



Optical Measurement Technology for the Brewing Industry

 **SIGRIST**
PROCESS-PHOTOMETER



SIGRIST. Your competent partner.

The measurement of turbidity in the brewing industry and specifically the monitoring of filtration in the brewing process is firmly connected with the name SIGRIST. SIGRIST offers a full range of optical measuring instruments covering all important applications in breweries – right from the brew house through to the laboratory.

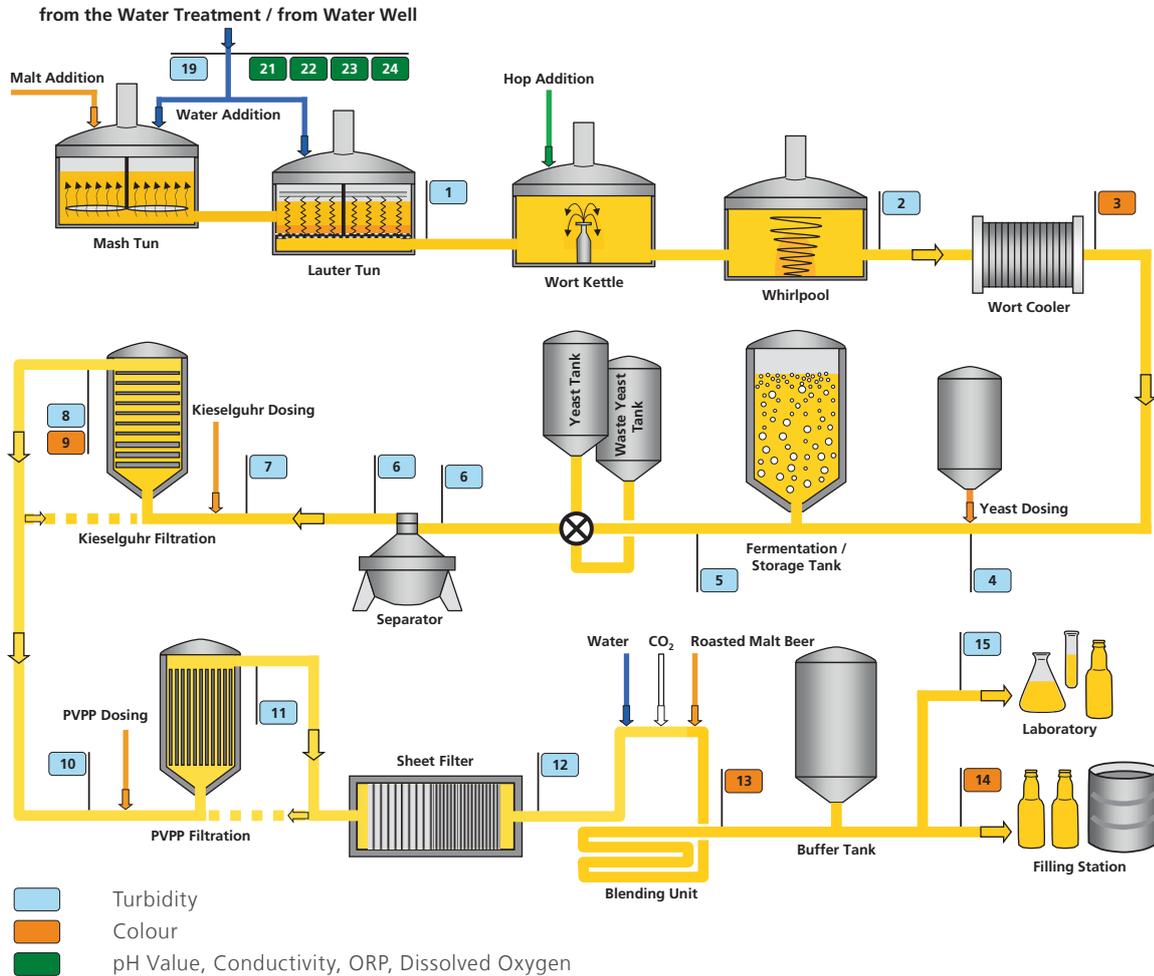
Numerous useful innovations can be attributed to SIGRIST: the introduction of LED technology which no longer requires regular lamp replacement whilst being extremely energy efficient, the increase of the usefulness of the measurement of turbidity by introducing the dual-angle measurement, a rapid and simple inspection of the instruments with a checking unit, the automated measurement of turbidity in the laboratory at pre-defined temperatures and the user friendliness of the operating units by means of a colour touch screen, to name but a few examples.

