressed air is hereby passed on to a heated catalytic converter surface and the hydrocarbons are decomposed catalytically to water (H₂O) and carbon dioxide (CO₂).

This reference gas is then continuously routed in alternation with the normal compressed air sample into the measuring chamber and the oil content is measured with the photo-ionisation detector (PID). The measuring chamber is both regularly “cleaned” by this reference gas generation and the measuring system is inspected for its zero point. This “self-monitoring” provides you with the assurance that the system is working accurately in the long term.

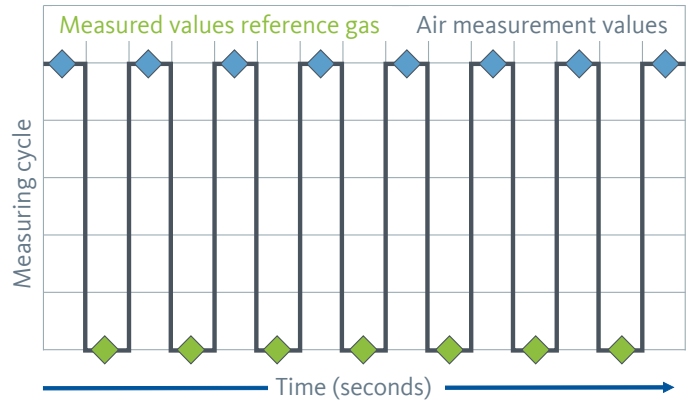
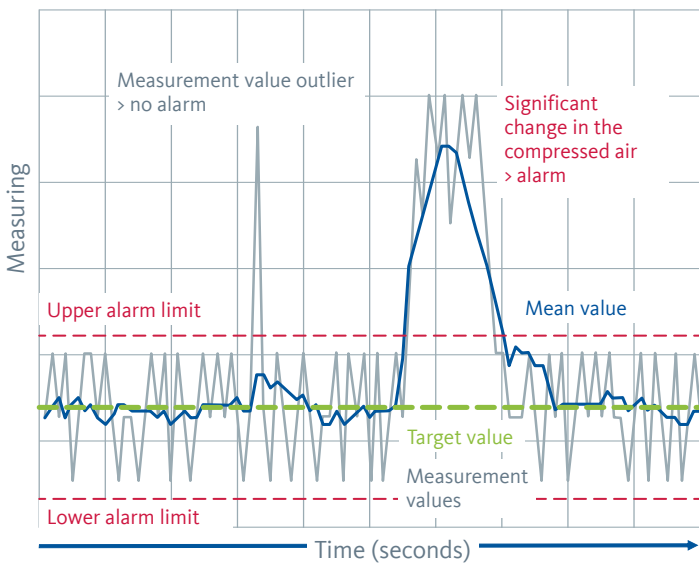


Illustration of the measurement alternating between reference gas and measured air

Meaningful results by using the right measurements



Principle for the floating mean value formation from noisy measurement values with target value and alarm limits

Measurement value for mean value formation

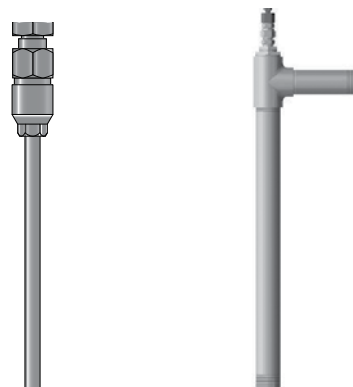
The compressed air composition hardly ever alters, apart from during malfunctions continuous oil vapour monitoring should be designed in such a way that gradual deterioration or sudden failure of a cleaning stage are indicated reliably. Under specific operating conditions, peak values that occur only briefly are recorded and displayed, although they are not always due to a fault in the compressed air treatment or a defect in the measuring device.

If these peaks only occur at very short time intervals, or they relate to individual measured values, they are due to other factors of influence rather than hydrocarbons in the sense of the oil definition.

