Application Report
Turbidity at Whirlpool / Centrifuge / Separator

SIGRIST PROCESS-PHOTOMETER

One of the most frequent applications of the PhaseGuard T is the control of separators in the fermentation and storage cellar.
The following description particularly refers to the application at the separator; however, it can also be applied to the whirlpool and the centrifuges.

Benefits
The main benefit in clarifying the beer during fermentation and storage lies in the fact that the production time is shortened, beer losses are reduced and the working cycle of the filter is improved so that the total brewing process becomes optimized as regards to costs. In order to optimally operate the separators, reliable turbidity sensors are needed.

Typical application
At a separator, turbidity can be measured at one to three positions. The three possible measuring points have different tasks:

1) Inlet turbidity measurement:
This instrument measures the turbidity of young beer, also called green beer, as it arrives from the fermentation or storage tank. The signal of this instrument controls the intake of the separator and reduces it if the turbidity becomes too high. Thus, the separator is protected from clogging and efficiency of the plant is increased. The risk of having to clean the plant is thus minimized; costs are saved. Thus, it is the turbidimeter with which money can be saved at the separator in a relatively simple manner.

2) Outlet turbidity measurement:
This instrument measures turbidity at the outlet. When the trub box of the separator is filled with yeast, it has to be emptied. When the trub box is full, turbidity increases rapidly since the separator cannot take in any more yeast. If this point is reached, the turbidity sensor gives a signal for briefly opening a valve. This results in a prompt emptying of the trub box; turbidity decreases again, etc.

3) Bypass turbidity measurement:
This instrument is positioned after the separator and measures the turbidity of the clarified beer. Since it is desirable to maintain a defined, reproducible turbidity for other technological reasons (improvement of the filter's working cycle by some yeast in the filter cake, or the expectations of customers in case of yeast beer), this turbidity measurement controls the position of a control valve and adds unseparated beer to clarified beer.

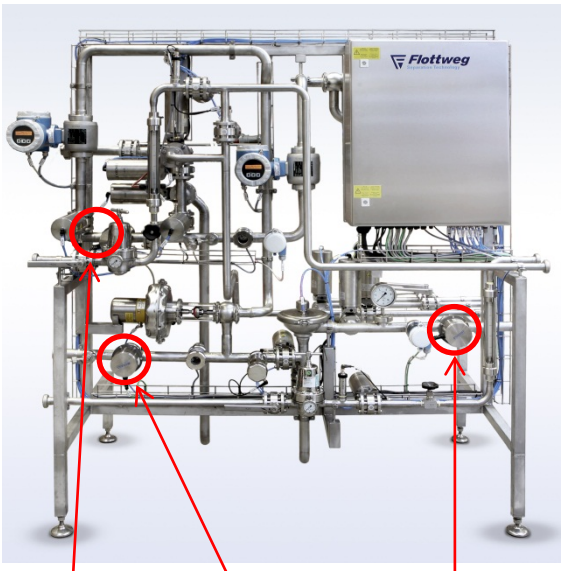
Which of these measurements are put to use depends on the customer's philosophy and budget.

Measurement 1 can clearly save money when large amounts of hops are used (North American craft beers). A separator clogged with hops has to be dismounted and cleaned by hand ("... three times clogged equals a PhaseGuard ..." quotation Mr. Bichlmeier of the Flottweg company).

Measurement 2 is the minimum requirement and a must. A time control results in considerable loss of beer.

Measurement 3 is necessary if
- the maximum use is to be made of the working cycle of the filter. So, the cost potential here lies more in the filter cellar.
- wheat beer or cellar beers with defined amounts of yeast are to be sold.

Picture 1: Separator control with installed PhaseGuard



Measuring point 1: Inlet turbidity

Measuring point 2: Outlet turbidity

Measuring point 3: Bypass turbidity

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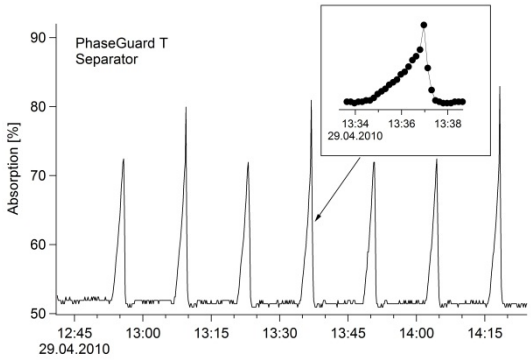
Practical measurement (example):



The diagram shows the typical course of the outlet turbidity measurement at a separator. The rapid rise in turbidity at a full trub box and the lowering of the turbidity values after the box is emptied can clearly be seen.

Cost-benefit-analysis

Saving potential:

1) The storage time of the beer can be shortened. If it took 4 weeks to have the beer bottled previously, this can now be achieved within two weeks. That means a capacity increase, less consumption of cooling energy, less storage volume.
2) A significantly longer working cycle of the filter, which lowers the filter costs per hl and the beer losses.
3) Less loss of beer, better yeast management.
4) The risk of clogging the separator is reduced.

Products

Various SIGRIST products can be used:

- PhaseGuard T
  (signal output in absorption percentage)
- PhaseGuard HT
  (signal output in absorption percentage)
- TurbiGuard
  (signal output calibrated in EBC)
- Optional: SICON control unit

Parameter settings

- Limit formation of the mA signal in the PLC (by the customer)

Advantages of the SIGRIST product

- LED light source, only 2W power consumption
- No purge air necessary
- Sealless design
- Extremely low maintenance costs

Picture 3 & 4: PhaseGuard T