SIGRIST process photometers distinguish themselves by low total cost of ownership in addition to their universally acknowledged quality. The secret of their high quality standard lies in their "Swissness": the instruments are being developed, manufactured and tested individually in Switzerland prior to their despatch in accordance with the strict quality standards of the ISO 9000:2008. SIGRIST offers a guarantee of 24 months after installation of their instruments without an additional charge.

Anyone who chooses SIGRIST products places particular value on quality, high value creation, sustainability and low energy consumption.

The brewing process

What originally started out just with the monitoring of filtration has now become a highly developed programme covering all optical process control in brewing – from the brew house to the laboratory. For their customers, the SIGRIST Company is a competent contact partner for all optical measurements. The following diagram offers an overview of the individual applications of the SIGRIST instruments in the brewing process.



1	TurBiScat/TurbiGuard	Turbidity after Lauter Tun
2	TurbiGuard	Turbidity at Whirlpool
3	PhaseGuard C	Phase Separation Water/Wort
4	TurbiGuard	Yeast Dosing
5	PhaseGuard HT	Phase Separation Yeast/Beer
6	TurbiGuard/PhaseGuard T	Turbidity at Separator (Inlet/Outlet)
7	TurBiScat/TurbiGuard/PhaseGuard T	Turbidity for KG Dosing
8	TurBiScat	Turbidity for Beer Filtration Monitoring
9	ColorPlus VIS/TurBiScat (Farbe)	Colour after Beer Filtration
10	TurBiScat	Turbidity for PVPP Dosing
11	TurBiScat	Turbidity after PVPP Filtration (Filtration Monitoring)
12	TurBiScat	Turbidity after Sheet Filter
13	ColorPlus VIS/TurBiScat (Farbe)	Colour of Beer/on the Blending Unit (Roasted Malt Dosing)
14	PhaseGuard C	Phase Separation Beer/Water
15	LabScat	Turbidity in the Brewing Laboratory
19	AquaScat P	Turbidity in Treated Water
21	AquaMaster with pH sensor	pH Value in Treated Water
22	AquaMaster with Conductivity sensor	Conductivity in Treated Water
23	AquaMaster with Redox sensor	ORP in Treated Water
24	AquaMaster with Oxygen sensor	Dissolved Oxygen in Treated Water

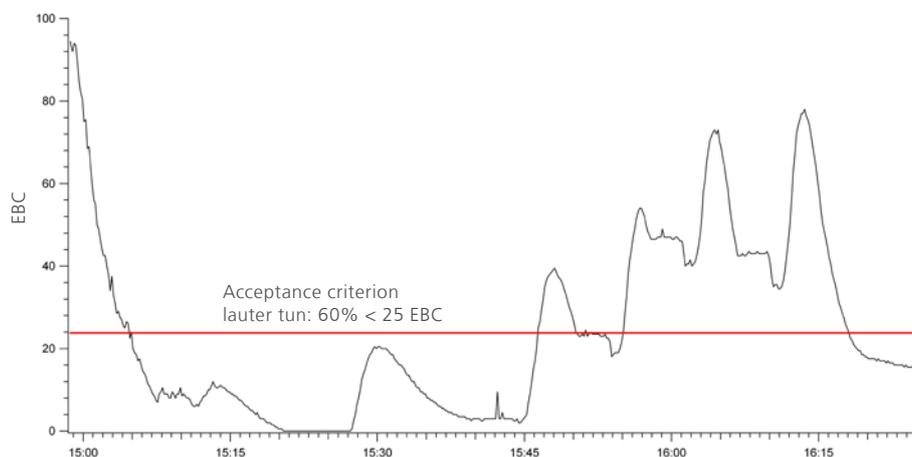
SIGRIST process photometers in breweries