For this reason, the METPOINT® OCV compact provides a measurement recording with floating mean value formation over defined times in order to eliminate individual measured value outliers automatically.

Sampling (measuring section)

If the oil classes defined in ISO 8573 are considered, the detection of hydrocarbons of Class 1 i.e. smaller than 0.010 mg/m³ = 10 µg/m³ can be designated as trace analysis. The sampling type and method is of particular importance in this range. The sample should be taken at a point where it can be ensured that a representative and usable mixture of all components of the compressed air is present. In the case of a homogeneous distribution over the pipe cross-section, the gas sample can be taken at a fixed point approximately at the centre of the pipe cross-section.



Sampling probe and measuring section

The advantages of the METPOINT® OCV compact at a glance

Multiple point calibration

Every METPOINT® OCV compact is calibrated at 10 points in the factory and the respective certificate is enclosed with the device. During calibration, a reference gas representing oil is routed into the METPOINT® OCV compact in defined concentrations via a calibrated gas mixer. The device is calibrated using the target/actual comparison between the display on the gas mixer and on the METPOINT® OCV compact.

To guarantee high reproducibility and measurement accuracy, we recommend that maintenance is carried out by the manufacturer once a year. Recalibration with a certified reference gas must also be executed at the same time. You can therefore be assured of the complete functionality of your METPOINT® OCV compact over many years and can rely on the measured oil vapour values at all times.



Simple and safe operation

The METPOINT® OCV compact provides information about the current measurement value (oil vapour in mg/m³), the ISO 8573 oil class as well as the status of the measuring system. In addition, the status of the measuring cell and the purifier is displayed visually. You therefore have an overview of the measurement values, oil class, system status at all times and know immediately that your compressed air is OK.

Communication

The METPOINT® OCV compact is equipped with various interfaces which transfer the data and alarm messages to a central control centre: analogue (4-20 mA) or ModBus RTU RS485 are the possible communication methods. You therefore have the necessary flexibility for reliable data transfer for controlling the oil vapour measurements from the remote control centre. In addition, the METPOINT® OCV compact has an integrated alarm contact.

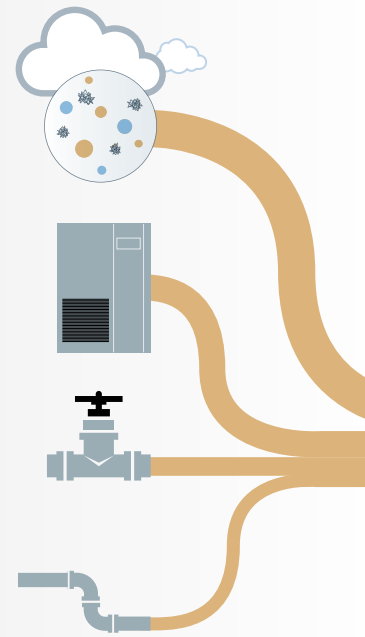
Typical sources of oil in compressed air?

Even when basically oil-free compressed air is generated, oil can get into the compressed air system.

Possible sources of contamination are:

- › Environment and ambient air
- › Valves and fittings
- › Pipes

Oil can occur in the compressed air system not only in liquid form but also as aerosol or in an even finer form as oil vapour. For this reason, **BEKO TECHNOLOGIES** offers customised solutions for demanding applications in addition to measuring technology.



Installation example for a METPOINT® OCV compact and the central elements for oil-free compressed air



Defined measurement values according to ISO 8573-1

The METPOINT® OCV compact has been designed for the range 0.01 to 2.5 mg/m³.

