

### RAW MATERIAL

Innovation and inspired synergy

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#### **INNOVATION AND INSPIRED SYNERGY**

The great OCS product range supports and matches individual requirements of polymer plants and the converting industry and reflects our fascination for new and pioneering technologies. Applied in the laboratory or during the production our customised measurement devices set quality control and quality assurance to a new level.

Our raw material inspection systems are the solution for optical, physical, chemical and rheological analysis and guarantee best polymer quality in the fields of polymerisation, processing and application.



#### **FILM INSPECTION**

Cast Film Line | Blown Film Line | Calender & Tape Cleanliness Analyser |
Surface Smoothness Analyser SSA | Measuring Extruder ME |
Modular Film Analyser MFA | Film Surface Analyser FSA100 V2 |
Tape Analyser XTA100 | On-line Additive Measurement Aplairs |
Film Thickness Measurement FTM | On-line Haze Measurement OHM |
On-line Gloss Measurement OGM

#### **PELLET & POWDER INSPECTION**

Pellet Scanner XP7 |
Pellet Scan PS200C | Pellet Scan PS800C |
Pellet Scan PS25C | Pellet Size & Shape Distribution PSSD |
Colour Measurement CM2 | Pellet Analyser PA66 |
Pellet Transport System PTS | Powder Testing PT2C

### RHEOLOGICAL, PHYSICAL & CHEMICAL PROPERTY ANALYSERS

Pelletizer | Filter Pressure Test ME FT |
On-line Rheometer OP5 |
Full Notch Creep Test FNCT |
Sample Testing ST4 |
Multiple Plaque Analyser MPA100 |
Liquid Analyser LA20 |
Remote Control Function |
Return on Investment (ROI)



# • FILM INSPECTION

### **CAST FILM LINE**

The OCS Cast Film Line produces high-quality flat film and is given the option to detect and measure optical and physical properties. All settings and parameters are stored in the touch panel control system, which guarantees the reproducibility of the film at any time. Devices for detecting gels, contaminations, degradations as well as measuring haze, gloss, density and additives can be attached to the line.

#### **BASIC COMPONENTS**

- Measuring Extruder ME 20, 25, 30, 40, 45 mm with cast film fix lip & flex lip die 20, 50, 100, 150, 300 mm
- Modular Film Analyser (MFA)

#### **ADDITIONAL COMPONENTS**

Film Surface Analyser FSA100 V2 |
Tape Analyser XTA100 | Surface
Smoothness Analyser SSA |
On-line Additive Measurement Aplairs |
Film Thickness Measurement FTM |
Haze Measurement OHM |
Gloss Measurement OGM | Pelletizer |
Pellet Transport System PTS |
Remote Control Function

#### PERFORMANCE CHARACTERISTICS

- Modular architecture for simple adaptation of additional measurement equipment
- Operation via touch panel with data trending as well as optical and acoustic alarm functions
- Several options for data communication
- Easy exchangeability of all parts for simple maintenance and cost reduction





#### **BLOWN FILM LINE**

The Blown Film Line produces high-quality blown films for the measurement of impurities, haze, gloss, density and other characteristics. Adjustable grids and Teflon coated rolls convert the film bubble into a flat layer film while guiding rolls prevent wrinkles. An opical device measures and controls the width of the flattened film and the diameter of the film bubble automatically. The tower height is electrically driven and adjustable.

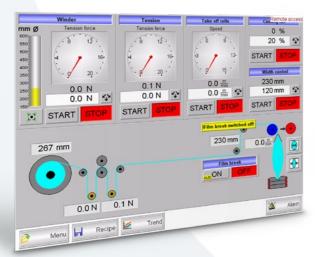
All parameters of the system, e.g. extruder speed, temperature, haul-off speed, film width, film bubble ratio, etc. are stored in the touch panel control system, which guarantees the reproducibility of the film quality at any time.

