



# KIENZLE®

Prozessanalytik



Measuring on surfaces

# Optimal processes call for specific solutions

adapted to your production conditions.

Industrial production processes are becoming more sophisticated, and their automation and monitoring increasingly complex. Despite the growing pressure to rationalize the production process, the best possible product quality must be ensured. This is why special requirements apply also to analytical and measurement systems:

- availability of online/inline options
- speed
- accuracy
- reliability
- cost-efficiency

KIENZLE Prozessanalytik is your ideal partner for measurement and analysis under industrial production conditions. Since 1999 we have been producing highly sensitive optical systems that reliably monitor production processes, thus ensuring process safety and efficiency.

Our special expertise is in the use of laser-induced time-integrated fluorescence spectroscopy, LIF(t), in industrial applications. We offer solutions based on our patented process that satisfy the most diverse customer requirements rapidly and flexibly.

**SPECIAL FEATURE:** The analysis is completed in seconds and without any need for sample preparation.



*For use under industrial conditions: the KONTAVISOR in a wall-mountable stainless steel cabinet*

# Accurately measured data: the key to product quality

KONTAVISOR, LUBRIVISOR and FLUOVISOR are our analysis systems for process monitoring in industrial production. On the basis of laser-induced time-integrated fluorescence spectroscopy, LIF(t), they perform measurements on surfaces and in liquids in a matter of seconds.

This highly versatile analytical technique can be used to

- measure coating thickness
- determine component purity
- monitor concentration



*For laboratory use or installation in a control panel: the KONTAVISOR in a 19-inch chassis*

The standard system can be configured for the customer's specific task by adapting the system components. This allows, for example, very rapid and highly sensitive real-time recording of production parameters. With the technology of the VISOR series complex sampling procedures and interrupted production are history. The use of light conductors allows the technology to be adapted flexibly to local conditions. Measurement point and analysis unit can be up to 30 m apart. Because the measuring head simply positions the light conductors at the measuring point and contains no active components, even the most sophisticated process-specific adaptations can be made cost-effectively:

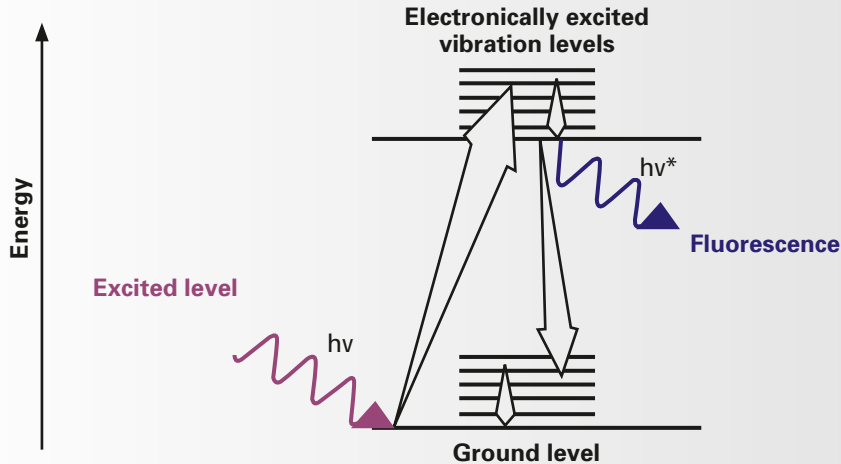
- product speeds of up to more than 800 m/min
- measuring-head geometries from 2 mm
- IP65
- can be used in Ex zones
- for aggressive media
- media temperatures of up to 300 °C



*The choice of measuring head used depends on the medium and the work environment.*

# Rapid and accurate measurement of fluorescence

Fluorescence is one of the most efficient forms of interactions between light and matter. It is therefore excellently suited for measurement of the thinnest coatings and the lowest concentrations. Fluorescence is the process of light emission from the substance to be measured, which is triggered by the absorption of exciting radiation. The fluorescence that is then emitted immediately after excitation of the molecule can be measured accurately even for very low concentrations.



# LIF(t), a proven and tested process incorporating the latest technology

All known fluorescence-based measurement systems analyze only the intensity of the signals.

**The drawback of this method** is that the effects of ambient light and of signals from the substances involved, for example from the substrate matrix, influence the measurement results.

