



**Everything all right?**

## **Optical or Acoustic Process measurement of liquids**

- **Oil on Water**
- **UV- / VIS- / NIR- Photometry**
- **Ultrasonic Turbidimetry**
- **Optical Turbidimetry**

**Models LAS, AP-2, TURBImat, MoniSpec-A & CSW (22)**

**Absorption Turbidimeter**

## Process- Absorption Photometer

Absorption photometer are suitable for the detection of turbidity or colour in liquid products. A wide span of applications and measuring ranges are realizable thanks to many different types of sensors & probes.

## Absorption Photometer

Designed as rod- / immersion probe, as a insertion probe or flow cell



Model TURBImat-LC (TBMLC)



Model TURBImat-A (TBM-A)



Models 25E-HC (CSK) und AP2,



Model Messenger (MSG)



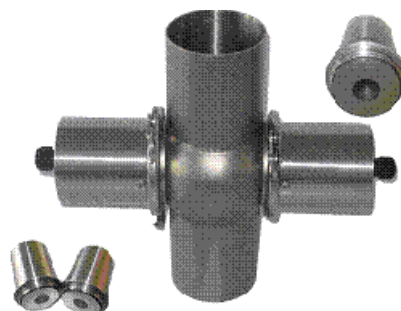
Model 22E-LC (CSS)



Model MoniSpec-A (MSA)



Model 22 (CSW)



Model LAS

## What does Turbidity mean?

Turbidity is an optical impression, which describes the characteristic of a transparent product, to scatter and absorb light. A focused light beam will be attenuated and scattered in hazy products, so that this product can become practically opaque in bigger layers.

## What Causes Turbidity?

Turbidity is caused by particles in transparent products. A particle is defined as something with a different refractive index as the carrier product. Some examples of particles are minerals, yeast cells, metals, oil drops in water, milk in water, gas bubbles and aerosol's.

## Measurement of Turbidity

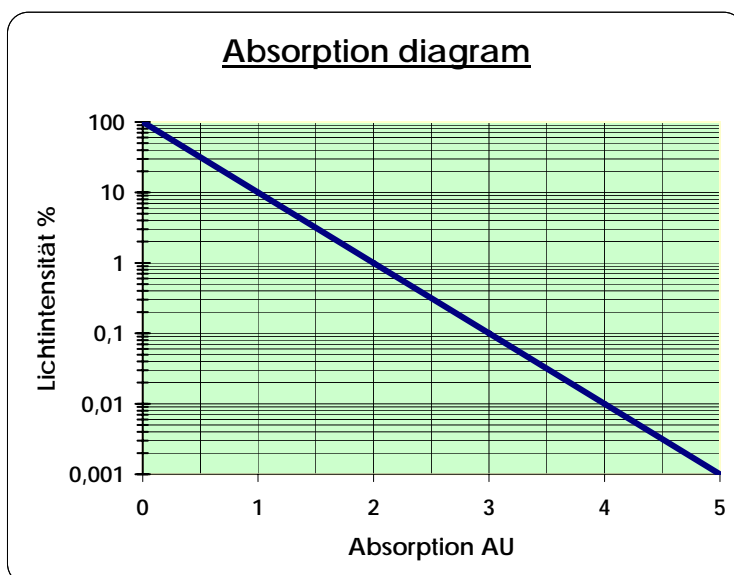
Turbidity is not a clearly defined magnitude like e.g. temperature or pressure. Turbidity is a subjective impression. For this reason turbidity measurement systems will be typically calibrated by using a comparison's standard such as Formazin or Diatomaceous Earth.

## Principle of Absorbance Measurement

A light source and a detector are located parallel over against. The changing of light intensity, caused by the product between lamp and detector, will be detected and displayed as measuring result. The application is the measurement of concentrations (color or solids) in a liquid. The basic measurement unit of an absorption photometer is called AU (Absorption - Unit).