#### **BASIC COMPONENTS**

- Measuring Extruder ME 20, 25, 30, 40, 45 mm with blown film die 30, 50, 75 mm
- Modular Film Analyser & Blown Film Tower (MFA-BFT)

#### **ADDITIONAL COMPONENTS**

Film Surface Analyser FSA100 V2|
Tape Analyser XTA100 | On-line Additive
Measurement Aplairs | Film Thickness
Measurement FTM | Haze Measurement
OHM | Gloss Measurement OGM |
Pellet Transport System PTS |
Remote Control Function



#### **TECHNICAL DATA BFT**

- Die diameter 30/50/60/75/80 mm, others on request
- Die gap 0.5 / 0.8 / 1.2 mm, others on request
- 8 channel melt distribution
- Blown-up film diameter max.
   180 / 240 mm
- Flattened film width max.
   280 / 380 mm
- Haul-off speed 0-15 m/min (optional 30 m/min)
- Haul-off force 0-20 N
- Power supply
- 400 VAC 3 phase + N + PE | 50/60 Hz | 3 kVA
- Size dimension
- BFT: (l x w x h) 1820, 820 x 2200-3200 mm
- Working height adjustable from 1100 mm
- · Weight approx. 500 kg

#### **PERFORMANCE CHARACTERISTICS**

- Electrically driven tower to adjust the operation height
- Automatic bubble diameter measurement and control according to the set film width
- Modular architecture for simple adaptation of additional measurement equipment
- Operation via touch panel with data trending as well as optical and acoustic alarm functions

- Filter Pressure Test ME FT20, ME FT25
- Remote Control Function
- Device interface
- Ethernet 10/100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible



### CALENDER & TAPE CLEANLINESS ANALYSER MFA-TCA

The Calender & Tape Cleanliness Analyser is specially developed for the wire and cable industry. When the extruded tape passes the three calender rolls which are placed on top of each other, it is pressed and cooled through a defined gap. The high resolution digital CCD-line scan camera detects metals, gels, black specs, degradations and other contaminations.

Detected contaminations can be marked by a Label Printer or Laser Marker; the tape will be chopped to small strips, contaminated strips will be sorted for further analysis. The equipment and its parameters are controlled via TFT Touch Panel.

#### **BASIC COMPONENTS**

- Measuring Extruder ME 20, 25, 30,
   40, 45 mm with flat film die 50 100 mm
- Calender MFA (Modular Film Analyser)
- OFC100 Online Film Cutter and Sorter

#### **ADDITIONAL COMPONENTS**

Film Surface Analyser FSA100 V2|
Tape Analyser XT100 | On-line Additive
Measurement Aplairs | Film Thickness
Measurement FTM | Haze Measurement
OHM | Gloss Measurement OGM |
Filter Test | Label Printer/Laser Marker

#### **TECHNICAL DATA**

- Calender MFA
- Three synchronous drive units with servo controllers
- Diameter 137 mm, width 140 mm, working width 100 mm
- Stainless steel, chromium-plated or anti-stick coating
- Production speed of up to 10 m/min
- Gap size adjusting 0.1 2 mm
- Temperature 5-85 °C (optional up to 150 °C)



# SURFACE SMOOTHNESS ANALYSER SSA

At first the extruded tape passes a specially developed chill roll which leads the tape to a camera. During that process the Surface Smoothness Analyser measure pips and other surface irregularities with the help of reflecting light.

The pips can then be marked by a Label Printer or a Laser Marker, showing their position, height, base diameter and half diameter, herafter the film will be chopped to small strips, contaminated strips will be sorted for further analysis. The equipment and its parameters are controlled via TFT Touch Panel.

#### **BASIC COMPONENTS**

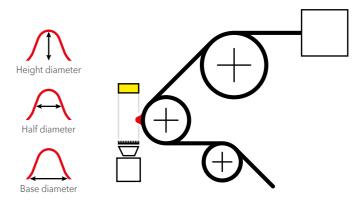
- Extruder type ME 20, 25, 30, 40, 45 mm with flat film die 50 – 100 mm
- Modular Film Analyser PM MFA
- Surface Smoothness Analyser SSA
- Online Film Cutter and Sorter OFC100

#### **ADDITIONAL COMPONENTS**

Film Thickness Measurement FTM | Label Printer/Laser Marker | Pellet Transport System PTS

#### **TECHNICAL DATA**

- Surface Smoothness Analyser (SSA)
- Diameter 137 mm, width 220 mm, working width 50 mm
- Material
- Stainless steel
- Chromium-plated or anti-stick coating
- Surface Smoothness Analyser (SSA) camera
- 1 µm resolution for pip height
- 10  $\mu m$  resolution for base- and half-diameter
- Reflection LED light



SSA

# MEASURING EXTRUDER ME 20, 25, 30, 40, 45

The Measuring Extruder is developed for the production of narrow films for laboratory and small-batch productions to simulate production lines.

