# Optical turbidity measurement technology for the brewing process

*The targeted use of appropriate turbidity measurement technology increases the process reliability, minimises the use of resources, and creates the potential for cost optimisations. At the same time, the overarching goal remains in view throughout - the consistently high quality of the final product for the production of authentic beer.*

Beer is more than just water, hops, malt and yeast. Its specific production not only includes the individual raw materials, but also their mixing and processing. During the actual brewing process, the structure of the ingredients in the individual production steps is subject to partial change. Depending on the processing, filtration or storage, a wide variety of beers are produced.

At the same time, the high art of beer brewing is increasingly being supported by the use of optical turbidity measurement technology. In this respect, it doesn't matter whether these are measures for increasing the quality, minimising product losses or detecting process disruptions at an early stage. The benefits of the measuring technique which is used are the delay-free response behaviour and the reproducible differentiation of the defined media or their concentrations.

**Application examples**

*Lauter tun:*
Checking the clarity of the wort with an opacity sensor can replace the visual checks through an observation window. At the same time, the automatic lautering when a predetermined turbidity value is achieved ensures the consistently high quality of the wort and enables the process time to be optimised at the same time.

*Mash filter:*
During the extraction of the wort, the results of the filtration can be monitored with the optical turbidity measuring technology to ensure the optimum quality of the wort.

*Whirlpool:*
At the outlet, the turbidity measurement technology ensures that all solid matter has been removed from the wort. This allows for the avoidance of disruptions with the clarified green beer in the subsequent process steps.

*Wort cooler:*
A turbidity sensor can be used for contamination control which responds very rapidly in the case of possible defects in the cooler; these are then reported to the control system.

*Yeast harvesting:*
The optimum process control allows for the various different yeast layers to be separated optimally during the yeast harvesting and for them to be forwarded automatically to the correct respective container for further use or disposal. In this context, the high reproducibility, the exact separation and the reduced use of staff thanks to the omission of the need for checks through an observation window all speak in favour of the optical turbidity measurement technology.

*Filtration / Separator:*
According to the type of beer, filtration and separation processes are required at various points during the processing. These can be completed, inter-alia, with the use of kieselguhr filters or separators or centrifuges. Turbidity sensors help set the required beer turbidity and necessary purity value of the filtrate, and support with the monitoring the filter system for the optimisation of the filter service life and/or the detection of possible filter breaks at an early stage.

*CIP cleaning:*
Turbidity sensors allow for the degree of contamination of the CIP medium in the return line to be checked. Depending on the level of contamination, this can then be used again for a new rinsing process for the pre-rinsing. This approach can help reduce the volumes of waste water and save resources and energy.

**Summary**
Starting the lautering at the optimum moment, ensuring the maximum re-usability with the yeast harvesting, having perfect control over the separators, reusing slightly contaminated CIP media and minimising waste-water costs. These are just a few of the benefits offered to users through the use of optical turbidity measurement technology in the brewing process. Optimisations in the field of staff use can also be achieved by eliminating the manual sampling and improving the levels of control over phase changes that were previously time-managed.

**Compact sensors for use in the process:**

EXspect 231 / EXspect 271

EXplore 131 / EXplore 171

**Rod sensor for use in the laboratory:**

EXcell 231