APPLICATIONS IN THE BREW HOUSE

Monitoring wort turbidity at the lauter tun and at the mash filter

Due to variation in quality of the raw materials, it is important to obtain information on the quality of the wort at an early stage. It makes sense to carry out this monitoring with a forward scatter angle photometer, i.e. the **TurBiScat 25°** (recommendation EBC/MEBAK) or a dual-angle measurement with the **TurBiScat 90/25**. If rising turbidity values are seen quickly, a process adjustment can then be carried out at the mash stage. During the subsequent brewing process, measures can be taken in advance to filter the problematic brew. As a cost-saving alternative, simply monitoring the turbidity by absorption can be achieved using the **TurbiGuard**.

TurbiGuard
Lauter tun



Monitoring the whirlpool

The discharge of a whirlpool should be monitored with a turbidimeter. Hot break has a negative effect on the chemical-physical stability of the beer. This measurement is carried out with the **TurbiGuard**.

Phase separation water/wort

The clearly defined transition from wort to water during the flushing of the pipes with water can be detected within seconds with the **PhaseGuard C**. Thus no water reaches the wort and the discharge water is not contaminated with wort.



APPLICATIONS IN THE FERMENTING ROOM

Yeast dosage

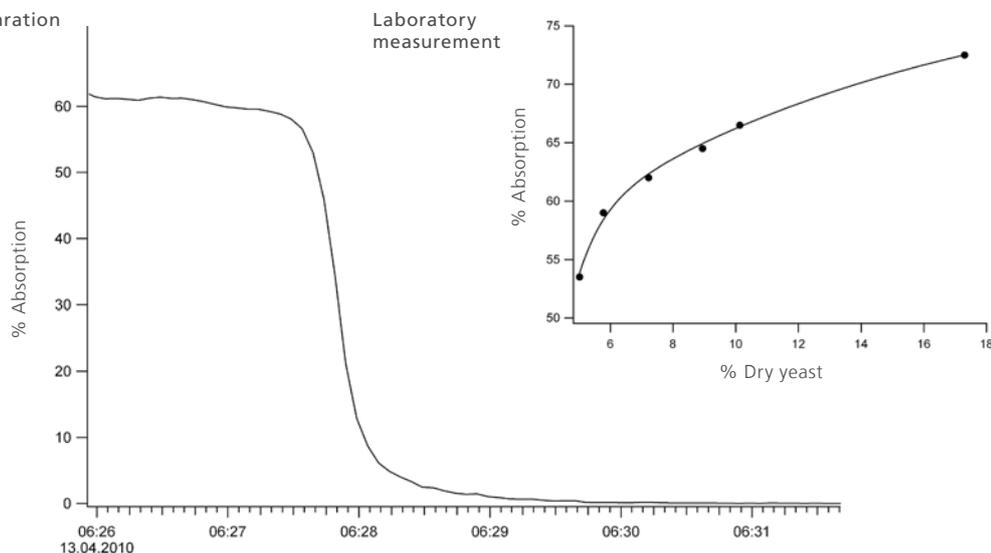
This application can be realized with two simple absorption turbidity sensors **TurbiGuard** in a cost-effective manner. The first sensor measures the turbidity of the incoming wort, the second sensor measures the overall turbidity of wort and yeast after yeast dosage. With the difference calculated from the two signals, the yeast concentration can be given directly in million yeast cells per millilitre.

Phase separation yeast/beer

With optical monitoring and control of the phase transition from yeast to beer, loss of product is avoided. The turbidimeter PhaseGuard HT with short path length and elongated sensor head reliably detects this phase transition.