The system is controlled via TFT Touch Panel for easy equipment parameter settings and recipes. Furthermore the optional Remote Control Function enables the operator to display and control the unit from different locations.

An automatic swiffle system enables the user to clean the extruder cylinder, die and screw. Hereafter the extruder automatically returns to its exact setting position to simulate the same condition as during production.

#### **PERFORMANCE CHARACTERISTICS**

- Modular architecture for simple adaptation of additional measurement equipment
- Operation via touch panel with data trending as well as optical and acoustic alarm functions
- Temperature zones controlled by self-optimising PID controllers
- Simple data and recipe handling
- Process synchronisation links the extruder to external measurement units



#### **MODULE COMPATIBILITY**

All OCS extrusion lines | Pelletizer

#### **TECHNICAL DATA**

- Drive technology
- Synchronous servo motors
- 2.8 kW, 5.8 kW, 9.1 kW
- Speed range 0.2 150 rpm
- Max. torque 120, 300, 500 Nm
- Screw (individual configuration)
- Special steel, ionitrided
- Barrel diameter 20, 25, 30, 40, 45 mm
- Temperature zones
- Setting range 0 380 °C
- Temperature sensors type FeCuNi, type J
- Power supply
- 400 VAC 3 phase + N + PE | 50/60 Hz | 10/17/20 kVA
- Dimensions
- (l, w, h) 1500, 800, 1650 mm
- Weight approx. 450 kg

- Filter pressure test ME FT20, ME FT25
- Remote Control Function
- Device interface
- Ethernet 10/100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0

- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible



### MODULAR FILM ANALYSER MFA | MFA-BFT | CALENDER MFA

The Modular Film Analyser MFA has been specially developed to meet the requirements of polymer raw material producers in the laboratory and on-line. The system consists of two chill rolls with controlled drive, several guidance rolls, a haul-off station with two rubber-nip rolls followed by a central pneumatically expandable winder.

The whole system is controlled via TFT Touch Panel for equipment parameters, a digital and manual rotation adjustment, film tension control and speed control easily. The MFA is also equipped with a film break sensor and a film direction detector supporting the safety and alarm function. Electrostatic discharging of the winder with ionised air is available.

#### PERFORMANCE CHARACTERISTICS

- Modular architecture for simple adaptation of additional measurement equipment
- Operation via touch panel with data trending as well as optical and acoustic alarm functions
- Safety clutch for all drives guarantees safe operation

#### **MODULE COMPATIBILITY**

All OCS extrusion lines | Film Surface Analyser FSA100 V2 | Tape Analyser XTA100 | On-line Aplairs | Surface Smoothness Analyser | Film Thickness Measurement FTM | Haze Measurement OHM | Gloss Measurement OGM



#### **TECHNICAL DATA**

#### Drive technology

- Three servo drive units with servo controllers
- Rating: 0.25 kW
- Production speed: up to 15 m/min (optional 30 m/min)

#### Chill rolls

- Working width: 200, 300, 400 mm
- Material: stainless steel chromiumplated or anti-stick coating
- Temperature range: 5-85 °C optional up to 150 °C

#### Winder

- Shaft: 150 mm
- Film roll diameter: up to 600 mm

#### Power supply

- 400 VAC 3 phase + N + PE | 50/60 Hz | 1 kVA
- Size dimension
- MFA: (1 x w x h) 1820 x 820 x 1680 mm

#### **OPTIONAL**

- Remote Control Function
- Device interface
- Ethernet 10/100 BASE T

#### Customer interface per industrial computer (Windows OS)

- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/O
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible



14-15 MFA MFA-BFT

### FILM SURFACE ANALYSER FSA100 V2 | FSA200 V2

The Film Surface Analyser FSA100 V2 is a modified modular surface inspection system which can be used in laboratories or during production. The film quality is assessed opto-electronically by means of a high resolution line scan camera (or full color camera FSA200 V2) and a special high power LED light source which allows an optimal defect detection in transparent, opaque, dyed such as non-transparent plastic films.

