

Turbidity measurement in practice!

Examples of process automation in breweries, dairies and the beverage industry using the turbidimeter itm-4



Separator monitoring in a wine press

Place of deployment: On the outfeed of the wine separator
 Customer: Westfalia Separator AG - Oelde
www.gea-westfalia.de



Description:

Before the wine or must is bottled, it is separated (i.e. particles or suspended matter is removed). The turbidimeter itm-4 is built into the outfeed of this separator.

This device has two tasks in this location:

1. After a certain amount of operating time the separator's drum is filled with solid matter, which has been removed from the wine or must. If this is the case, the solid matter will also get into the separator's outfeed, which will cause an increase in the turbidity there. This increase is detected by the itm-4. At a specific limit value the control system switches over to "empty drum". The limit values for this vary:
 Wine: approx. 30 to 40 NTU (in some cases even up to 1 NTU)
 Must: 200 to 400 NTU
2. The medium is continuously monitored, controlled and, if necessary, recorded by the turbidimeter.

Advantages of the itm-4 in this application:

- >> The company **Westfalia Separator** states that the compact design and the two outputs that are available (4...20 mA and the switch output) are the decisive criteria for selection of the turbidimeter itm-4. Of course the price was also convincing!
- >> **This application has also been realized by Westfalia Separator with the turbidimeter itm-4 in a multiple of breweries and fruit juice plants!**



High-precision turbidimeter itm-4

The turbidimeter itm-4 used at the Münch-Bräu Eibau brewery is deployed before the filter for the purpose of detecting yeast surges. If a yeast surge reaches the combination filter, the filter will become impenetrable within a short period of time. The itm-4 detects these surges dependably and thus ensures smooth, interruption-free bottling!

See the detailed description on page 2.



Detection of yeast surges before the filter

Place of

deployment: In a brewery between the storage tank and the filter

Customer: Münch-Bräu Eibau GmbH - Eibau
www.eibauer.de

Description:

The turbidimeter is installed in the unfiltered beer line between the blender and the combined diatomite/layer filter (a combination of a diatomite filter for particles and a layer filter for degermination). The brewery operates on the single tank principle, i.e. fermentation and storage take place in one tank, the beer is not transferred by pumping.

Although the yeast in the tanks is drawn off, a small residue of yeast is always left lying at the bottom. When bottling is commenced, the beer is drawn out of the tanks, passes through the blender to the filter and from there runs into the fillers, where it is finally filled into casks or bottles.

When beer is removed from the tank, it can occur that the yeast detaches itself and then moves through the blender in the direction of the filter.

If this yeast surge gets into the filter, the filter will become impenetrable after roughly 4 hours of operation and will have to be cleaned. This cleaning requires roughly 3 hours of work, during which time no bottling can be performed. => Stoppage and loss of production.

Normally, without a yeast surge, the filter can be operated without any problem for 10 hours and more. The itm-4 is installed approx. 50 m before the filter to prevent a yeast surge from blocking it up. If the turbidity is greater than 150 EBC the diatomite dosage is increased and a message is output to the operator. If the turbidity is greater than 450 EBC the pipe to the filter is shut off, the filter is run in recirculation mode and a message is output to the operator. The operator can now scoop off the yeast surge and restart the process.

The turbidimeter itm-4 prevents stoppages and the additional work associated with them. The scooping-off of the yeast surge can also be automated.

Special feature:

This application is mainly of interest for small-sized and medium-sized breweries. Larger breweries that have a separator before the filter can do without a turbidimeter in this application. However, as in wine pressing, here too it is wise to use a turbidimeter on the separator's outfeed for the purpose of yeast monitoring or yeast dosing.

The following points were decisive for the Münch-Bräu Eibau brewery in selecting the itm-4:

- >> This device works for pale or dark beers without having to change the limit values. The reason for this is that the itm-4 measures independently of colour at a wavelength of 860 nm.
- >> The considerable price advantage in comparison with the competition.
- >> The low-maintenance LED technology and the easy handling.
- >> By utilizing a turbidimeter itm-4 the separator can be dispensed with.

Waste water separation - reduction of the COD value in a dairy

Place of deployment: In the waste water line

Description:

The itm-4 is used in the waste water sector. In this case it is differentiated between normally contaminated waste water and heavily contaminated waste water. The limit value is 4900 NTU. Normally contaminated waste water is piped immediately to the sewage treatment plant. Heavily contaminated waste water is collected in a 300 000 l buffer tank and piped to the sewage treatment plant at the weekend.

