LIBELLE

Process reliability

BvL
Oberflächentechnik

# Libelle – the system component for bath monitoring

Reliable cleanliness is essential!

Component cleanliness is indispensable for modern production processes. Even tiny impurities can result in rejects or recalls. A high degree of wear on the end products or adhesion problems during application of paint or coatings can often simply be attributed to insufficiently cleaned surfaces.

Cleaning processes are complicated.

Complex parameters determine the quality of the cleaning process. Contaminations in the form of particles, oil, grease and cutting oils are substantial risk factors. Optimum concentration of the cleaning chemicals which are consumed during the cleaning process is equally crucial to the cleaning performance.

This is exactly where the Libelle praecisio devices can provide clarification. **A Libelle never misses anything: as simple as a temperature display.**
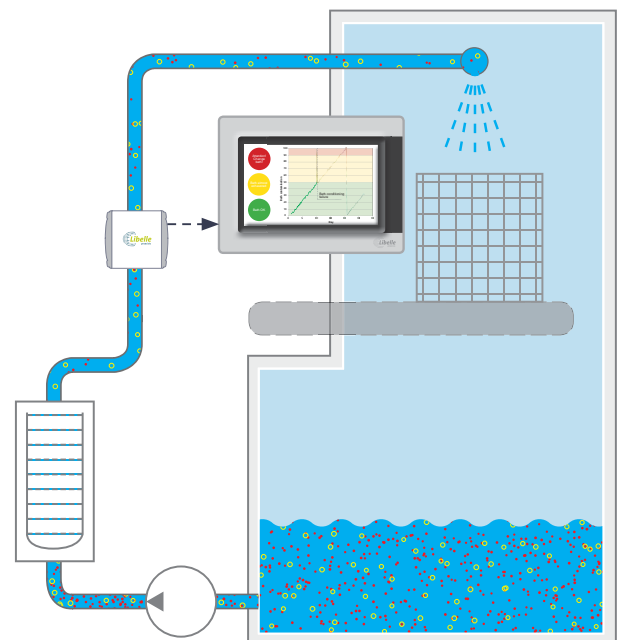
Libelle sensor und monitor

Libelle Fluid Control

Monitoring bath contamination

Every cleaning process requires a sufficiently pure cleaning medium. When the bath is exhausted, sufficient cleaning results can no longer be achieved. The operator of the cleaning system therefore has to know the condition of the bath to ensure constant component cleanliness. Information about the condition of the bath is output by the machine display or optionally by the Libelle Data Control.
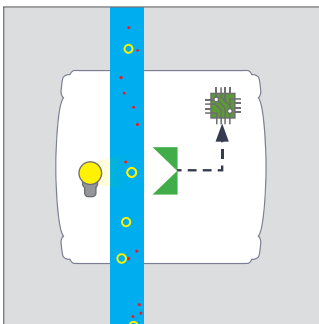
Measuring principle
Measurement of the absorption properties of the cleaning fluid: If absorption increases in the visible light wave range, the fluid is contaminated with more impurities.

Fields of application

- any cleaning process
- impurity mixture of particles and other contaminations

Advantages: quality and cost optimisation

- fast and precise evaluation of bath quality
- allows direct intervention when the cleaning medium changes (e.g. filter failure)
- reduction of rejects caused by insufficient cleaning
- reduction of expensive residual contamination analyses
- optimisation of bath life and bath change
- process reliability
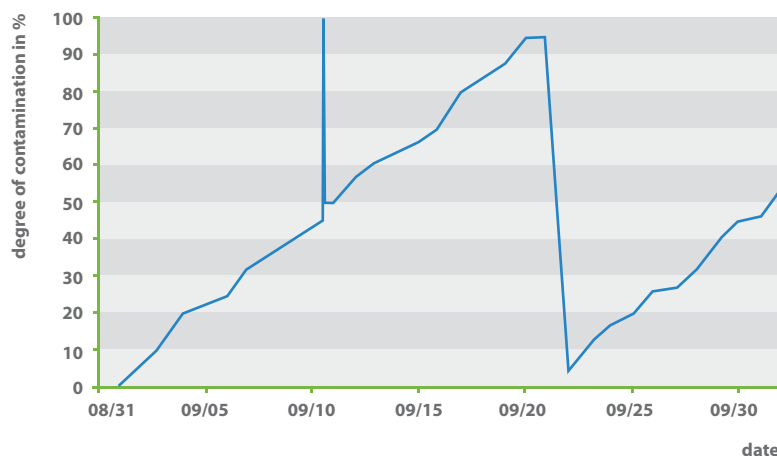
Example