### Definition of AU:

- 1 AU = 90 % loss of light intensity
- 2 AU = 99 % loss of light intensity
- 3 AU = 99,9 % loss of light intensity
- 4 AU = 99,99 % loss of light intensity
- 5 AU = 99,999 % loss of light intensity



## Model LAS



- Low maintenance
- Extended calibration interval: Typical 12 month
- Measuring windows directly melted to the Steel
- No additional window gaskets required
- No overreaching components inside the flow cell
- Perfect hygienic design
- Cleaning in place (CIP)
- Build in calibration filters
- Process installation via TH- Varivent plates

### Description:

The sensor model LAS uses the principle of light absorption to detect dissolved or suspended particles in liquids. The transmitter model Messenger or CCAb is required to use this sensor. The system has been designed for continuous operation with long life time. The use of metal melted measurement windows without any additional gaskets guarantee for a perfect hygienic design. The installation by using TH-Varivent plates offers a cost saving process installation via standardized flow cells. The implemented calibration filters allow the calibration of the system without using liquid calibration standards. The absorption caused by turbidity will be detected at a wavelength of 850nm. Therefore the measurement results are not affected by product colour.

### Applications:

- Product concentration
- Turbidity measurement
- Suspension
- Product separation

### Operational areas:

- Breweries
- Beverages
- Dairies

### Technical Data:

Line size:	DN 40 – DN 125 (TH- flow cells)	Measurement ranges:	typical 0–50EBC, 0–500EBC
Process pressure:	PN10 / ANSI class 150	Reproducibility:	± 1 %
Process temperature:	maximum 140°C	Detector:	Silica diode
Sensor material:	1.4404 / 316L	Measurement wavelength:	typical 830nm
Sight glass material:	Metaglas	Protection:	IP65 / NEMA4X
Gasket material:	No window gaskets required	Sterilization:	CIP

## Model AP2



- 19 mm probe technology
- Measurement method: Absorbance
- Different measurement wavelength on request
- Low maintenance
- Extended calibration interval: Typical 12 month
- Sapphire measuring windows
- Hygienic design
- Cleaning in place (CIP)
- Process installation via TH- Varivent plates available
- Process installation via DIN / Ansi flange available
- Process insertion via ball valve with adapter available

### Description:

The probe model AP2 uses the principle of light absorption to detect colour or turbidity in liquids. The transmitter model Messenger or CCAb is required to use this sensor. The system has been designed for continuous operation with long life time. The 19mm probe design allows insertion to laboratory fermentation tanks. Different flanges, TH- Varivent plates, APV- plates or ball valves are as well available and allow the easy installation of the probe to many applications.

### Applications:

- Product Separation
- Turbidity measurement
- TSS concentration measurement

### Operational areas:

- Breweries
- Beverages
- Dairies
- Bio technology
- Water / Waste water
- Chemical industry

### Technical Data:

Line size:	DN 25 / 1" up to ....	Measurement ranges:	typical 0–100EBC, 0–500EBC
Process pressure:	PN16 / ANSI class 300	Reproducibility:	± 1 %
Process temperature:	45°C (131°C short time CIP)	Measurement wavelength:	880nm (other on request)
Sensor material:	1.4404 / 316L	Protection:	IP65 / NEMA4X
Sight glass material:	Sapphire	Hazardous Area:	ATEX, Zone 1 & Zone 2 (option)
Gasket material:	EPDM (other on request)	Sterilization:	CIP

# Model MoniSpec-A (MSA)

Process- Photometer, Monitek Product Line of Galvanic Applied Sciences Inc.



- **Low maintenance**
- **Extended calibration interval: Typical 12 month**
- **Sight glass material: Sapphire**
- **Sight glass cleaning: Via cleaning jet probe**
- **Cleaning in place (CIP)**
- **Process connection: DIN, ANSI, SMS, NPT, APV, TH, ...**
- **Optional air purge connection: 4mm**

## Description:

The sensor model MoniSpec-A uses the principle of light absorption to detect dissolved or suspended particles / colour in liquids. The transmitter model Messenger is required to use this sensor. The system has been designed for continuous operation with long life time. The sensors can be installed into almost any type of pipe. Process connection, pressure, temperature, gasket material, etc will be application specific. Optional cleaning jets will allow a cleaning of the sapphire windows in determined intervals. Calibration can be done in multiple ranges and measurement units like EBC, ppm, %, g/l, etc.. Due to the availability of multiple optical path lengths (2mm up to 120mm) the sensors can cover measurement ranges from 0-100ppm up to 0-50000ppm. The sensor will detect IR-absorption for turbidity measurement. Therefore the measurement results are not affected by product colour. In case the customer wants to detect the product colour, the absorption will be measured at an application specific wavelength.