PhaseGuard HT

Yeast/beer separation



APPLICATIONS IN THE FILTER ROOM

Turbidity in the unfiltered beer

By measuring the turbidity value in the unfiltered beer, the use of filter aids can be optimized, costs are reduced and the quality of the product is ensured. The measurement is either carried out with the **TurBiScat 90°** or the **TurbiGuard** (calibrated), or the **PhaseGuard T** (as absorption value), respectively.

Filtration control and monitoring

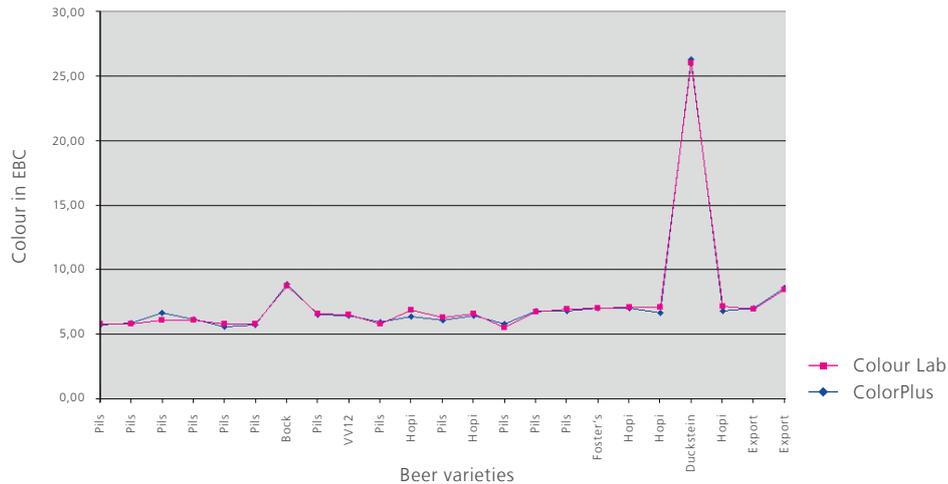
The measurement of the colloidal turbidity via 90° scattered light as a measure for the brilliant clarity of the beer is an important optical quality feature. In addition, by measuring the forward scattered light at 25°, Kieselguhr particles and yeast cells can selectively be detected. Thus, an optimized control in the Kieselguhr pre-coating and in the case of a filter breakdown can be accomplished.

The 25° angle has proven to be the optimum angle for measuring these particles at sufficiently high sensitivity. Leading breweries all over the world have adopted the successful combination of the 90/25° angle measurement. Of course, the **TurBiScat 90/25°** supplies these measured values in a colour compensated manner.

Measurement of Colour

The colour of some types of beer is adjusted either with malt extract, roasted malt beer or by the addition of caramel. By continuously measuring the colour, the dosage in the blending unit can be precisely controlled and monitored. For this, the in-line colour monitor **ColorPlus** is used. The continuous measurement of colour before filling serves as valuable quality management parameter. This measurement can either be carried out with a **ColorPlus** or with the option of colour monitoring integrated in the **TurBiScat**. If desired, the measurement can be carried out with the turbidity compensated in accordance with the EBC standard at 430 nm and correlates with the laboratory values.