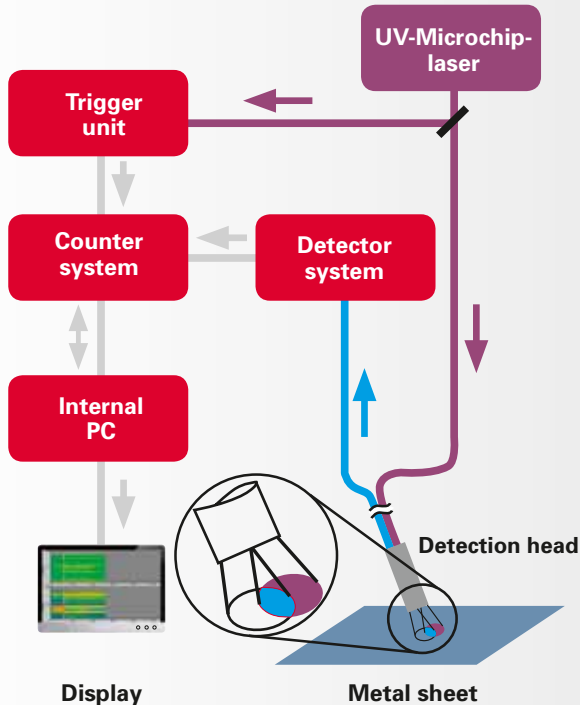
**The advantage of laser-induced time-integrated fluorescence spectroscopy, LIF(t)**, is that by the use of a pulsed light source the time-dependent decay of the fluorescence, or attenuation of the signal, is measured in addition to the signal intensity.

## **BECAUSE:**

The greater the amount of fluorescing substances in a liquid or on a surface, the longer is the decay time of the fluorescence after the excitation.

From this characteristic decay behaviour the measured value is calculated on the basis of a calibration. Interferences and background signals can be separated from of the useful signal by time-integrated measurement. One result, based on 10,000 individual measurements, is output every second.

# The functional principle of the VISOR series



Optimal components are used to exploit the physics of the fluorescence effectively.

- A small solid-state laser delivers 10,000 short and intense light pulses with a power of up to 100 W.
- Rugged glass fibres transmit the light energy to the measurement point.
- The photons of the fluorescence signal, also transmitted via glass fibres, are detected by a highly sensitive photomultiplier and counted by a specially developed counter system in the nanosecond range.
- An industrial PC controls the entire system and calculates the results of the measurements.
- All the components are integrated in a hard-wearing wall-hung stainless-steel housing or a 19-inch tabletop unit.

<b>Signals</b>	(0)4–20 mA, potential-free outputs and inputs
<b>Interfaces</b>	TCP/IP CAN bus serial (e.g. RS232) OPC various network interfaces USB for data readout
<b>Other features</b>	long-term data storage unit, remote control via LAN, fixed network or GSM/UMTS, internal monitoring of 6 parameters (measured value, counting rates 1 and 2, laser intensity, repetition rate and temperature) per second, simple software adjustment via internal industrial PC
<b>Laser safety class</b>	1M or higher
<b>Ambient temperature</b>	10 to 40 °C
<b>Protection class</b>	IP53 to IP65
<b>Use in Ex zones</b>	zones 1 and 2



## KONTAVISOR for measurement of surface cleanliness

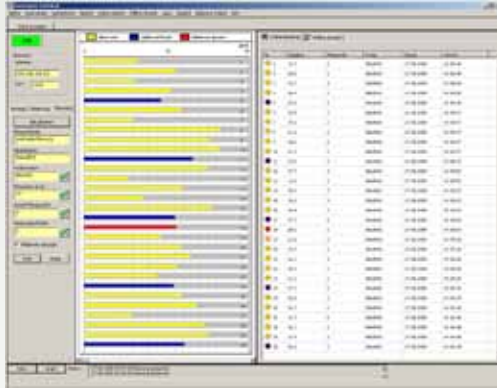
### THE PROBLEM

Components may become contaminated during production by, for example, residues of cooling lubricants or cleaning agents. This may result in quality defects in sophisticated bonding, joining or finishing processes. In such cases, reliable assessment of surface cleanliness is very important.

cooling lubricants  
drawing agents  
parting agents  
cleaning agents  
rolling oil  
organic residues  
solvents

