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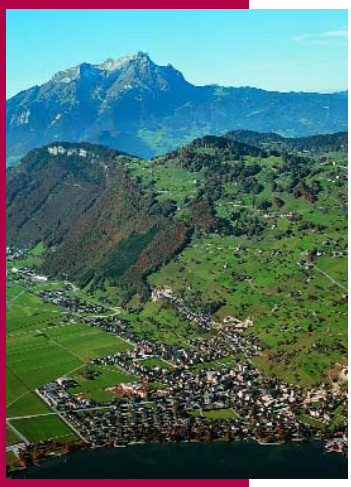
OPTICAL INSTRUMENTATION FOR INDUSTRIAL PROCESSES

SIGRIST
PROCESS-PHOTOMETER

SIGRIST
PHOTOMETERS
FOR PROCESS MONITORING

Comitted to upholding tradition

SIGRIST instruments have been used for over 50 years to ensure the quality of industrial production processes by detecting turbidity and other optical properties. The precision and reliability of SIGRIST photometers are now legendary all over the world. The purpose of this brochure is to give you a broad view of the different SIGRIST products and their applications in process instrumentation and control. Detailed brochures are available for applications in the beverages industry, in water treatment, and in dust detection.



The company

SIGRIST is a leading manufacturer of process photometers for continuous safety, purity and quality monitoring. Whether you're talking turbidity, suspended solids, dissolved substances, color, oil or dust, we produce an instrument adapted to your particular process. With our reliable, low-maintenance sensors, we can help you guarantee quality and reduce operating costs.

The SIGRIST Group is domiciled at Ennetbürgen, Switzerland. About 60 employees work at the head office developing, producing, and selling SIGRIST photometers. Around the world, a network of over 50 representatives and service partners provides on-the-spot assistance. Wherever you are, a SIGRIST expert is never far away.

Leadership through innovation

Steady progress in sensor technology and the implementation of innovative ideas to the benefit of users mark all of SIGRIST's products. Today, modern sensors with semiconductor light sources and micro-processor controls keep this instrumentation technology reliable and practically maintenance-free. At the same time, it is usable for an ever-broader range of duties in the monitoring and control of production processes as a result of reduced capital cost with simultaneous expansion of measurement capabilities.

SIGRIST PHOTOMETERS IN INDUSTRIAL PROCESSES

Producing profitably

Today's industrial production processes would be inconceivable without modern control and instrumentation systems. Heightened quality consciousness and the need to minimize costs to remain competitive make it necessary to control production processes within tight limits. There is no other way to ensure unvarying product quality while achieving high yields.

Conventional parameters such as pressure, temperature and flow are used routinely for the optimal control of processes, but nowadays special product properties such as turbidity or substance concentration are coming increasingly into play. In some cases this opens the way to more direct control, and in others it increases the reliability of the process.

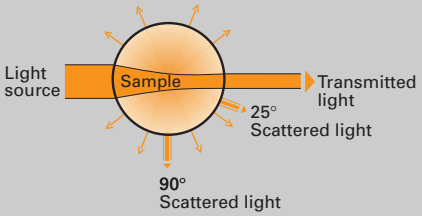
Going easy on the environment

In recent years, too, environmental awareness has risen sharply – with stringent limits and monitoring requirements imposed by the authorities. Early detection of accidents or leakage and the routine monitoring of the relevant emission levels enable operators to remain within statutory limits and also to optimize their processes, thus helping to cut costs.

SIGRIST in the production plant

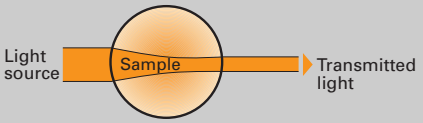
Control and instrumentation systems for industrial processes have to meet special requirements. Besides accuracy and stability, reliability and the ability of sensors to withstand harsh environments play crucial roles. Because SIGRIST process instruments for the optical detection of turbidity, color, oil traces, dust concentration, etc., were developed specifically for harsh process duty right from the start, they have no trouble meeting these requirements.

THE PARAMETERS



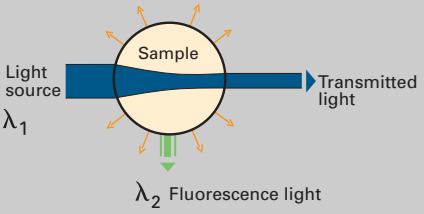
Turbidity

Turbidity in liquids is used as a direct measure of the effectiveness of cleaning steps such as filtration and as an indirect indication of particle or solids concentration in liquids. The turbidity level is determined by measuring scattered light. Simultaneous measurement at different scattering angles yields additional information on particle size distribution.