According to ISO 8573, the following limits are defined for the respective classes

Class	Solid particles, max. number of particles per m ³			Pressure dew point °C	Oil content (liquid, aerosol, oil vapour) mg/m ³
	0.1 µm < d ≤ 0.5 µm	0.5 µm < d ≤ 1.0 µm	1.0 µm < d ≤ 5.0 µm		
0	In accordance with the device operator's or supplier's specification, stricter requirements than class 1				
1	≤ 20,000	≤ 400	≤ 10	≤ -70	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	≤ -40	≤ 0.1
3	-	≤ 90,000	≤ 1,000	≤ -20	≤ 1
4	-	-	≤ 10,000	≤ +3	≤ 5
5	-	-	≤ 100,000	≤ +7	> 5
6	-	-	-	≤ +10	-

Configuration for operating pressure

The METPOINT® OCV compact can be adjusted to a wide operating pressure range (3 ... 50 bar) depending on the requirements of the compressed air system. Pressure reducers can adjust the system to your local requirements and provide you with **flexibility for the application** – even if operating conditions often change.

Rapid measurement

Compared to other technologies, the photo-ionisation detector (PID) used in this case reacts rapidly to the smallest changes in oil content in the compressed air. Differences can be displayed and alarms can be triggered in the shortest possible time. This is the transparency and safety that you, as a user of the compressed air, require to be able to rely on the desired quality of compressed air at all times.

Activated-carbon adsorber
guarantees compressed air in
the highest quality classes.



CLEARPOINT® V



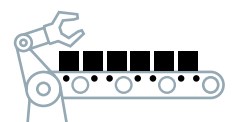
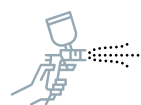
METPOINT® OCV compact