The measurement of the Libelle Fluid Control clearly shows how bath contamination develops over time. The filter failure on 10 September could have gone undiscovered without the Libelle, resulting in a large number of rejects. A simple filter change redressed the problem easily. The diagram also clearly illustrates the marked improvement of the bath condition after the bath change.

Libelle Oil Control

Measuring oil content in the medium

Too much oil and grease in the cleaning medium would prevent it from providing a high level of degreasing. Sufficient degreasing becomes impossible when the bath has been exhausted or when the treatment measures become ineffective. It is therefore crucial that the operator of the cleaning system knows the oil content in the medium to ensure constant degreasing action. Information about the oil content in the medium is output by the machine display or optionally by the Libelle Data Control.
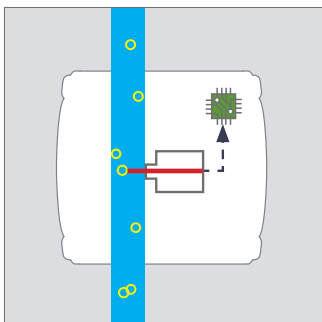

Measuring principle
Measurement of the fluorescence properties of the cleaning fluid: An increase of fluorescence within a certain wavelength is a sign of oil contamination. The intensity of the fluorescence is then a measure for the oil contamination in the cleaning medium. Other substances exhibit a different fluorescence wavelength and therefore have no influence on the measurement.

Fields of application
- cleaning processes where it is important that the component surface is free from oil
- e.g. cleaning before coating, painting, glueing, welding

Advantages: quality and cost optimisation

- precise and fast evaluation of oil content in the medium
- allows direct intervention when the condition of the bath changes (e.g. batches with very high oil input)
- reduction of rejects caused by insufficient degreasing
- optimised bath life and bath change
- optimised parts throughput
- process reliability
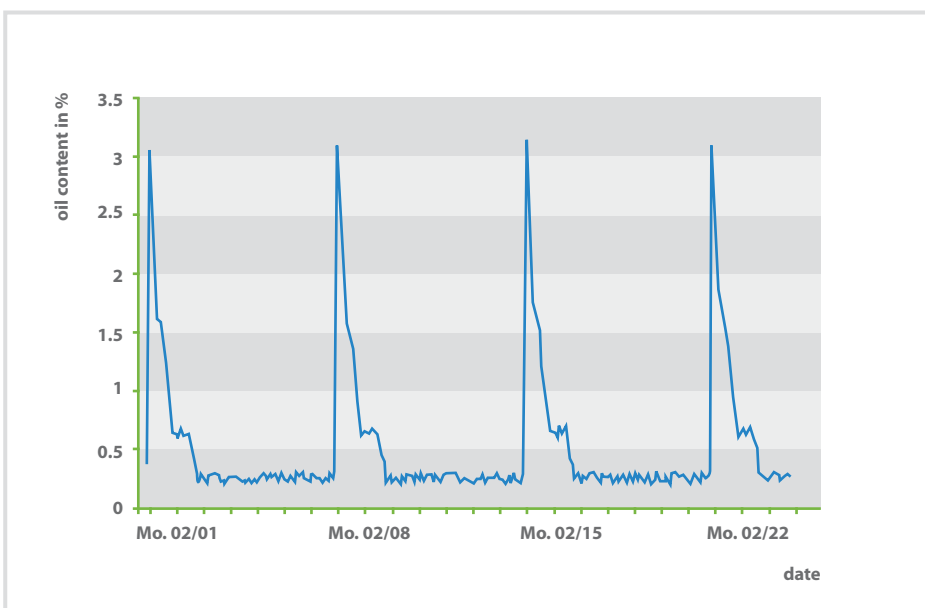
Example
The measurement of the Libelle Oil Control shows that the cleaning of components with oil contamination on Monday caused a large rise in the oil concentration of the bath. The connected treatment measures require several hours for regenerating the bath which means they cannot be turned off during the night. Only after this can sufficient cleaning action for other parts be ensured again. Knowing the oil concentration allows optimisation of parts throughput.