## Applications:

- Product concentration
- Suspension
- Cell concentration
- Oil in water / Water in oil

## Operational areas:

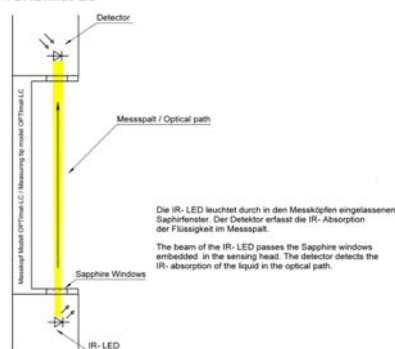
- Chemical industry
- Petrochemical industry
- Dairies
- Brew & Beverage

## Technical Data:

Line size:	DN 25 – DN 125 / ½" - 5"	Measurement range:	typical 0–100ppm, 0–5%TS
Process pressure:	PN16 / ANSI class 150	Reproducibility:	± 1 %
Process temperature:	maximum 140°C	Detector:	Silica diode
Sensor material:	1.4404 / 316L	Measurement wavelength:	390 – 900nm
Sight glass material:	Sapphire	Cleaning:	optional cleaning jet probe
Gasket material:	application specific	Sterilization:	CIP (cleaning in place)
Protection class:	IP65 / NEMA 4X	optional hazardous area:	ATEX Zone I or Zone II

# Model TURBImat-LC (TBLC)

TURBImat-LC



- Low maintenance
- 30cm immersion probe
- Pipe extension 0,5m for pipe insertion via ball valve
- Insertion/removal without process interruption
- Pipe extension up to 2m for installation in open channel
- Calibration interval: Typical 6 month
- Wide span of measurement ranges
- Sight glass material: Sapphire
- Sight glass cleaning via cleaning jets
- Optional available with DIN- or ANSI flanges

## Description:

The turbidity probe model TURBImat-LC uses the principle of light absorption to detect dissolved or suspended particles in liquids. The transmitter model Messenger or CCAb is required to use this probe. The system has been designed for continuous operation with long life time. The probe design allows installation into large process pipes, tanks or open channels. Up to a process pressure of 3bar and non critical product, process insertion and removal of the probe can be easily done via a 2"ball valve. So calibration and maintenance ensues without process interruption. Other process connections like flanges, swivel clamps, etc. are available on request.

## Applications:

- Product concentration
- Sedimentation
- Flotation
- Oil in water / Water in oil

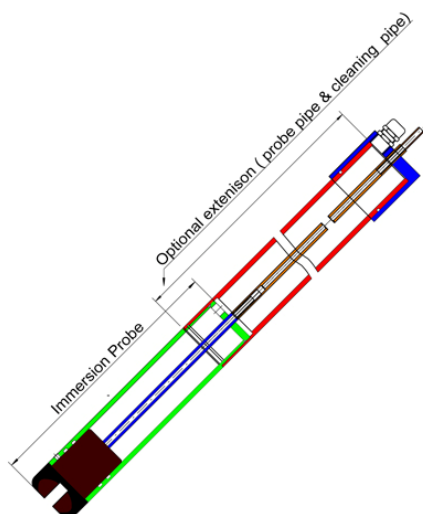
## Operational areas:

- Chemical industry
- Petrochemical industry
- Pulp & Paper
- Power plants

## Technical Data:

Line size:	minimum diameter DN 200	Measurement range:	0–100ppm, 0–2000ppm
Process pressure:	maximum PN 16 / ANSI class 150	Reproducibility:	± 1 %
Process temperature:	maximum 60°C	Detector:	Silica diode
Probe material:	1.4471 / 316SS	Measurement wavelength:	typical 880nm
Sight glass material:	Sapphire	Protection:	IP65 / NEMA 4X
Gasket material:	Application specific		optional hazardous area: ATEX Zone I / Zone II

## Model TURBImat-HC (TBMHC)



- Immersion probe
- Low maintenance
- Extended calibration interval: Typical 6 month
- Multiple probe extensions available
- Immersion / or pipe installation via 2" insertion adapter
- Insertion / removal without process interruption
- Multiple optical path lengths available (max. 10 mm)
- Optional available with DIN- or ANSI flanges
- Optional 316 SS measurement head / sapphire windows
- Optional cleaning jets
- Wide span of range

### Description:

The turbidity probe model TURBImat-HC uses the principle of light absorption to detect dissolved or suspended particles in liquids. The basic probe is 230mm long and will be immersed into the measured product.

Extension tubes allow the installation to pipes as well as the immersion in tanks or open channels. Pipe installation is typically done by using a 2" ball valve or a mounting flange at the probe shaft.

The sensor requires the transmitter model Messenger or CCAb and is suitable for the measuring of high concentrations in liquids. The calibration depends by application, measuring range and unit.

### Applications:

- Product concentration
- Sedimentation
- Flotation
- Sludge concentration

### Operational areas:

- Chemical industry
- Petrochemical industry
- Pulp & Paper
- Power plants & Waste water

### Technical Data:

Line size:	minimum diameter DN 80	Immersion depth:	maximum 80m
Process pressure:	maximum 8Bar	Measurement range:	typical 0-6%
Process temperature:	maximum 60°C	Reproducibility:	± 1 %
Probe material:	1.4471 / 316SS	Detector:	Silica diode
Measurement head:	PVC (optional 1.4571 / Sapphire)	Measurement wavelength:	typical 880nm
Gasket material:	Application specific	Protection:	IP68
Cleaning:	Optional cleaning jets (air/water)	optional hazardous area:	ATEX Zone I / Zone II



# Turbidity Sensor Model TURBImat-A



- Low Maintenance
- NIR LED- Technology (860nm DIN / EN 27027 / ISO7027)
- Wide measuring Range
- Typical calibration Interval 12 Month
- PVC-U Flow Cell (d63 DN50) / PN16 / 50°C
- Access to Sapphire Windows via GF- Fittings
- Ultra fast Window cleaning
- Process connection via Solvent Cement jointing, Flanges or GF- Fittings

The sensor model TURBImat-A uses the principle of NIR- light absorption to detect dissolved or suspended particles in liquids. The transmitters model Messenger or CCAb are required to use this sensor. The system has been designed for continuous operation with long life time. Calibration can be done in multiple ranges and measurement units like FTU, ppm, etc.. The sensor detects the absorption of infra red light. Therefore the measurement results are not affected by product colour. Ranges of 0-50FTU up to 0-20000FTU are possible, due to the availability of multiple optical path lengths (2mm up to 60mm). The sapphire windows of the sensor are accessible via GF- fittings, this allows a very fast window cleaning if required.

## Applications:

- Process water
- Potable water
- Product separation
- Centrifuge In- / Outlet
- Filtration control (break through)

## Areas of Application:

- Chemical Industry
- Waste water treatment
- Food / Beverages Industry
- ...

## Technische Daten:

Line size:	DN50 / d63	Measuring range:	typical 0-50 - ...20000FTU
Pressure rating:	PN 16	Optical path length:	2mm to 60mm*
Process temperature:	maximum 50°C	Reproducibility:	± 2 %
Sensor material:	PVC-U	Detector system:	Silica Pin diode
Window material:	Sapphire	Measuring wavelength:	860nm
Gasket material:	EPDM (other on request)	Protection class:	IP65 / NEMA 4X

\*optical path length depending by specified range!