Comparison in-line colour monitoring with laboratory

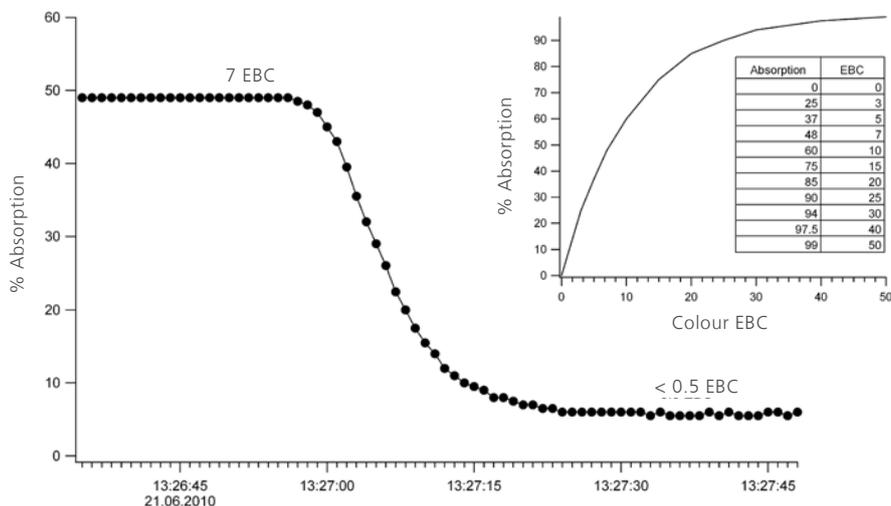


APPLICATIONS IN THE FILLING STATION

Phase separation beer/water

In the filling station, different varieties of beer are processed from the storage tanks. During the change of products several hectolitres of product are lost per week as a result of the intermediate flushing with water between the products. The use of an in-line phase switch on an optical basis reduces loss of beer and increases product safety. Investment in a **PhaseGuard C** is returned, typically within a few months.

PhaseGuard C Filling plant



GENERAL APPLICATIONS IN BREWERIES

Separators

Separators are used at different locations in breweries: in the brew house after the whirlpool, in the fermenting room for the processing of yeast and in the separation of the beer/yeast mixture as well as very frequently in the filter room. The applications of the **PhaseGuard T** or the **TurbiGuard** are diverse. In the infeed, the inflow turbidity is monitored and an alarm is given when the turbidity is too high. In production, the sensor is used for monitoring the correct and regular draining of the turbidity chamber to achieve an optimal quality of the unfiltered beer.

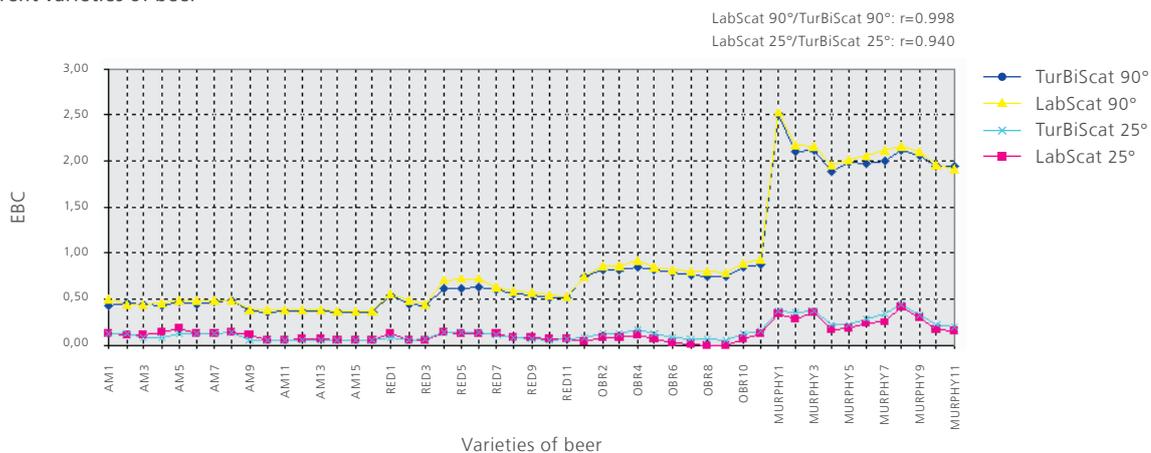


APPLICATIONS IN THE LABORATORY

Process monitoring and quality control management

The **LabScat** is the optimal supplement for the quality control management of the complete process. Measurements can be carried out in glass cuvettes as well as directly in bottles. Since the **LabScat** is the market leader here, an optimal comparison can be made in proficiency testing.

Comparative values TurBiScat/LabScat
with different varieties of beer



Forcing test

In order to determine its shelf life, beer is heated and cooled in varying cycles. The varying turbidity is measured directly in the bottles and the shelf life of the beer is thus determined.



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