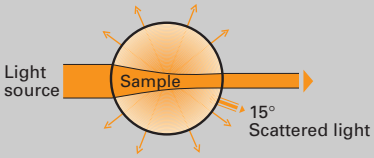
Absorption

SIGRIST absorptiometers provide information on the absorption of a sample at one or more wavelengths. For one thing, this permits the determination of color as a direct quality characteristic of a product. Usually, however, absorption detection is employed to indicate the concentration of substances such as metallic ions or organic compounds that can be measured at characteristic wavelengths in the visible or ultraviolet range.



Fluorescence

SIGRIST's fluorescence instruments are used mainly for detecting oil traces in water. Depending on the type of oil involved, concentrations ranging from less than 1 ppm up to a few hundred ppm can be measured. Detection is based on the effect exhibited by most mineral oils by which they radiate visible light (fluorescence) when excited by UV light. The intensity of the radiated light is proportional to the oil concentration. Fluorescence detection can also be used as leakage indicator simply by adding a substance such as fluorescein to the liquid in question.



Dust concentration

The measurement of dust concentration is based, like turbidity detection, on the ability of even the tiniest particles to scatter light. By measuring the amount of light scattered, one obtains a measure of the dust particle concentration in the sample. Concentrations normally range from µg/m^3 to several hundred mg/m^3.

THE EXTRAS

In-line or bypass

To suit various detection requirements, SIGRIST offers both in-line instruments for mounting right in the product pipe and on-line instruments for bypass installation for most of the parameters.

Customized flow cells

SIGRIST offers the special service of adapting in-line flow cells to suit particular pipe diameters and flange connections. And the instruments can be equipped with heating or cooling systems, e.g. using jacketed flow cells, to monitor processes with temperatures up to 180 °C and pressures as high as 20 bar.

Free-fall detection

SIGRIST was the first manufacturer to employ detection in a freely falling stream of product. Contactless measurement is a unique way to eliminate the problems of cell window fouling. It also cuts instrument servicing to a minimum.

Ex-protection

For applications in potentially explosive atmospheres, SIGRIST offers customized solutions with pressurized enclosures for most of its instruments. For the measurement of oil traces, a pressurized encapsulation (EEx-p) is used and for the measurement of absorption and turbidity it's a flameproof enclosure (EEx-d).

SIGRIST PHOTOMETERS IN THE CHEMICAL INDUSTRY

Turbidity

- Monitoring of solid/liquid separation steps (filtration, sedimentation, hydrocyclones, etc.) in colored and uncolored solutions, e.g. in synthetic resins and intermediates
- Monitoring and control of crystallization processes
- Measurement of separation layer at phase break processes.

Absorption

- Measurement of color in sulfuric acid
- Determining concentration of nickel, copper, chromium, etc., in electrolytes
- Monitoring of ozone concentration in the air or in oxygen following ozone generators
- Measurement of color in prussic acid (hydrocyanic acid)

Fluorescence

- Oil traces in cooling water
- Oil traces in condensate
- Monitoring of proper operation of oil separators
- Optical brighteners

Dust

- Measurement of emissions from hazardous waste incinerators to European guideline 94/67/EG and EN 14181
- Monitoring of exhaust air following bag filters, e.g. in production plants for herbicides, dyestuffs, vitamin C
- Dust emissions following scrubbers, electrostatic filters and other dust separators
- Monitoring of dust concentration at work stations
- Early fire warning

SIGRIST PHOTOMETERS
IN THE PETROCHEMICAL AND OIL INDUSTRIES

Turbidity

- Determination of solids concentration in oil and other fuels
- Monitoring of water content and dust particle content in kerosene
- Turbidity in sea water for injection (off-shore)

Absorption

- Measurement of color in paraffin (Saybolt) following decolorization
- Oil coloration to ASTM standard
- Monitoring of the coloration of engine fuels
- Monitoring of distillation steps by measuring the Hazen coloration, e.g. in phthalic anhydride, maleic anhydride or dimethyl terephthalate

Fluorescence

- Oil traces in produced water, off-shore and on-shore
- Oil concentration in slope tanks
- Monitoring of proper operation of oil separators
- Monitoring of oil traces in surface and waste water
- Oil traces in cooling water
- Oil leakage into condensate