Special: The combination of XTA100 (X-Ray) and FSA100 V2 (optical) allows extended classification options to define the nature of the defect.

#### **PERFORMANCE CHARACTERISTICS**

- Modular architecture for simple adaptation of additional measurement equipment
- Individually calibrated lighting technology
- Real-time defect analysis with result presentation in various options
- Transparency measurement

#### **MODULE COMPATIBILITY**

Cast Film Line | Blown Film Line | Calender/Tape Test Equipment



#### **TECHNICAL DATA**

- 3CMOS line scan camera, resolution from 5  $\mu$ m, 25  $\mu$ m 50  $\mu$ m standard resolution
- Larger inspection range
- LED lighting
- Flexible adjustment of the device holder
- Comparability of measurement results (FSA V1 / FSA V2)
- Device interface
- Ethernet 10/100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible
- Teach-in function through intelligent fuzzy and neuronal network technology
- Power supply
- 115/230 V | 50/60 Hz | 1.5 kVA
- Size dimension
- (I x w x h): 350 x 150 x 150 mm
- · Weight approx. 10 kg

### TAPE ANALYSER WITH X-RAY TECHNOLOGY XTA100

The OCS Calender & Tape Test equipment is specially developed for the wire and cable industry and now additionally offers X-Ray technology, named XTA100. First, the extruded tape is calendered and cooled from both sides by the special chill roll unit of the modular tape analyser. The XTA100 enables detection of defects absorbing X-Ray (e.g. metal particles).

Special: The combination of XTA100 (X-Ray) and FSA100 V2 (optical) allows extended classification options to define the nature of the defect.

#### PERFORMANCE CHARACTERISTICS

- High-resolution from 20 µm
- Advanced particle classification due to combination of optical and X-Ray inspection
- Usable as a full protective device (DIN 54113)
- Easy operation by slidable measuring unit
- Easy access to all components
- Real-time results displayed in various forms

### On-line FT-Infrared Spectroscopy System APLAIRS®

APLAIRS® (Analysis of Plastics by InfraRed Spectroscopy) is a spectroscopic technology to measure real time additives, co-monomer composition as well as chemical and physical properties during the production of the base resin. Many customers have established a whole range of QC predictions with a better precision and a faster analysis time with only one APLAIRS® unit. The system provides control and safe guidance of various processes, labour costs are reduced significantly and the technology provides a powerful tool for root cause analysis. Typically the investment of one APLAIRS® unit is paid off in less than one year.

#### **MEASURING PRINCIPLE**

A continuous flow of cast or blown film runs through a special infrared sampling section of the APLAIRS® system, which is equipped with an FTIR spectrometer and controlled by dedicated software. The morphology and chemical information concealed in the spectra can be abstracted by APLAIRS® and linked with physical test data. In addition, it is possible to determine the composition and thickness of different layers in co-laminates.

#### **APLAIRS® EVALUATION SYSTEM**

The APLAIRS® software is an essential part of the technology package as it provides the application and prediction of calculated multivariate calculation models. Furthermore, full automated computer controls spectral

acquisition, background recording, instrument control, perfomance monitoring, alarming function and computer interfacing with the process host.

#### **PERFORMANCE CHARACTERISTICS**

- New spectrum data every 3 minutes
- Robust and extremely precise FTIR spectroscopy in an industrial process environment
- Conventional as well as multivariate based analysis can be applied in the software
- Operation via touch panel with data trending as well as optical and acoustic alarm functions

#### **MODULE COMPATIBILITY**

All OCS extrusion lines

#### **FIELDS OF APPLICATION**

- Material i. e. LDPE, LLDPE, HDPE, PP, ABS, PS, PET, EVA, PC
- Additives i.e. antioxidants, slip agents, UV-absorbers, stabilisers, fillers, processing aids, etc.
- Physical properties i.e. the density in polyolefin, thickness, etc.



# FILM THICKNESS MEASUREMENT FTM

The FTM system was designed for the continuous thickness measurement of running film strips using OCS extrusion lines.

The film runs between a fixated wheel and a variably adjustable wheel which can be controlled independently. The film is analysed due to the distance between both wheels and seized by the connection of a sensor and the movable wheel. The FTM is optimally installed in one of OCS extrusion lines.