CLEARPOINT® 3eco



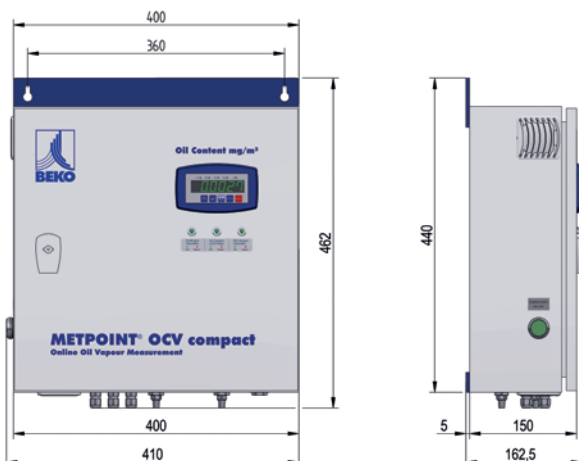
DRYPOINT® AC



Technical data of the METPOINT® OCV compact

Specifications	METPOINT® OCV compact
Measuring medium	Compressed air, free of aggressive, corrosive, caustic, toxic, flammable and oxidizing components. The use of compressed air treatment adapted to the measurement task is necessary.
Measured value	Residual oil content in mg of oil/normal m ³ , relative to 1.0 bar(a), +20 °C, 0 % relative humidity, according to ISO 8573-1
Detectable substances	Poly-alpha-olefines, aromatic and aliphatic hydrocarbons, functional hydrocarbons Compressed air free of aggressive, corrosive, caustic, toxic, flammable and oxidizing substances
Applications	Downstream of activated carbon filter and activated-carbon adsorber, downstream of BEKOKAT® (catalytic converter), downstream of oil-free compressing compressor, each with pre-switched filtration and drying
Ambient temperature, minimum/maximum	+5°C ... +45°C, rel. humidity ≤ 75%, non-condensing
Storage temperature	+5 °C ... +50 °C
Ambient pressure	800 ... 1200 mbar(a)
Climatic resistance	Maximum +10 °Ctd
Compressed air temperature, minimum/maximum	+5 °C ... +50 °C
Operating pressure	3 ... 16 bar(g), optional pressure reducer which can be pre-switched for up to 300 bar(g)
Settings for operating pressure	By means of integrated pressure reducer with display
Measuring gas humidity	≤ 40 % relative humidity, max. pressure dew point +10 °C, non-condensing humidity
Compressed air connection	G 1/8" internal thread according to ISO 228-1
Measurement values	mg/standard m ³ , pressure and temperature compensated
Measuring range	≤ 0.01 ... 2.50 mg/m ³
Calibrated measuring range	≤ 0.01 ... 1.25 mg/m ³ residual oil content, according to ISO 8573-1
Use of measuring probe	Optional use
Detection limit (residual oil)	0.001 mg/m ³
Measuring gas flow rate	approx. 1.20 standard litres / minute relative to 1.0 bar(a) and +20 °C, in depressurised state
Display for adhering to an ISO residual oil vapour class	As LED (red/green)
Reference gas generation	Integrated catalytic converter
Voltage supply	100-240 VAC / 1Ph. / PE / 50-60 Hz / ± 10%
Degree of protection	IP54 / DIN EN 60529
Interfaces	4 ... 20 mA analogue output, 2-conductor system, RS-485, MODBUS RTU for the transmission of measured values 1 alarm contact, normally open contact
Operating hours counter	Integrated
Dimensions	410 x 440 x 163 mm (W x H x D)
Weight	approx. 16.3 kg
Measuring and display unit	A unit with a robust industrial design
Oil vapour detection	Compressed air free of aggressive, corrosive, caustic, toxic, flammable and oxidizing substances
Sensor element	PID (photo-ionisation detector)
Updating of the measured value display	Every 4 seconds
Display and operating concept	7-segment display with 5 buttons for setting configuration and alarm
Protection of the measuring cell against too high oil content	The measuring cell is protected against too high oil content by a valve switching process.
Suppression of measured value outliers	Continuous floating mean value

Dimensions of the METPOINT® OCV compact

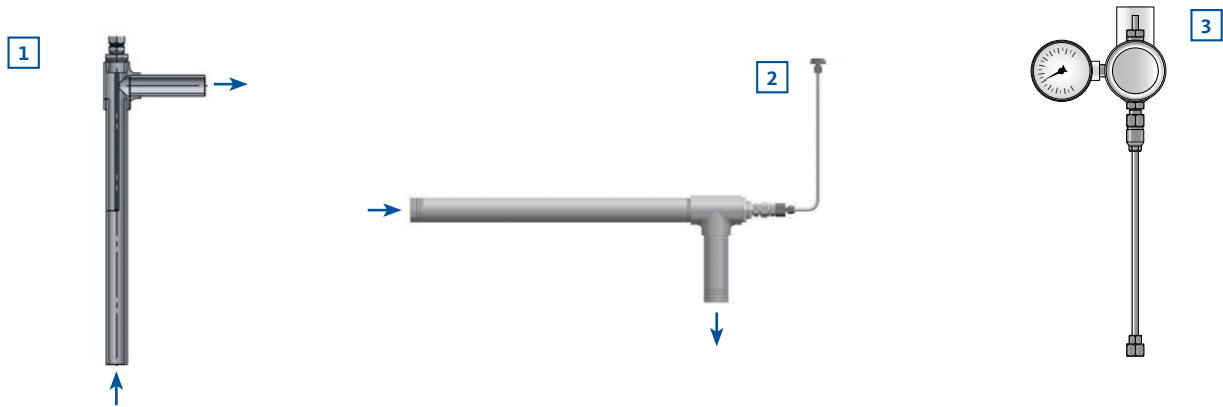


Applied EU Directives and harmonised standards

2014/68/EU	Pressure Equipment Directive
2014/35/EU	Low Voltage Directive
2014/30/EU	Guideline relating to electromagnetic compatibility, EMC directive
EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use
EN 61326-1	Electrical equipment for measurement, control, regulating and laboratory use EMC requirements

Optional equipment for the METPOINT® OCV compact

Depending on compressed air system requirements, the OCV compact can be equipped with sampling probes for different measuring sections DN20-80 (1/2" – 1 1/2") and customer-specific DN80-xx (from 3") **1**. Stainless steel pipework as 6 x 1 mm (including screwed fittings) can also be provided to suit local circumstances for your system **2**. For applications with higher pressures up to 50 bar(g), a pressure reducer with manometer is available as an accessory in order to reduce the operating pressure to the pressure permissible for the OCV compact **3**.