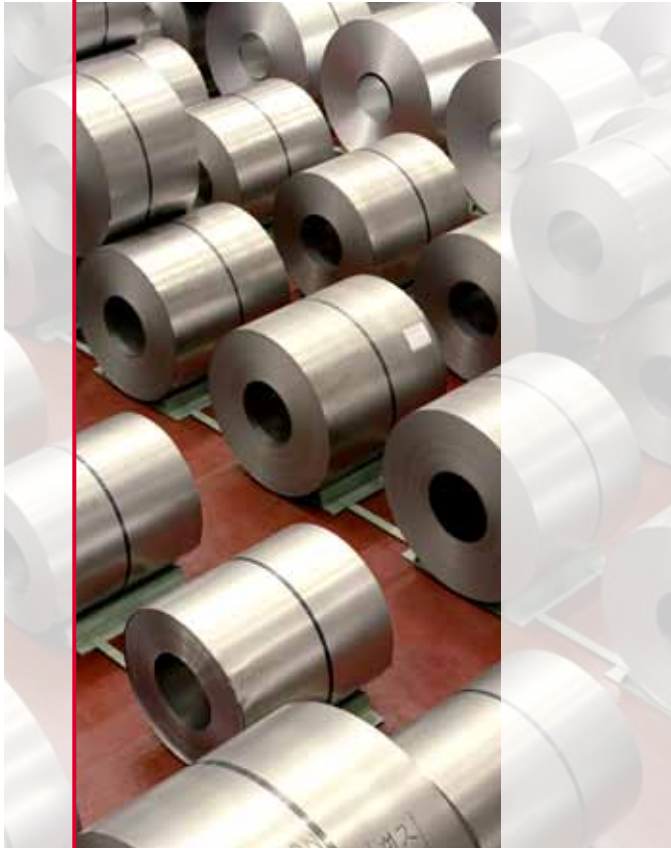
## THE SOLUTION

The KONTAVISOR is calibrated on the contaminated surface that may impact quality as well as on a surface that has been perfectly cleaned. Measurements can then be carried out directly on the component. This allows the definition and monitoring of exclusion criteria – directly in the process line and within seconds.



## THE ADVANTAGES

- Thanks to the high excitation power of the individual laser pulses even the slightest traces of residues can be detected.
- The increasing contamination of the wash bath is determined in seconds directly from the cleanliness result on the component.
- Additional information can be recorded for documentation purposes.



# LUBRIVISOR for measurement of oil coatings

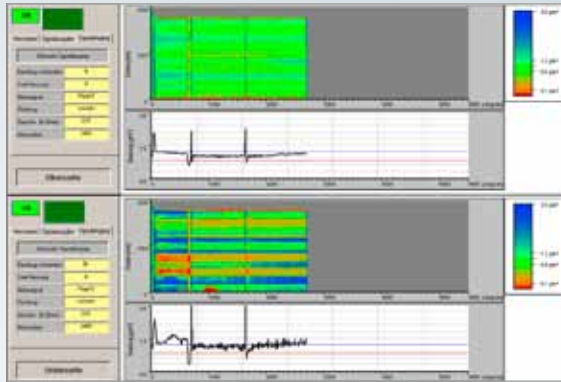
## THE PROBLEM

Lubricants and coolants are used in metal forming, as in the rolling of sheet metal. Accurate measurement of the coating thickness of these substances is particularly important for product quality and for wear on the forming tools. Rapid and accurate measurement of even the thinnest coatings is therefore essential.

drawing agents/hot melt  
rolling oil/emulsions  
wet skin-passing agents  
grease  
conversion coatings  
lacquers  
minimum quantity lubrication

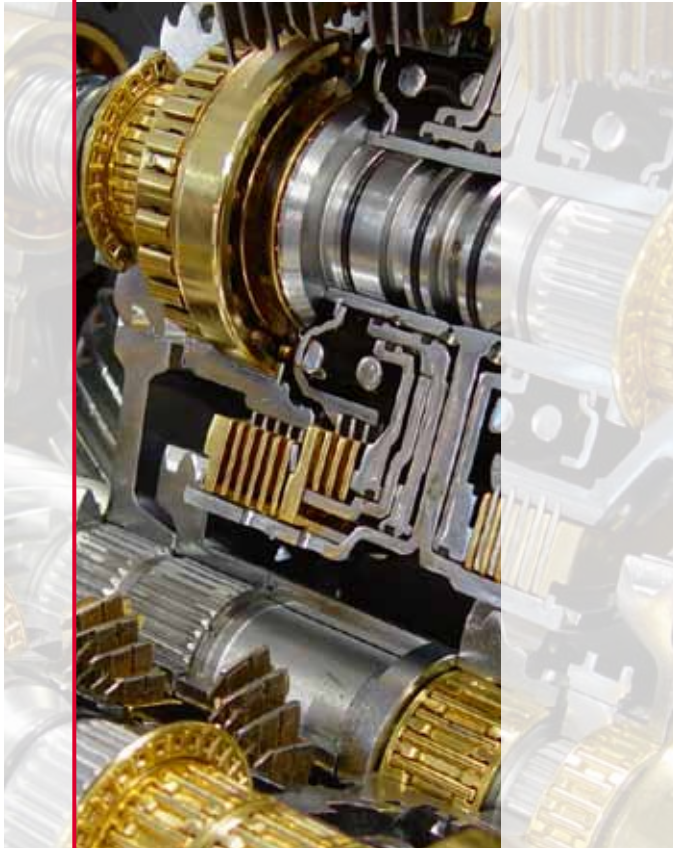
## THE SOLUTION

The LUBRIVISOR allows measurement within seconds of even the thinnest coatings, directly in the production process and also at high line speeds. The data obtained allow the production parameters to be adjusted immediately.



