Meat Processing

Production of Raw-, Blanched-, Boiled Sausage, Ground- and Burger Meat





Continuous Measurement of organic constituents with NIR-Spektrometer standardisation, sausage production

Meat Processing
Sausage production

Fat standardisation
Pork
Beef
Poultry

Ham
Boiled Ham
Processed Ham

Raw sausage
Ground Pork Sausage

Salami
Pork Pate

Blanched sausage
Pork Sausage
Ham Sausage
Lyoner
Meat Loaf
Mortadella
Frankfurter
Wiener

Bavarian Sausage

Boiled sausage
Black Pudding
Liver Sausage
Pastries
Aspic

Minced meat
Hash
Burger Meat
Meatballs






Color independent measurement with NIR-Spectrometer HK4

The HK- instruments are applicable as continuous online-measurements in a wide variety of engineering technologies in the different production-lines of the meat processing industries. Because of further increasing quality requirements after ISO and EU standards, the industries have an enhanced demand for improved quality assurance, standardisation and online-trend observation.

Meat Processing
Sausage production

Raw Ham	Receipt of raw Meat	
Pressing Squeezing	Mincer fat-standardisation	Standardisation Fat i.e. 30%
Recipes	Recipes / Dosages	
Tumbler	Cutter / Blender / Hot Blender	Measurement of Fat and if necessary Protein Collagen Water and Calculation of BEFFE (Protein - Collagen) Restwater
Vacuum-Cooking	further processing	

Ham
Boiled Ham
Processed Ham

Raw Sausage
Ground Pork Sausage

Salami
Pork Pate

Blanched Sausage
Pork Sausage
Ham Sausage
Lyoner
Meat Loaf
Mortadella
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Minced Meat
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Boiled Sausage
Black Pudding
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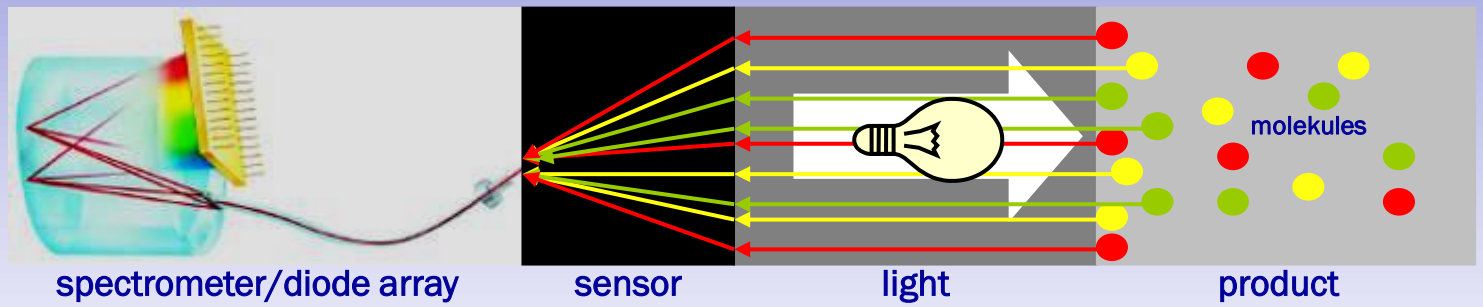
Pastries
Aspic

Identification of organic constituents
with NIR-spectroscopy

In the NIR-measurement technology the surface of the product is illuminated by white halogen light. An optical fiber sensor transfers the data, measured after the transmissive or reflective principle, to the diode array. The evaluations with a diode array realize the measurement of every organic constituent with an absorption line in the detected spectrum.
Mainly this are molecules of the CH-, OH- and NH-compounds.

The measurement is not influenced by colour variation



Preconditions for very good measuring results:
The place for measurment should be selected carefully and during measurement the sensor system always should be covered by the sausage meat.