Libelle Cleaner Control

INNOVATION / new BvL development

Monitoring cleaner concentration

Almost all cleaning processes require the addition of cleaning chemicals with a set concentration. If the concentration is too low, the contamination cannot be removed from the component by the medium. Excessive concentration results in higher costs as well as undesired chemical reactions. For the operator of the cleaning system, it is also helpful to know the exact concentration of the cleaning substance in the medium. This is the only way to effectively top up the cleaning agent to ensure constant cleaning performance. Information about the cleaning agent concentration is output by the machine display or optionally by the Libelle Data Control.

Measuring principle
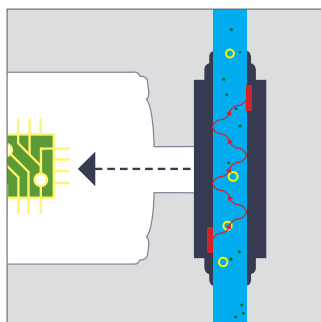
Measurement of the acoustic properties of a liquid: These properties are strongly influenced by the amount of cleaning substances in the medium. If these properties change, the concentration in the medium will also be altered. Comparison with a calibration curve allows exact determination of the concentration in the medium than would be possible with manual methods (e.g. titration).

Fields of application

- any cleaning process using cleaning chemicals
- replaces titration

Advantages: quality and cost optimisation

- unmanned, precise and continuous measuring of cleaner concentration
- allows direct intervention when the concentration of the cleaning agent changes
- option for automatic top up of cleaning chemicals
- reduction of rejects caused by insufficient cleaning performance
- optimised bath life
- maintenance free sensor
- process reliability
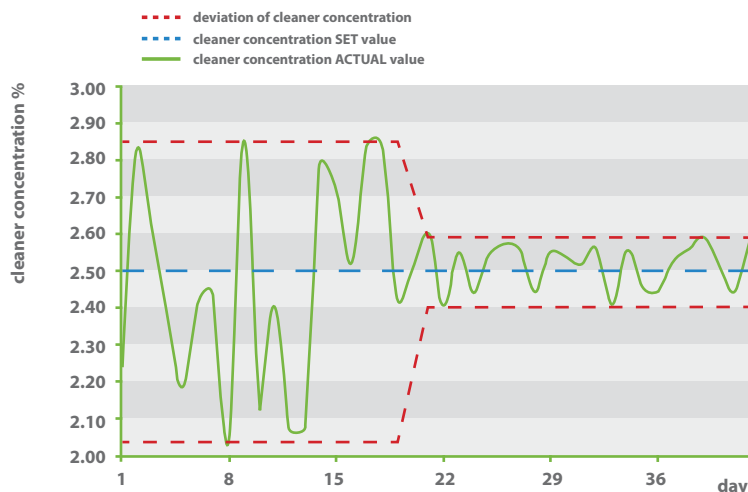
Example

Random manual titration can only provide imprecise results and causes large fluctuation of cleaner concentration. This example shows how using Libelle Cleaner Control with automatic dosing markedly decreases these fluctuations. The cleaner concentration is controlled precisely and cleaning performance is kept constant.