## THE ADVANTAGES

- Deviations from the desired coating thicknesses, such as dry streaks, are detected immediately.
- Hot melts and other substances applied only at isolated points can also be measured.
- A hard-wearing measuring head and the flexible light conductors allow the equipment to be used directly in production.
- Quality information can be recorded for documentation purposes.
- The compact and simple structure allows retro-fitting into existing systems.



# FLUOVISOR for measurement of coatings

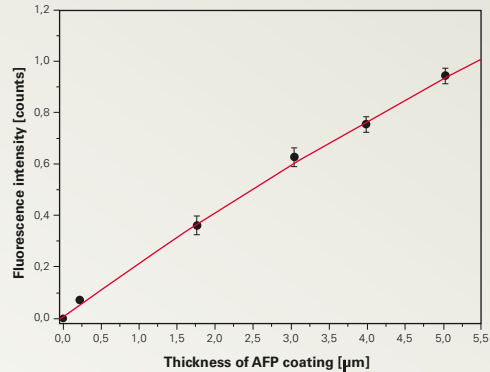
## THE PROBLEM

Materials, components and machines are used under the most demanding conditions. Special coatings are applied to ensure the required functionality. In addition, certain processing steps require specified application of auxiliary materials. This calls for a measurement technique that verifies – in a process-oriented way – that the coating is present in the required thickness.

transparent coatings  
homogeneity  
corrosion protection  
lacquers  
primers/adhesives  
anti-fingerprint  
polymers

## THE SOLUTION

Coatings often contain fluorescing substances. Even when present in minute quantities, these form the basis for determination of the corresponding coating thicknesses using the FLUOVISOR – rapidly, accurately and in an automatable process.



## THE ADVANTAGES

- The good signal yield allows measurement even on moving surfaces.
- Measurement is also possible directly after application, while the coating is still liquid.
- Measurement of the thinnest transparent coatings, down to molecular monolayers.
- Cost savings through reduced laboratory expenditure.
- Quality information can be recorded for documentation purposes.
- The measuring head contains no active components; it can therefore be flexibly and cost-effectively adapted to the particular application.
- Even weakly fluorescing coatings are very easily measured using minimal (ppm) quantities of markers.

# Free feasibility study

To enable you to assess the suitability of our analysis technology for your particular application, KIENZLE Prozessanalytik offers you a free preliminary investigation of the questions and problems relating to your process. Please send us samples of the substances and components involved in the process. These will be spectroscopically examined in our laboratory to derive the optimal configuration of our technology.

Following this preliminary investigation we will send you an evaluation, including a graphical representation of the results. We will also give you our assessment for implementation of the measurement or analysis.

Please send your samples to:

KIENZLE-Prozessanalytik GmbH  
Dr. Jens Bublitz  
Schauenburger Strasse 116  
24118 Kiel  
Germany

## **TEST OPERATION:**

If the feasibility study convinces you of the power of our technology, we will offer you a trial run after a visit to your production facility; the costs of this will be partly reimbursed if you decide to buy the equipment.

# Hand-held device for fluorescence measurement

Fitted with power modules of the proven VISOR series, this range of devices has been developed for manual measurement of coating thickness during production.

Based on a fast fluorescence measurement technology, the device indicates the results on the display. The parameters are defined individually by the user; there are up to 20 possible calibrations.

Calibration is performed on the basis of at least two measured points on real process surfaces. The results are indicated in  $\text{mg}/\text{m}^2$  or  $\mu\text{m}$ .

**KONTAmini:** for assessment of surface cleanliness

**LUBRImini:** for measurement of applied coatings

## PRODUCT FEATURES

- Compact portable device for 8 hours of battery-powered operation
- Fluorescence excitation with latest-generation high-performance UV LED
- Monitoring of fluorescence with special high-resolution detector system
- Results evaluated by a sensitive single-photon counting technology
- Result displayed as index value. Can be calibrated for  $\text{mg}/\text{m}^2$  or  $\mu\text{m}$
- Automatic ambient light compensation
- Measurement time from 1 second



*Simple handling:  
Measurement on a component*

Modern process analysis technology  
must be fast, accurate and cost-effective.  
To satisfy the individual requirements of our customers,  
we work in close conjunction with them and adapt our  
flexible technology effectively for their  
specific goals and conditions.