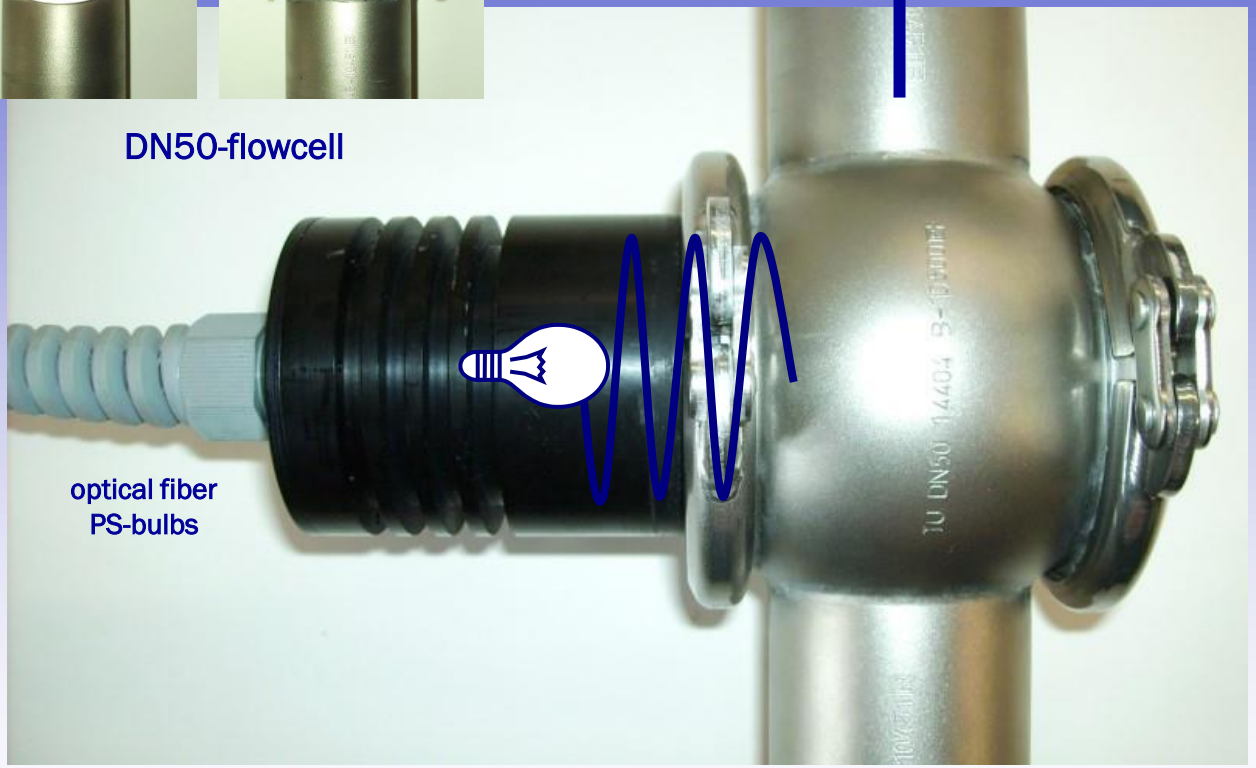
Layout of the measurement

product
i.e. Ground Meat

lamp-housing NIR-sensor

DN50-flowcell

optical fiber
PS-bulbs



tank-cell:
application in
blenders and tumblers

NIR- Spectrometer HK4

analogue signal
0/4 – 20mA
-fat

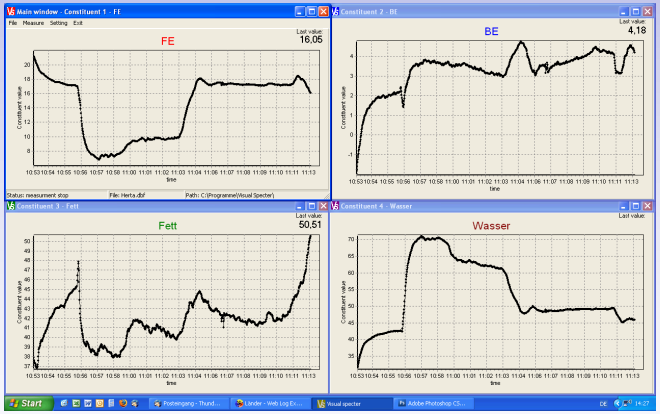
analogue signal