#### **PERFORMANCE CHARACTERISTICS**

- Continuous thickness measurement on running film
- Distance measurement by incremental measuring sensor
- Simple control via VFD-display with 4 control buttons
- Modular architecture for simple adaptation of additional measurement equipment

#### **MODULE COMPATIBILITY**

All OCS extrusion lines

- Remote Control Function
- Device interface
- Ethernet 10 / 100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible



# ON-LINE HAZE MEASUREMENT OHM

During the haze and transparency measurement on running film strips, the measuring unit operates according to ASTM D 1003. The light source generates a parallel light beam, which strikes the sample along the entrance of an integrated sphere. The scattered and the full light let through is measured with the help of the integrated sphere and a sensor. The ratio of these values is given as the percentage transmission value.

#### PERFORMANCE CHARACTERISTICS

- Haze and transmission measurement during running production
- Operation via touch panel with data trending as well as optical and acoustic alarm functions
- Signal processing by use of modern lock-in amplifier technology

#### **MODULE COMPATIBILITY**

All OCS extrusion lines

#### **TECHNICAL DATA**

- Measurement area Ø 22 mm
- Accuracy  $\pm$  0.2%
- Range haze 0 100 %
- Range transmission 0 100 %
- Spectral adaptation
- CIE standard spectral value function V

   (λ) under standard light type C
- Device interface
- Ethernet 10/100 BASE T MODBUS TCP protocol
- Power supply
- 115/230 VAC | 50/60 Hz | 1.5 kVA
- Size dimension
- (I x w x h) 275 x 220 x 630 mm
- Weight approx. 25 kg



### ON-LINE GLOSS MEASUREMENT OGM

The On-line Gloss Measurement system OGM is designed for everlasting and precise control of film gloss properties and is used in laboratories as well as on-line. It detects the particular gloss characteristics of films by using their differential ability to reflect light. A special LED lighting unit illuminates the running film while a photodetector collects the beams of coherent light which is glossed back.

The measured amount of gloss from matt to lustrous is specified in GU (Gloss Units).

The measurement process is automatically controlled by background measuring and calibration and certified under ASTM D 523, DIN 67530, EN 14086, ASTM D 2457.

#### PERFORMANCE CHARACTERISTICS

- Measurement during running production
- Integrated automatic calibration

#### **MODULE COMPATIBILITY**

All OCS extrusion lines

#### **TECHNICAL DATA**

- Measuring
- 60°: DIN 67530
- 45°: EN14086
- 45°: ASTM D2457 (0-150 GU)
- Range 0 200 GU
- Area 3 cm
- Indicators resolution 0.1 GU
- Averaging 1-50 s
- Detector
- Silicon photo detector with spectral evaluation
- Device interface
- Ethernet 10/100 BASE T MODBUS TCP protocol
- Power supply
- 115/230 VAC | 50/60 Hz
- Size dimension
- (I x w x h) 160 x 320 x 320 mm
- Weight approx. 13 kg





### PELLET SCANNER WITH X-RAY TECHNOLOGY XP7

The new XP7 X-Ray Pellet Scanner opens up new ways to detect metal defects, resulting in improved polymer and product quality. The innovative X-Ray technology in the XP7's measurement system continuously records pellet stream images. Due to the different absorption of the X-Rays in the metal and in polymer, the embedded metal particles can be captured with a resolution of 50  $\mu$ m. Contaminated granulates are sorted out by a multilane air nozzle rejection system.

#### PERFORMANCE CHARACTERISTICS

- High-resolution X-Ray of 50 μm
- High speed throughput of up to 600 kg/h depending on pellet properties
- Especially designed for detecting metal defects in pellets
- Contamination per seconds regulation Usable as a full protective device (DIN 54113)
- Real-time results displayed in various forms



#### **TECHNICAL DATA**

- Resolution 50 μm
- Temperature zone: 10°C 40°C
- X-Ray system
- X-Ray tube:
  - Specification max: 75 kV, 1000 W - Operated @: 25 kV, 300 W
- High-voltage generator:
  - Specification max: 30 kV, 300 W
  - Operated @: 25 kV, 300 W
- X-Ray tube water cooling:
  - Cooling capacity: 1000 W
  - Water flow: >5,0 l/min @ 4bar
  - Flow switch opens: <4,0 l/min +/- 0,1 l/min
  - Maximum pressure: 6,0 bar
  - Operating temp.: +10°C..+40°C (use antifreeze if ambient temp. is below 10°C)
  - Storage temp.: -25°C..+70°C (store with antifreeze)

