



HIGH PERFORMANCE CENTER

DYNAFLEX®

FLEXIBLE SOLUTIONS FOR THE ENERGY
TRANSITION AND RAW MATERIALS SHIFT

SENSOR-DATABASE FOR IN-PROCESS MEASUREMENTS

TEST ENVIRONMENT FOR ON-LINE PROCESS SENSORS

CONTACT

Dr.-Ing. Axel Kraft
Head of Department
Biorefinery und Biofuels
Phone +49 208 8598-1167
axel.kraft@umsicht.fraunhofer.de

Dr.-Ing. Jürgen Grän-Heedfeld
Project Manager
Biorefinery und Biofuels
Phone +49 208 8598-1274
juergen.graen-heedfeld
@umsicht.fraunhofer.de

**Fraunhofer Institute for
Environmental, Safety, and
Energy Technology UMSICHT**

Osterfelder Strasse 3
46047 Oberhausen, Germany

www.umsicht.fraunhofer.de/en



A database for sensors and methods for online measurement in the sectors chemicals und chemical engineering will be compiled.

The database will give users an orientation for selecting sensors and methods as well as suppliers and contact points for screening them upfront of any implementation.

Manual sampling combined with a simple digital data treatment does not always provide an optimal solution. Such an approach is labor intensive, infrequent and mostly does not deliver sufficient data being relevant for the process and the products made. Introduction of automated sensors and an improved statistical data evaluation can lower the operating cost, improve the quality and reliability of a process. SMEs often do not test new methods, since they lack relevant test environments or specialized personnel. Hence, opportunities and risks as well as costs and benefits of a range of methods and sensors are often not known.

Keywords

- Sensor, probe, methods, database
- Industrials test environment
- Technical feasibility studies
- On-line measurements
- Analytical data evaluation (big data)

Industrial Sectors

- Chemicals, Fuels, Plastic
- Industrial (white) biotechnology
- Recycling, Residues, Water
- Analytical chemistry
- IT (Big Data, AI, "Industry 4.0")



Spectroscopic methods		
Method	Detection of	OFF-/ON-/IN
NIR	liquid, multi peak	IN/ON/OFF
UV	gas, liquid, multi peak	IN/ON/OFF
Raman	gas, liquid, multi peak	IN/ON/OFF
IR	gas, liquid, multi peak	IN/ON/OFF
LIBS	liquid, solid multi peak	ON/OFF
Fluorescence	liquid, multi peak	IN/ON/OFF
Physical methods		
Method	Detection of	OFF-/ON-/IN
Refractive index	liquid	ON/IN/OFF
Density	liquid	ON/IN/OFF
Sound Speed	liquid	IN/OFF
Heat Conductivity	liquid	IN/OFF
Electr. Conductivity	liquid	IN/OFF
Viscosity	liquid	IN/OFF
Impedance	liquid	IN/OFF
Color	liquid / gas	ON/IN/OFF
Turbidity	liquid	ON/IN/OFF
Sensors		
Method	Detection of	OFF-/ON-/IN
Chemical Nose	gas, multi component	ON/OFF
Electrical Tongue	liquid, multi component	ON/IN/OFF
Electrochemical	gas, liquid, multi component	ON/IN/OFF
Dipolmoment	gas, single/multi component	ON/OFF
PID	gas, multi component	ON/OFF
Catalytic	gas, single/multi component	ON/OFF
TDLA(S)/TDS/TDL	gas, single peak	IN/ON



1 Structure of Sensor Database, Mid-IR-Sensor, Test-System.

Technological specification

The database distinguishes between physical, spectroscopic, electro-chemical measuring methods and sensors as well as between the determination of single components (concentration) and aggregated parameters (viscosity, pH, etc.). Also the specificity for certain phases (gas, liquid, solid) is listed.

Per measuring method different assembly options, measuring principles and sensors exist. Those also depend on temperature, pressure, flow (regime), compatibility towards process media, geometry and measuring frequency. The interplay of the mentioned factors frequently implies differences with respect to applicability and scalability as well as pronounced differences in OPEX and CAPEX.

Our service

We analyze for you options as well as costs and benefits of different measuring methods and sensors in the framework of a feasibility study. This could be a desktop study or an additional experimental evaluation of measuring techniques and methods. Experimental studies can comprise orientating trials for proof-of-principle up to long-term tests and quantitative comparisons measuring methods and techniques.

An existing industrial test environment ranging from lab to pilot plants and our sector overarching know-how about processes, products and raw materials enables a validation relevant for the industry as well as an efficient screening of methods and sensors. User-specific constraints concerning measurements executed at-, on- or in-line can optionally be investigated as well.

Your benefit

- Comparative assessment of options and methods for improvements of quality, yield and productivity in the framework of the trend towards digitalization
- Optional renting or renting with buy-option for sensors
- Tests in relevant lab- and pilot plants with products or intermediates
- Control for new or varying raw materials and by-products
- Tighter specs
- Production flexibility
- Inexpensive screening
- Interdisciplinary cooperation of scientists, analysts, engineers and information technology