0/4 – 20mA
-protein

analogue signal
0/4 – 20mA
-collagen

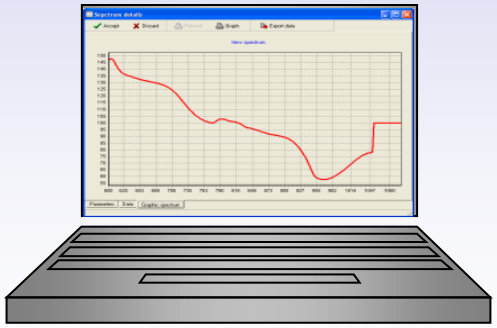
analogue signal
0/4 – 20mA
-water

HK4-2

HK-VisualSpecter
-trend visualisation
-data archiving



RS232 / RS485
chemometric
calibration software
SPECTER



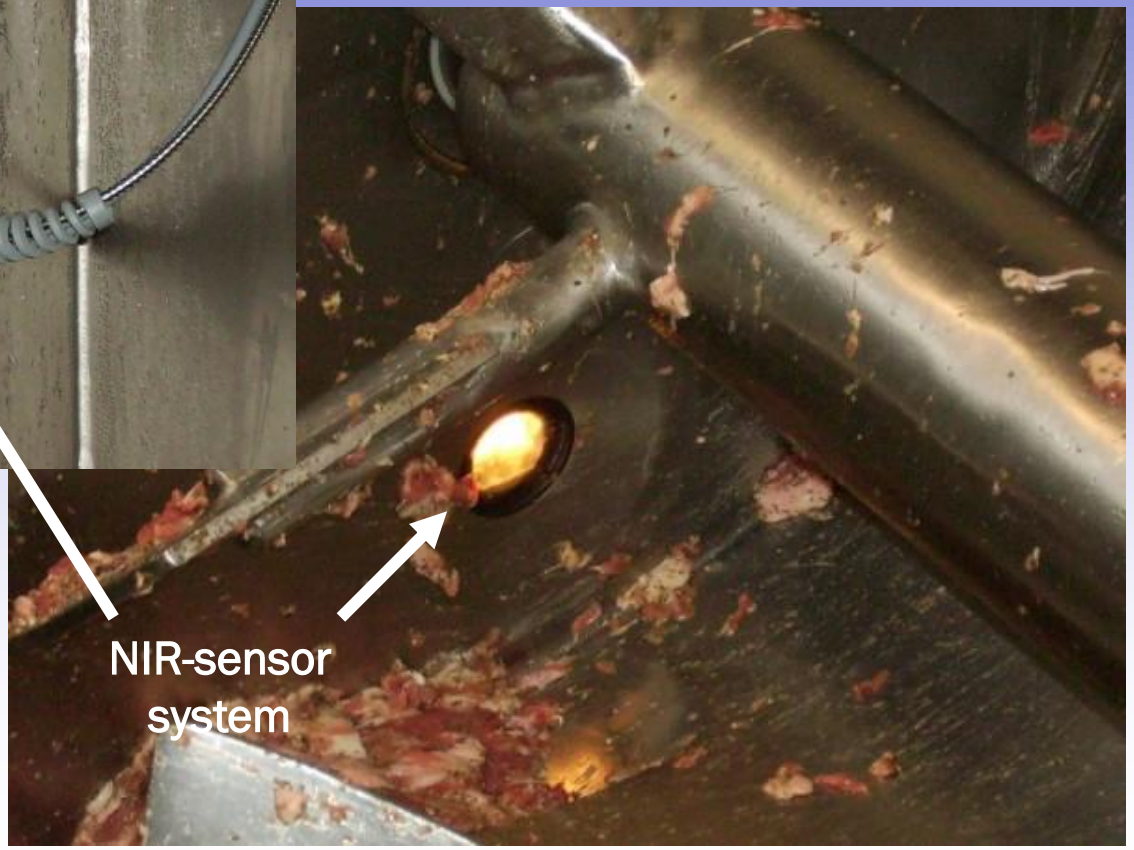
optical
fiber

NIR-sensor