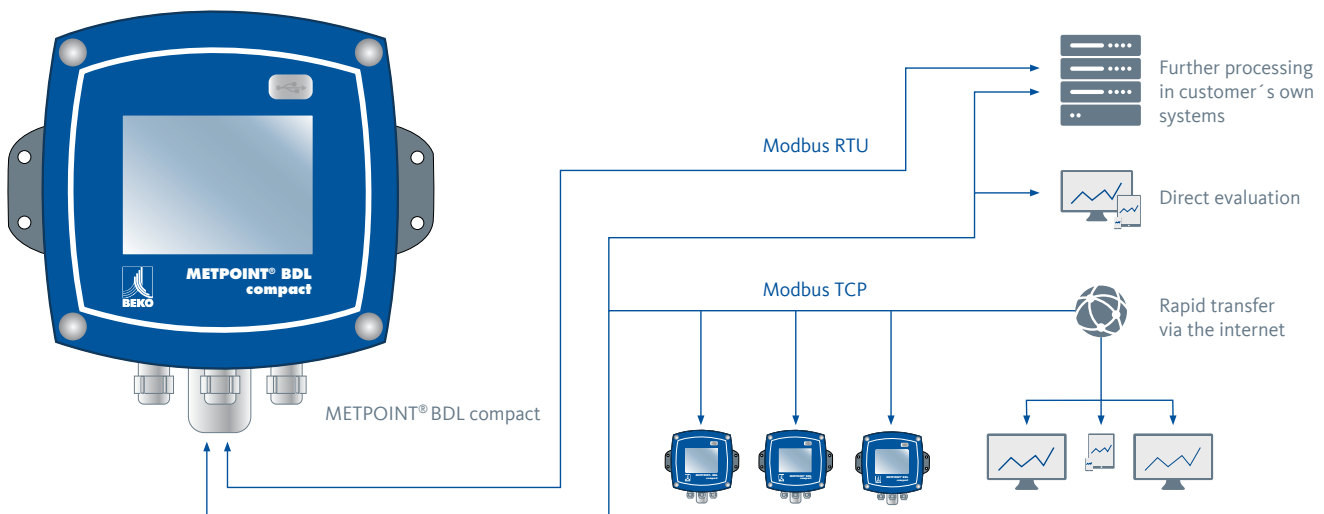
Even better as a double act – METPOINT® OCV compact and BDL compact

Visualising and data logging

Quality can be seen – by being recorded. Our data loggers translate process data into clear statistics and graphs. You can therefore comprehend the measured values simply and in real time and immediately take action if required. From every location, at all times.

Making the invisible visible

- › Central signal processing unit: complete monitoring with just one device
- › Independent solution which can be integrated in existing systems and can be retrofitted and extended at any time
- › Completely networked for worldwide and inter-system data transfer



The mobile solution for oil vapour measurement in your company: METPOINT® MCA

Our METPOINT® OCV compact in combination with a BDL data logger on wheels

Check your complete compressed air system for oil vapour and find out where more intensive treatment is necessary – with our mobile measuring and analysis unit METPOINT® MCA. There are different equipment versions available depending on requirements.

- › Sensor system for monitoring residual oil content
- › Built-in network-capable data logger with touch display
- › Optionally available with integrated particle counter for the measurement of certain concentrations and sizes, with additional volume flow measuring device, dewpoint sensor, pressure sensor and temperature sensor for especially comprehensive analysis of the compressed air supply.



Do you have questions about the best way of processing compressed air?

We have the answers! We offer efficient solutions for any type of processing chain. Please contact us with your queries. We would be delighted to tell you more about, and present, our

condensate processing, filtration, drying, measuring and process technology as well as our comprehensive services.

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