SIGRIST PHOTOMETERS IN THE PHARMACEUTICALS INDUSTRY

Turbidity

- Monitoring of solid/liquid separation steps (filtration, sedimentation, hydrocyclones, centrifuges etc.) in colored and uncolored solutions
- Monitoring and control of crystallization processes
- Monitoring of product purity
- Filtration monitoring of biomass

Absorption

- Monitoring of ozone concentration in the air or in oxygen following ozone generators
- Measurement of ozone concentration in ultrapure water
- Detection of dissolved organic substances in process water

Dust

- Emissions from hazardous waste incinerators to European guideline 94/67/EG and EN 14181
- Monitoring of exhaust air following bag filters, e.g. in vitamin C production plants
- Monitoring of work stations and production rooms
- Early fire warning

SIGRIST PHOTOMETERS
IN POWER PLANTS

Turbidity

- Turbidity measurement in condensate
- Turbidity measurement in process water (intake/outlet)
- Detection of iron traces in the primary circuit (corrosion monitoring)

Fluorescence

- Oil traces in cooling water
- Oil in process water (intake/outlet)
- Oil leakage into condensate
- Oil traces in boiler feed water

Dust

- Measurement of power plant emissions to 13. BImSchV
- Measurement of emissions from waste incinerators to European guideline 94/67/EG and EN 14181
- Dust emissions following scrubbers, electrostatic filters and other dust separators

SIGRIST
PHOTOMETERS
IN THE METALS INDUSTRY

Turbidity

- Turbidity measurement in cooling water and other coolants
- Turbidity measurement in process water (intake/outlet)

Absorption

- Determining concentration of nickel, copper, chromium, etc., in electrolytes
- Detection of dissolved organic substances in process water

Fluorescence

- Oil in cooling water
- Monitoring of the proper operation of oil separators

Dust

- Dust emissions following scrubbers, electrostatic filters and other dust separators
- Measuring the concentration of metallic dusts in exhaust air and at work stations
- Early fire warning

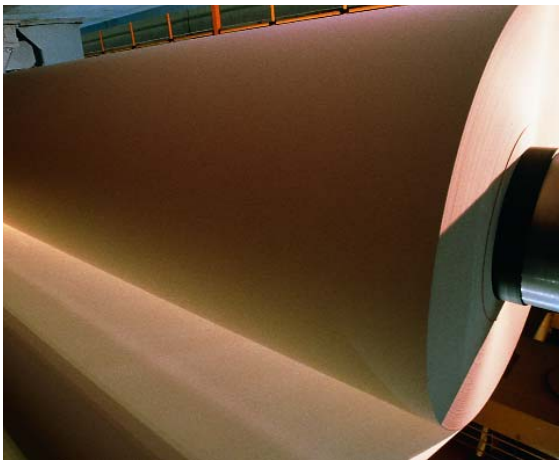
OTHER APPLICATIONS

Pulp and paper industry

- Determination of ClO_2 concentration in pulp bleaching
- Turbidity measurement in mill effluent
- Dust emissions following scrubbers, electrostatic filters and other dust separators

Packaging industry

- Controlling of the ozone generators by cardbord lamination processes



Textile industry

- Color measurement in wastewater
- Detection of optical brighteners in wastewater

Sugar industry

- Filtration monitoring following saturation
- Monitoring of the crystallization process
- Color in the sugar liquor following the decolorization process
- Dust emissions following scrubbers, electrostatic filters and other dust separators

Water treatment

- For information on applications of our instruments in process water treatment, refer to our brochure “Optical Instrumentation for Water Treatment”

THE INSTRUMENTS AT A GLANCE

Instrument	Application	Measuring span
DualScat	Multipurpose process turbidimeter	0 ... 2000 NTU
AquaScat P	Extremely low turbidities	0 ... 100 FNU
ColorPlus UV	UV absorptiometer for DOC determination	0 ... 60 E/m 0 ... 3 E
ColorPlus Ozone	Ozone concentration in gas Ozone concentration in water	0 ... 300 g/Nm³ 0 ... 200 mg/l
ColorPlus VIS	Color and concentration Concentration of chloride dioxide	0 ... 3 E 0 ... 2o g/l
OilGuard	Oil traces (closed flow cell) Oil traces (free-fall flow cell)	0 ... 100 FLU 0 ... 100 FLU
VisGuard	Dust concentration	0 ... 100 mg/m³ PLA 0 ... 3000 mE/m
StackGuard	Dust concentration in stack emission monitoring	0 ... 100 mg/m³ PLA

Represented by:

SIGRIST
PROCESS-PHOTOMETER

TÜV SÜD ISO 9001 Reg.Nr. 96-113-019

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