system

applications / example 1

application blender

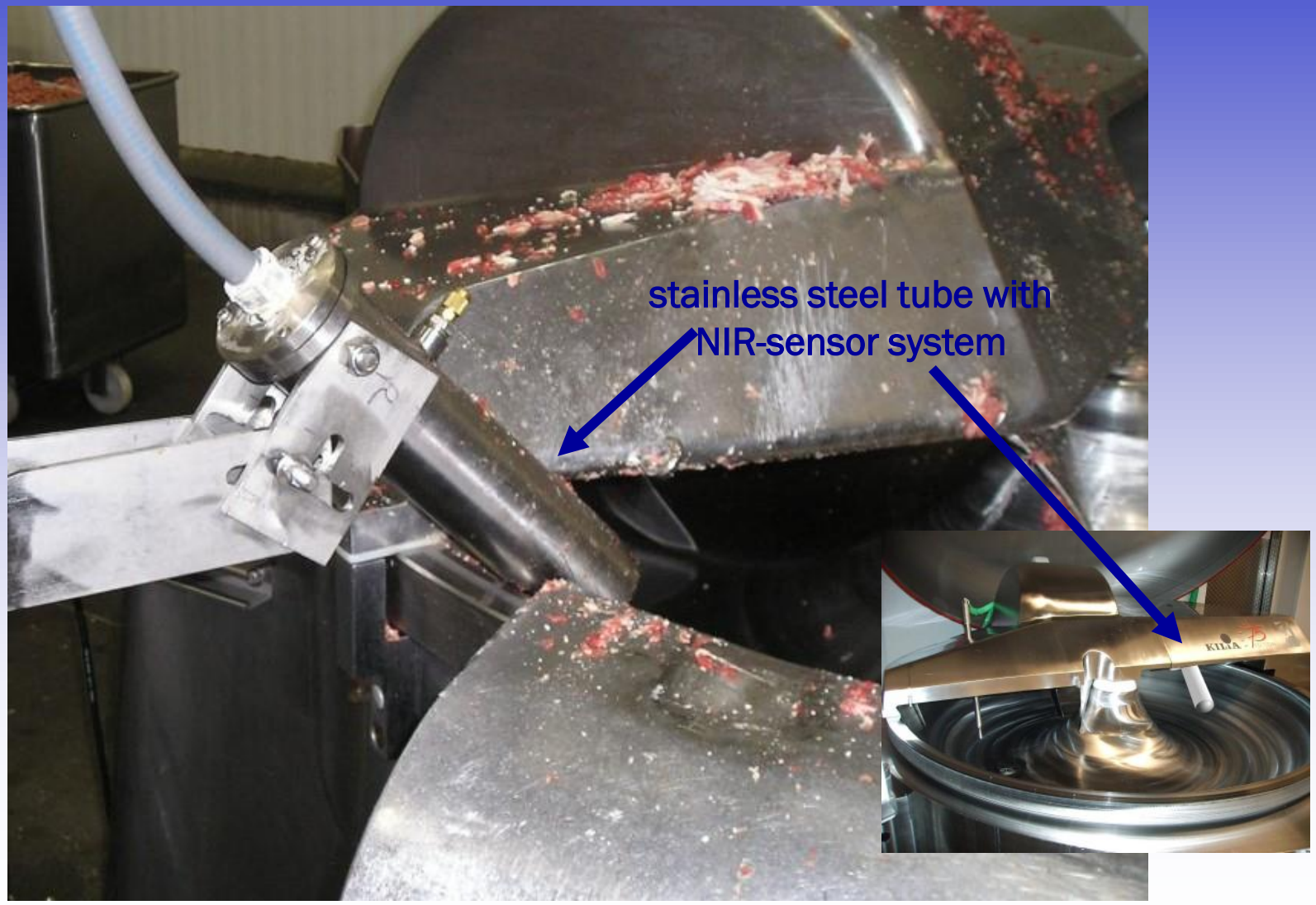
tank-cell



NIR-sensor system

applications / example 2

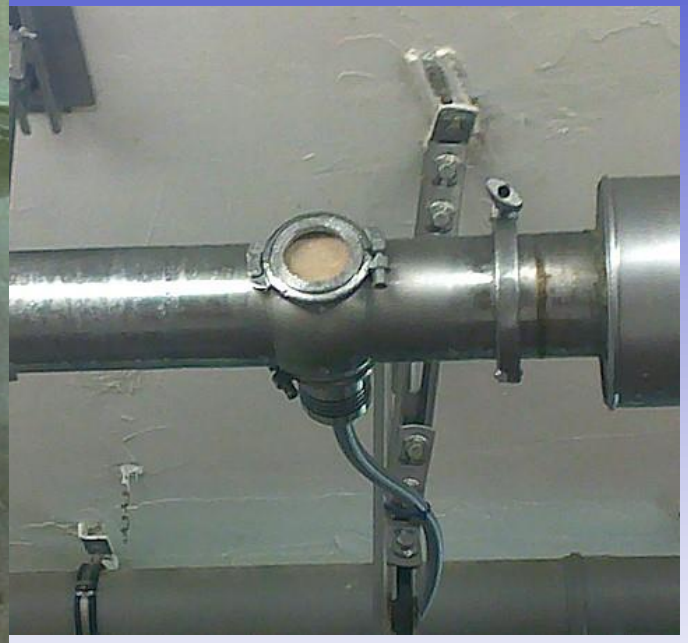
application cutter

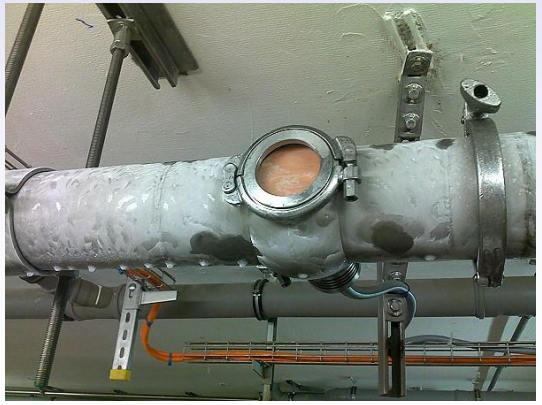


applications / example 3

application pipe

flow cell with
NIR-sensor system