Libelle Oil Control Solo

Measuring film contamination on the component surface

After the cleaning process, the quality of the component surface should meet the requirements for oil and grease removal. Otherwise, the result might be the production of an entire batch of rejects. A visual check is often not sufficient for high requirements. The Libelle Oil Control Solo allows direct quality control. The film contamination on the component is output on the hand-held device or on a computer via a Bluetooth interface.
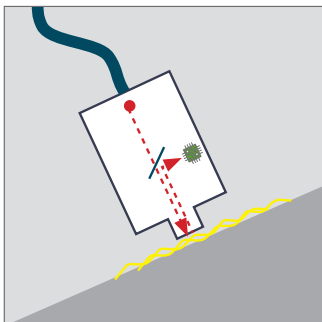

Measuring principle

Measurement of the fluorescence properties of the component surface: An increase of fluorescence within a certain wavelength is a sign of oil contamination. The intensity of the fluorescence then provides a measure for the level of oil contamination on the component. Other substances exhibit a different fluorescence wavelength and therefore have no influence on the measurement.

Fields of application

- checking whether components are free from oil
- e.g. cleaning before coating, painting, glueing, welding

### Advantages: quality control

- mobile verification of component cleanliness with regard to film contamination
- quick decision whether the component is suitable for the subsequent process
- allows direct intervention when component cleanliness changes (e.g. monitoring of processing measures)
- optimisation of bath life and bath change
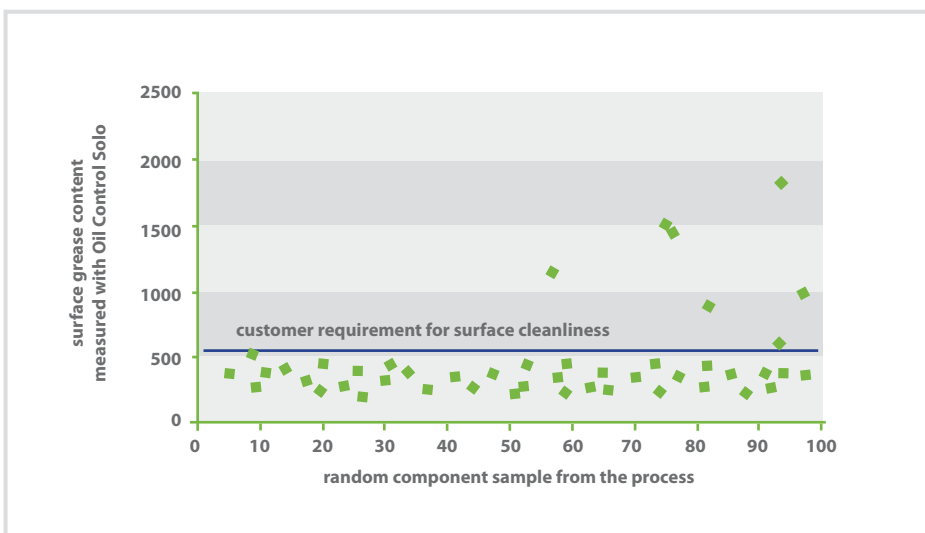
Example

The measurement with the Libelle Oil Control Solo shows how the random samples change over time. Initially, the cleanliness results are within the range for OK parts. Later outliers can be seen in the NOK range. Over the course of time, the system operator will have to decide whether to change the bath or use stronger treatment measures in order to minimise the number of NOK outliers again.