#### Device interface

- Ethernet 10/100 BASE T MODBUS TCP protocol
- Power supply
- 115/230 VAC | 50/60 Hz | max 1000 W | min. 6 bar dry oil-free instrument air
- Size dimension
- (I x w x h) 2642 x 692 x 1877 mm
- Weight approx. 650 kg



# PELLET SCAN PS200C

The PS200C inspection system is used to analyse opaque pellets on a rotary plate. Equipped with one colour line scan camera for higher accuracy of defect detection, the system provides high precise measurement of contaminations, discolorations and other impurities in different size classes and coloration.

The storage of analysis and permanent availability of measuring results and images assure excellent statistic measuring performance and ideal production and process control.

#### PERFORMANCE CHARACTERISTICS

- High performance 3CMOS color scan camera with up to a resolution of 55  $\mu$ m, high power LED lighting
- High speed throughput of up to 200 kg/h depending on resolution pellet properties (inspection on rotary plate)
- Real-time results displayed in various forms
- Detection of colored particles down to 55 μm

#### **TECHNICAL DATA**

- 3CMOS color line scan cameras
- Resolution of 55 μm
- Lighting
- High power LED white light spectrum
- Power supply
- 115/230 VAC | 50/60 Hz | max. 350 W Instrument air: 5 bar
- Size dimension
- (I x w x h) 1760 x 890 x 820 mm
- Weight approx. 100 kg

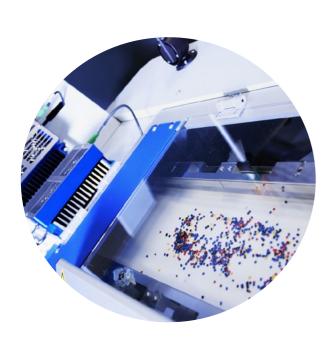


### PELLET SCAN PS800C

The PS800C inspection system is used to analyse transparent and opaque pellets in the free fall. Equipped with two colour line scan cameras for higher accuracy of defect detection, the system provides high precise measurement of contaminations, discolourations and other impurities in different size classes and colouration. Additional feature for the PS800C is a sorting unit for the contaminated pellets as well as the determination of the mixing ratio. The storage of analysis and permanent availability of measuring results and images assure excellent statistic measuring performance and ideal production and process control.

#### **PERFORMANCE CHARACTERISTICS**

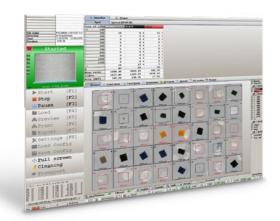
- Two high performance color line scan cameras with up to resolution of 50 μm
- High speed throughput of up to 1000 kg/h depending on resolution
- Especially designed for highly transparent pellets (Polycarbonate), opaque pellets and coloured pellets
- Real-time results displayed in various forms



#### **TECHNICAL DATA**

- Two 3CMOS color line scan cameras
- Resolution of 50 μm
- Lighting
- High power LED white light spectrum
- Power supply
- 115/230 VAC | 50/60 Hz | 1.5 kVA | Instrument air: 6 bar
- Size dimension
- (I x w x h) 2000 x 2600 x 800 mm
- · Weight approx. 550 kg

- Automatic material feeding via Pellet Transport System PTS
- Sorting unit with 18 flaps
- Remote Control Function
- Device interface
- Ethernet 10/100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, file transfer, PROFIBUS/PROFINET implementation to other fieldbus-systems possible





### PELLET SCAN PS25C

The PS25C inspection system is used to analyse transparent and opaque pellets. The testing material can be fed manually in a hopper or automatically by an on-line or a multi-hopper system. The pellets are transported on a vibrating channel passing the inspection zone, which consists of a high-resolution 3CMOS color matrix camera and a lighting unit.

The PS25C guarantees rapid monitoring and response to any occurrences such as impurities, foreign bodies, or colour deviations for an optimum adaptation in laboratories or measuring stations during production. All data are stored for later analysis and can be displayed in various forms.