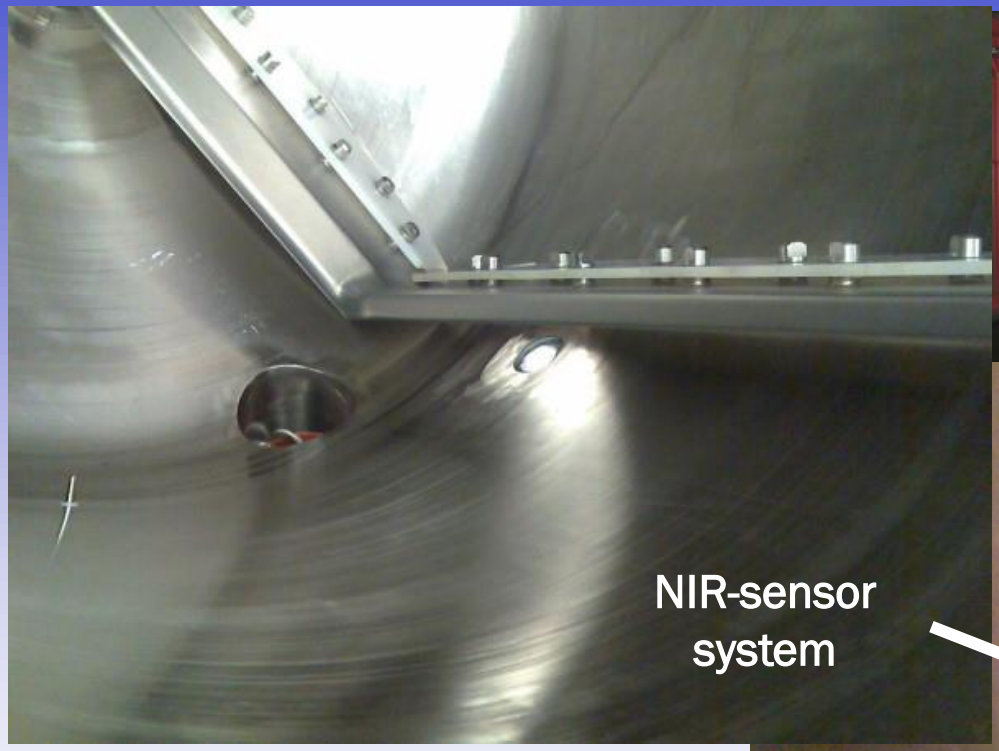


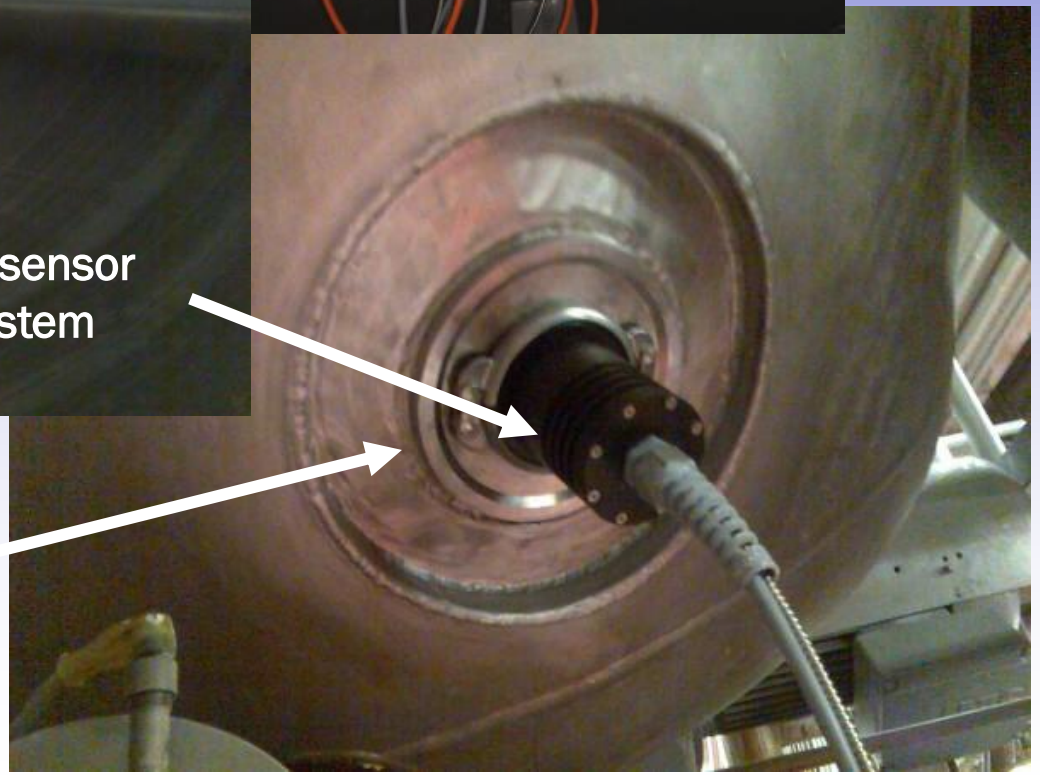
applications / example 4

application tumbler

applications / example 5

application hot blender





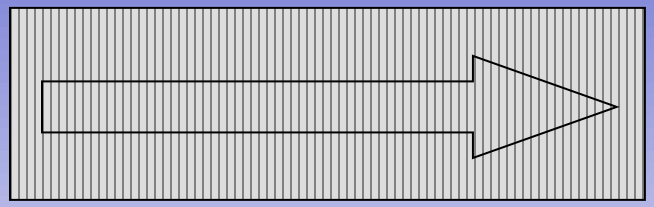
NIR-sensor system

tank cell

NIR- Spectrometer HK4

Production

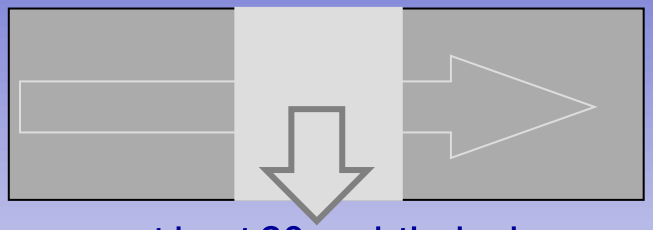
9 scans in 250ms
scan time in volume flow
no influence by colour variation



average determination
out of 9 scans

Laboratory-Reference

at least 30 samples for each
Product (i.e. chemical method)
From a i.e. 4t blender at least 4 removals are processed for one sample.
no influence by colour variation