## Model 22 (CSW)



- **Low maintenance**
- **Extended calibration interval: Typical 12 month**
- **Sight glass material: Sapphire**
- **Flow cell material: 1.4404**
- **Process connection: DIN, ANSI, SMS, NPT, APV, TH, ...**
- **Cleaning in place (CIP)**
- **Optional air purge connection: 4mm**

### Description:

The sensor model 22 uses the principle of light absorption to detect dissolved or suspended particles / colour in liquids. The transmitter model Messenger or CCAb is required to use this sensor. According to the application, calibration can be done in multiple ranges and measurement units like EBC, ppm, %, etc.. The measurement system has been designed for continuous operation with long life time. The sensors can be installed into almost any type of pipe. Process connection, gasket material, etc will be application specific. Due to the availability of multiple optical path lengths (2mm up to 120mm) the sensors can cover measurement ranges of 0-50EBC up to 0-10000EBC. The sensor will detect the IR-absorption for turbidity measurement. Therefore the measurement results are not affected by product colour. In case the customer wants to detect the product colour, the absorption will be measured at an application specific wavelength.

### Applications:

- Product concentration
- Turbidity measurement
- Suspension
- Oil in water / Water in oil

### Operational areas:

- Chemical industry
- Petrochemical industry
- Dairies
- Brew & Beverage

### Technical Data:

Line size:	DN 25 – DN 125 / ½" - 5"	Measurement range:	Typical 0–50EBC, 0–10000EBC
Process pressure:	PN16 / ANSI class 150	Reproducibility:	± 1 %
Process temperature:	maximum 140°C	Detector:	Silica diode
Sensor material:	1.4471 / 316SS	Measurement wavelength:	typical 830nm
Sight glass material:	Sapphire	Protection:	IP65 / NEMA4X
Gasket material:	Application specific	Sterilization:	CIP

# Model Monitek Messenger

Universal Transmitter, Monitek Product Line of Galvanic Applied Sciences Inc.



- Configuration via PC, Laptop or Netbook
- Optional with implemented Panel PC
- Menu - based, intuitive User Interface
- Instruction Manual available via Help Function
- Serial Interface RS 232C / RS 485 (Modbus RTU Protocol)
- Simultaneous Use of up to 4 Sensors
- Sensors for Turbidity, Colour or Absorption measurement
- Fully Programmable Units (ppm, EBC, FTU, g/l, % TS...)
- Two Independent, fully programmable Cleaning Cycles
- Linearization of Measurement Values
- Integrated Data Logger for up to 8000 measurement Values
- Recovery via Back-up File

## Description:

The universal transmitter model Messenger can be used with all optical sensors of the Monitek series. The Messenger allows the simultaneous use of multiple sensors. Hereby you can use up to four single channel sensors. Even different sensors can be used with one transmitter. The measurement results can be linked together using almost any mathematical equation. This ensures an easy setup of e.g. dosage systems. The programming / calibration of the system will be done via a PC, Netbook or Laptop using the menu-based software. Only one PC or Panel- PC is required to configure an instrument in a network of up to 255 Messengers. Using the Messenger with an integrated Panel- PC allows the paperless recording or displaying of the measurement results as bar- or line graph's.

## Applications:

- Scatter light turbidity measurement
- Absorption turbidity measurement
- Single channel colour measurement
- Dual channel colour measurement

## Operational areas:

- Chemical industry
- Petrochemical industry
- Pulp & Paper
- Beer and beverages

## Technical Data:

Supply voltage:	90-260 VAC, 50-60 Hz optional: 24 V AC/	optional digital inputs:	4x 5V High
Power consumption:	DC	Reproducibility:	± 1 %
Relay capacity:	maximum 50 VA	Temperature:	-10°C to 50°C
Analogue output:	4 Relays fully programmable (48V / 2A)	Enclosure / Protection:	1.4301 / IP65 (NEMA 4X)
Interfaces:	Up to 4x 0/4 - 20mA (isolated)	optional hazardous area:	ATEX Zone I / Zone II
	RS 232C / RS 485 Modbus RTU		