#### **PERFORMANCE CHARACTERISTICS**

- High resolution camera from 10 μm
- Throughput of up to 25 kg/h depending on pellet properties
- Menu-controlled Windows interface and easy customisation
- Real-time colour image analysis displayed in various forms
- Adaption of CM2 and PSSD possible (PA66)



#### **TECHNICAL DATA**

- High-resolution 3CMOS color matrix camera
- Resolution 10, 20, 30, 40, 50, 60, 100 μm
- High power LED lighting
- Device interface RS232
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible
- Size dimension
- (I x w x h) 800 x 600 x 360 mm
- Weight approx. 45 kg
- Size dimension with table
- (I x w x h) 1260 x 600 x 1600 mm
- Weight with table approx. 150 kg
- Utilities
- 115/230 VAC | 50/60 Hz | 0.5 kVA | Instrument air: 5 bar

- Sorting unit to separate contaminated pellets
- Material feeding via Pellet Transport System PTS or Multi Hopper System
- Remote Control Function
- UV-lighting





# PELLET/POWDER SIZE & SHAPE DISTRIBUTION PSSD

The PSSD is a modular inspection system for rapid analysis and classification of the size and shape of granules. The pellets are transported and distributed by a vibrating table, for an individual measurement during the free fall, passing the camera and the light source, which are placed opposite each other.

Variations of the pellets shape, size, diameter, elongation, roundness, roughness and/or convexity are recorded in the measurement protocol and can be shown in a table or graph.

#### PERFORMANCE CHARACTERISTICS

- Real-time results displayed during measuring process
- Process synchronisation between the inspection system and external instruments
- Throughput of up to 18 kg/h

#### **TECHNICAL DATA**

- 3CMOS line scan camera, resolution from 20 µm
- Lighting
- Device interface
- Ethernet 10/100 BASE T



- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible
- Power supply
- 115/230 VAC 3 phase | 50/60 Hz | 1.5 kVA
- Size dimension
- (l x w x h) 1000 x 500 x 500 mm
- Weight approx. 60 kg

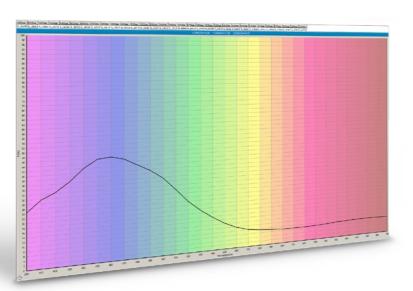


### COLOUR MEASUREMENT CM2

The CM2 system is an automatic colour measurement of polymer granules in the laboratory or during production process. The granules are carried in a special measuring channel while a colour spectrometer records and defines the colour spectrum of the granules. Hereafter the colour measurement results (X, Y, Z) are analysed and can be represented as yellowness index (YI), whiteness index (WI), CIE L\*a\*b\*, etc. The CM2 is usually part of the Pellet Analyser System PA66, which consists of Colour Measurement (CM2), Pellet Scan (PS25) and the Pellet Size & Shape Distribution (PSSD) systems.

#### **MODULAR COMPATIBILITY**

Pellet Analyser PA66 (PS25C + PSSD)



### PELLET ANALYSER PA66

The OCS Pellet Analyser measures various quality characteristics at the same time. Its modular concept allows the measurement of col ur spectrums (Colour Measurement CM2) impurities and contaminations (Pellet Scan PS25C) and pellet size and shape irregularities (Pellet Size & Shape Distribution PSSD) with in seconds after material feeding. Depending on customer requests the PA66 can be fed manually or with the Pellet Transport System PTS during production process.

The system is operated via external Windows interface, which automatically stores each production batch and all measurement results for later analyses.

#### **MODULAR CONCEPT**

- Colour Measurement CM2 (optional)
- Pellet Scan PS25C
- Pellet Size & Shape Distribution PSSD

#### **DETECTABLE DEFECTS**

Twins, triples, spikes, dog-bones, pellets with tails, dust, impurities, sharp edged pellets, colour spectrum, size, shape



### PELLET TRANSPORT SYSTEM PTS

The OCS Pellet Transport System PTS guarantees a full automatic transportation of pellets between the production lines and the measuring systems. The PTS uses hopper loaders with shutter valves for the extruder and a level sensor for sampling. The samples are transported through OCS stainless steel pipes with gafree flange connections, specified to avoid dust, angel hairs and streamers. A stand-by tank for purge and calibration material and a diverter valve for a starvation system are available.