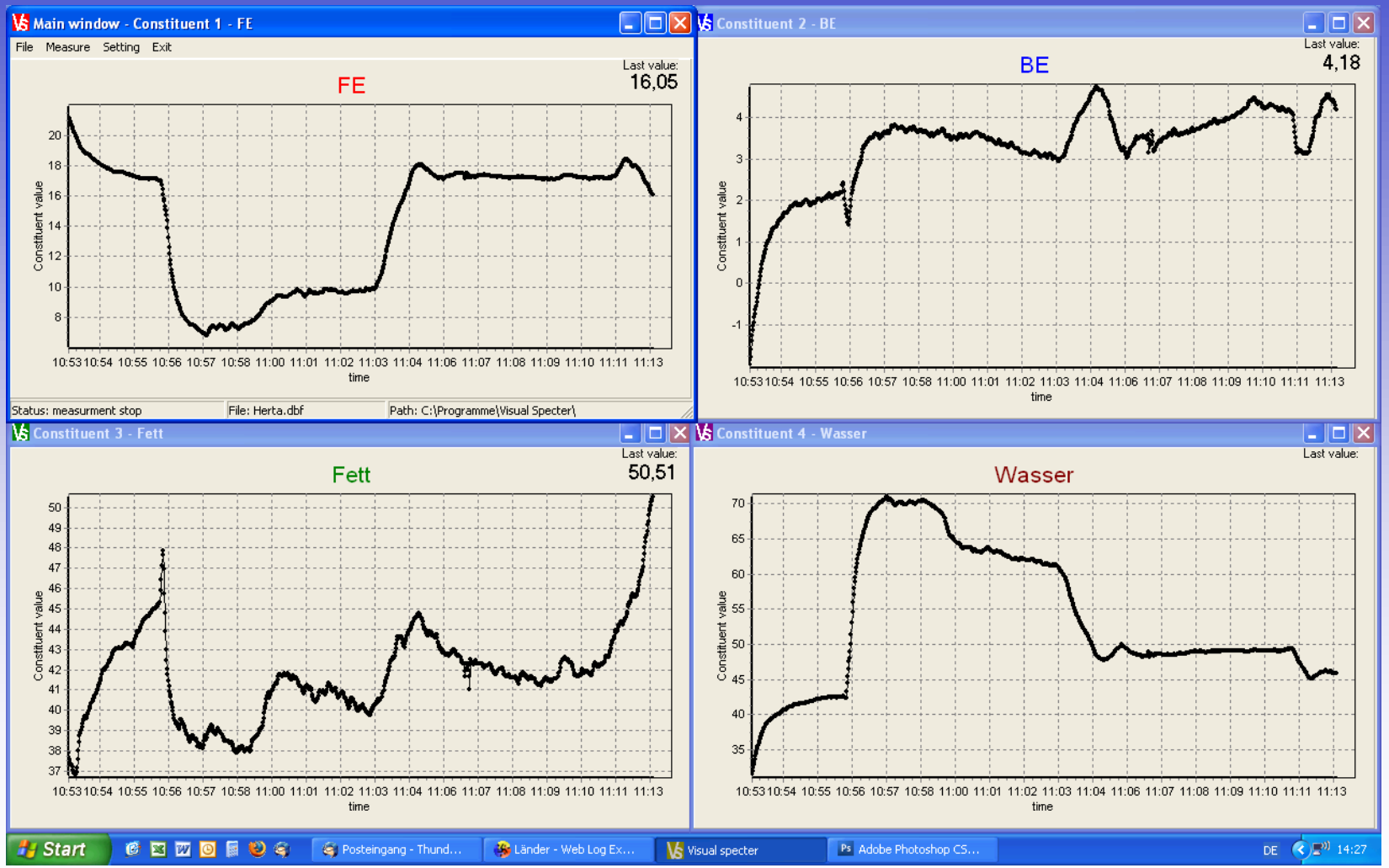
at least 30 analytical values
for each product

calibration spectra

Samples are taken out of the production line!

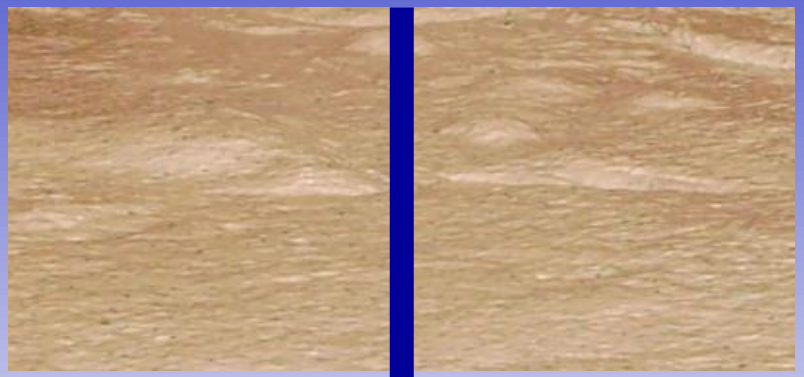
Online-trend indication

HK-VisualSpecter



Display, calculation, archiving

Blender-Cutter / sausage meat



PCS

dosages

quantities

continuous average values

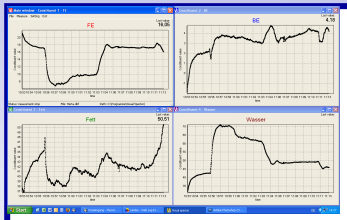
waterer %
fat %
protein %
collagen %

analogue signals (0/4-20mA)