This provides advantages both for the dairy and for the sewage treatment plant:

The advantage for the dairy:

The degree of contamination (the COD value) of the waste water is less during the week. The wastewater surcharge applicable for heavy contaminants (such as dairies, butchers etc.) can therefore be kept smaller. This saves the dairy or butcher money! The degree of contamination of the waste water is checked regularly by the sewage treatment plant.

The advantage for the sewage treatment plant:

The sewage treatment plant can make good use of the bacteria in the heavily contaminated waste water at the weekend, because it can then do without the use of expensive additives.

- >> The 300 000 litre tank complete with installation of the turbidimeter has amortized itself within a year due to the waste water savings made by this customer!

Yeast dosing in a brewery

Place of deployment: After the separator

Description:

Beer is removed from the storage tank and fed to the separator. After the separator the beer has a turbidity of approx. 10 EBC. After the separator the metered addition of yeast is performed and the beer is then carbonated (CO₂ is added). The beer is finally bottled in the filler. The measuring function of the itm-4 consists of controlling the yeast dosage.

In the test the itm-4 was arranged in line between the separator and carbonator. Shortly before the itm-4, bottom yeast is fed to the separated beer from a separate yeast tank, this being defined by way of a dosing pump. With the turbidimeter itm-4 the yeast turbidity is recorded and an appropriate metered addition of yeast is performed, this being dependent on the turbidity value. In this brewery the setpoint is 90 EBC for Kellerbier.

The itm-4 was able to convince this customer thanks to the following features:

- >> Easy handling and operator control of the device.
- >> The measuring operates independently of the beer type and beer colour, i.e. the measuring does not have to be adapted for pale or dark beers.
- >> In addition to this there is a price advantage and easier installation in comparison with the competition.



High-precision turbidimeter itm-4

Control of the lauter process

Place of deployment: In the brewery immediately after the lauter tun

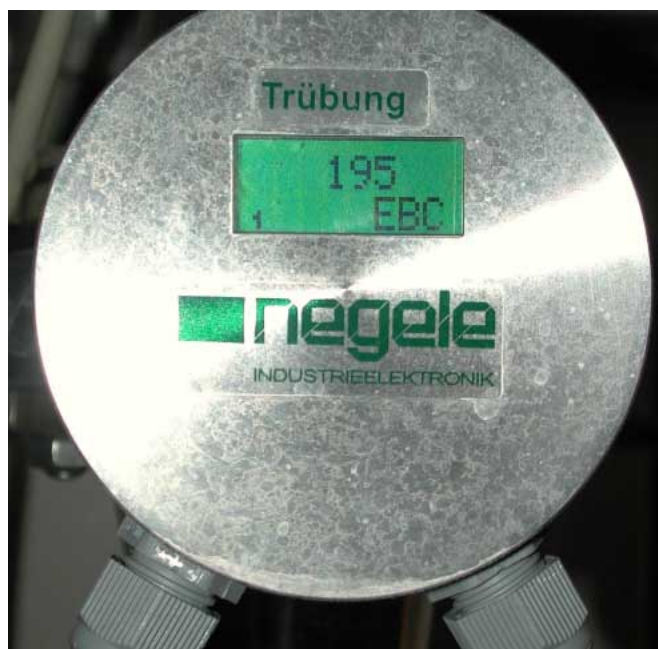
Description:

The mash is conducted from the mash copper with the addition of water into the lauter tun. The draff (husk residue from the malt etc.) sediments in the lauter tun and collects at the bottom of the tun. The outfeed of the lauter tun is also at the bottom of the tun. After the lauter tun the medium (wort) is passed into the wort boiler and then boiled. When medium is removed from the lauter tun, this process is called "sparging" or "lautering". The draff layer has the function of a filter in this process. At the beginning of the lautering the medium is turbid and then gradually becomes clearer. Only a little turbid medium should be allowed to get into the wort boiler.

The turbidimeter itm-4 is installed between the lauter tun and the wort boiler. The limit value for this customer is 30 EBC. If the turbidity is greater than 30 EBC, the medium is not pumped into the wort boiler, but is recirculated to the top and back into the lauter tun. If the turbidity is less than 30 EBC, the medium is conducted into the wort boiler by switching over a valve.

The turbidity value is monitored during the entire removal process. If the value rises above 30 EBC, because, for example, part of the draff has detached itself, a switch back to recirculation is performed until the turbidity is below the limit value again.

- >> Decisive for selection of the itm-4 is the measuring process's independence of the particle size and the optimal cost-benefit ratio.



The turbidimeter itm-4, installed immediately after the lauter tun, enables exact and reproducible monitoring or control of the turbidity of the wort that is pumped into the wort boiler. If the turbidity is too high, recirculation takes place. The wort is not passed into the wort boiler until the turbidity is correct.

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