Libelle Data Control
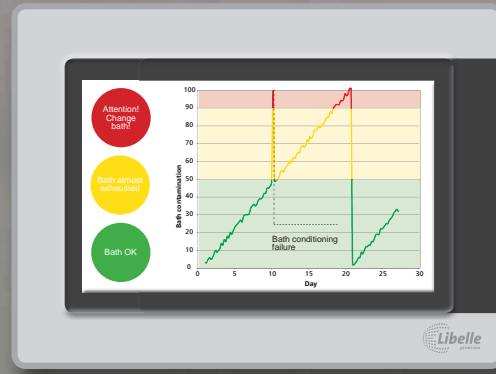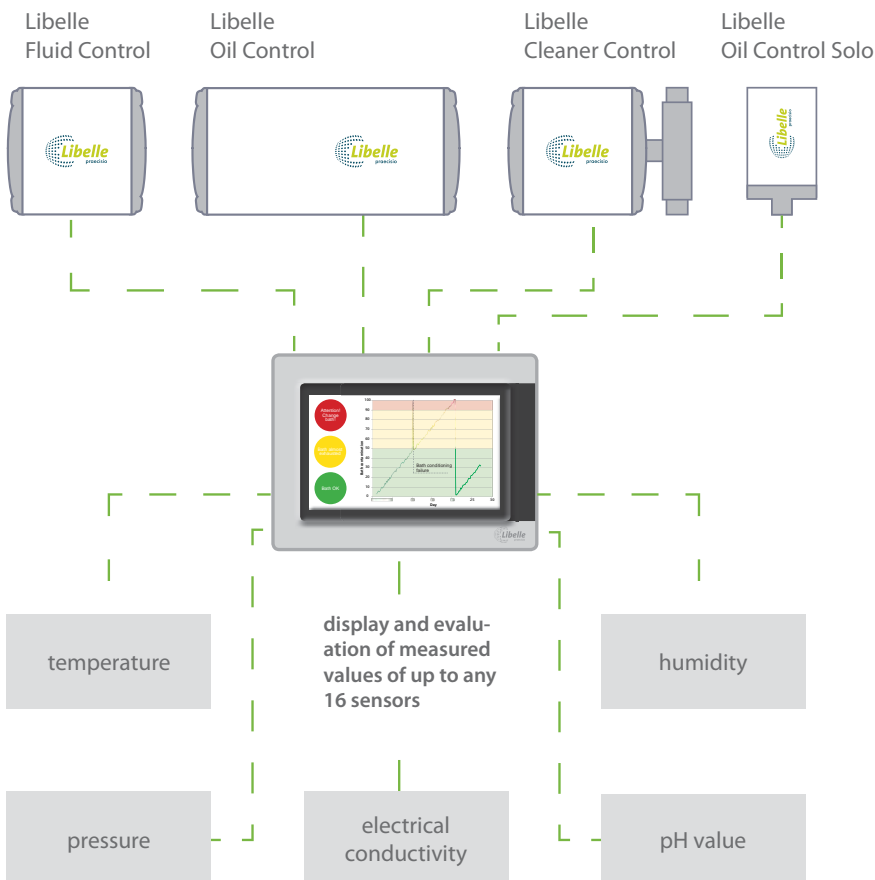

Documenting process parameters

Internal and external quality control and documentation are becoming increasingly important. The operator can use Libelle Data Control to prove that the system was in optimum operating condition at the time of cleaning. The Panel PC enables simple data recording from up to 16 sensors, e.g. Libelle Fluid Control, Libelle Oil Control, temperature, pressure or other process parameters.

Fields of application

- any cleaning process that is monitored by sensors
- documentation of the process

Advantages: quality and cost optimisation

- proof of cleaning performance internally and towards the customer
- reduction of residual dirt analyses based on documentation
- simple error analysis through traceability of the parameters
- display of warnings
- process documentation

Libelle Fluid Control	Libelle Oil Control	Libelle Cleaner Control	Libelle Oil Control Solo

temperature	display and evaluation of measured values of up to any 16 sensors	humidity
pressure	electrical conductivity	pH value

Features

- 7" touch panel for easy operation
- 16 sensors, can be controlled and logged
- data storage going back over 1000 days
- four outputs for forwarding error messages
- additional network connection option

BvL Oberflächentechnik GmbH
Grenzstr. 16
48488 Emsbüren
Germany
Phone: +49 (0) 5903 951-60
Fax: +49 (0) 5903 951-90
Email: info@bvl-group.de
Internet: www.bvl-group.de

Pure Technology.