digital

scope of supply
Harrer & Kassen

sensor system
HK4



VisualSpecter

	current	total
water	57,4	58,3
fat	25,9	24,7
protein	13,1	13,4
collagen	2,1	1,8

calculation: BEFFE / add water / collagen-value / water-protein-proprtion

HK4

measured data / optical fibre cable

further processing / sausage meat

Performance Features HK4-2

4 constituents / analogue outputs
high availability because of 4
halogen bulbs
lifetime halogen bulbs: ca.2 years
change of lamps: no new calibration necessary
Measurement also in case of blackout by 3 of 4
hologen bulbs

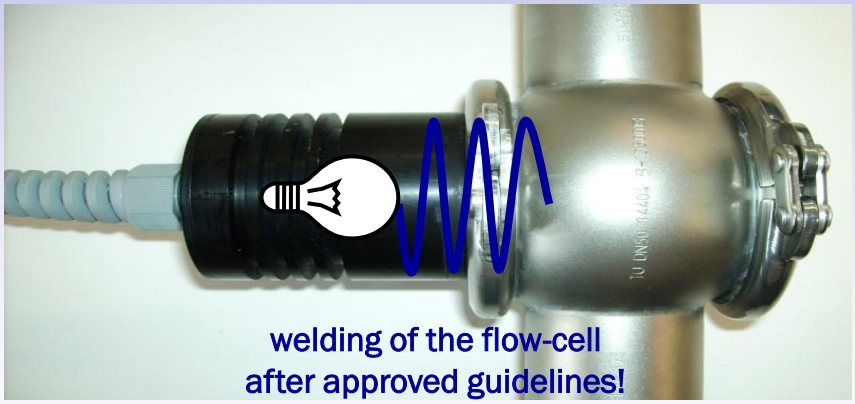
standardisation

colour differences / - variations have no influence on the measurement
distance variations to the product can be calibrated
lamp ageing will be compensated

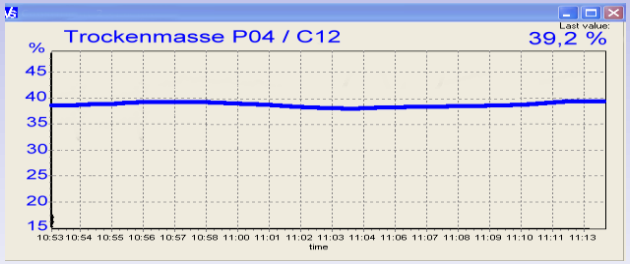
contactless online-analysis of meat- & sausage products! No sampling required during online-measurement!

maximum 16 product-constituent-combinations:
Calibrations i.e. for
- water, protein, collagen, fat

installation by client



welding of the flow-cell
after approved guidelines!



data communication

RS232	RS485
appr. 100m	appr. 10km
data transfer PC SW-integration	network Ethernet / intranet

Customer´s benefit

Reliable trend indication of water-, fat-, protein- and collagen content for every product during the whole production.

Reliable recording of the „actual values“ for every product all over the daily production.

Analysis of water-, fat-, protein- and collagen content in realtime and not after hours or days.

Definite results to control the sausage production process! Calculation of BEFFE and other important figures.

Establishment of audit approved statistics orientated to brands, products and/ or clients.

Compensation of the daily laboratory analysis for production control.

Savings through prevention of an „overspill“ production.

NIR- Spectrometer HK4

Technical Data

Environmental temperature	-20° C to +35° C
Product temperature	0° C to +130° C
Product pressure	≤ 10bar
Principle	NIR-/ Reflection measurement
Lifetime halogen bulbs / MTBF	2 years
Measure value / Constituents	1-4 constituents (fat, protein, ...)
Analogue outputs	4 x 0/4 – 20mA
Stainless steel housing evaluation unit	300 x 500 x 167mm
NIR-sensor system	Stainless steel / optical fiber to evaluation unit
Calibration	Specter (chemo metrical Calibration-SW)
PC- interfaces	Serial RS232 or RS485
Ambient light	No influence
Product color	No influence
Protection supply	85 – 270 VAC
Protection class	IP67

Thank you

for your attention !

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