#### PERFORMANCE CHARACTERISTICS

- Real-time response on parameter changing with short-time switch-over
- Absolute stable performance during production process
- Simple operation via touch panel with optical and acoustic alarm functions
- Individually optimised transport speed for each application

#### **MODULE COMPATIBILITY**

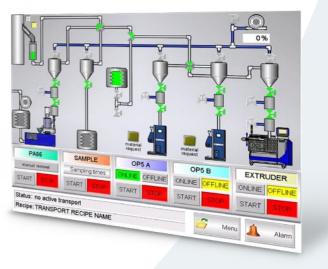
All OCS equipment

#### **TECHNICAL DATA**

- Transportation distance up to 400 m depending on the sample
- Multiple sample takers and consumers possible

#### **OPTIONAL**

- Remote Control Function
- Device interface
- Ethernet 10/100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible
- De-dusting device, dehydration device, temperature control



Pellet Analyser PA66 36-37

### POWDER TESTING PT2C

The OCS Powder Testing system PT2C counts and classifies contaminations for laboratory purposes or for on-line inspection. The system is capable of detecting discolored powder particles, foreign bodies and other irregularities. The contamination can be sorted into different customised defect classes with customised alarm limits.

The powder can be inserted manually, by a multi hopper system or directly from the production process via Powder Transport System. This allows faster response in order to prevent off spec production.

#### **PERFORMANCE CHARACTERISTICS**

- High resolution camera with up to a resolution of 10 μm
- Throughput of up to 300 g/h depending on powder properties
- Modular architecture for simple adaptation of additional measurement equipment
- Real-time color image analysis stored and displayed in various forms
- Menu-controlled Windows interface and easy customisation



#### **TECHNICAL DATA**

- 3CMOS color matrix camera with up to a resolution of 10µm
- Lighting
- High power LED lighting
- Device interface RS232
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP,
   OPC, file transfer, PROFIBUS/
   PROFINET implementation to other fieldbus-systems possible
- Power supply
- 115/230 VAC | 50/60 Hz
- Size dimension
- (I, w, h) 63 x 60 x 36 cm
- Weight approx. 30 kg
- Size dimension with Multihopper
- (I x w x h) 1140 x 720 x 960 mm

- Sorting unit to separate contaminated powder
- Material feeding via Powder Transport System PTS or Multi Hopper System
- Remote Control Function





#### **PELLETIZER**

The OCS Pelletizer controls and influences the quality characteristics of polymer such as additives, matrixes, master batch compounds, or size and shape for R&D and recycling studies.

The mixture of material can be fed via hopper to the extruder producing the required strad, which is then cooled down in the water bath and dried via air blower. Hereafter the pelletizer cuts the strand into pellets with new properties.

#### COMPONENTS

- Measuring Extruder ME 20, 25 or 30 mm diameter
- Screw with option of different compression ratios and mixing zones
- Strand die plate with 1 or 2 outputs of 3, 4, 5 mm or other diameter
- Stainless steel water bath with air blower dryer



#### **TECHNICAL DATA**

- Size dimension
- (I x w x h) 3260 x 730 x 1750 mm
- Weight approx. 600 kg

# FILTER PRESSURE TEST ME FT20, ME FT25

The OCS Measuring Extruder Filter Test determines the Filter Pressure Value (FPV), which is the increase of pressure in front of the screen filter, measured by time, as indication of the melt purity to optimise the general quality control of polymer.

The extruder melts and homogenises the test material, which is then delivered to the filter via a melt pump with a defined and constant volume flow. With this constant volume flow in front of the screen, the pressure increases and is recorded.

#### PERFORMANCE CHARACTERISTICS

- Automatic temperature decrease in alarm situation
- Synchronised pressure and melt temperature measurement
- All measured data is evaluated and stored for later analysis

#### **TECHNICAL DATA**

- Barrel diameter 20, 25, 30 mm
- 3 heating zones with thermocouples for barrel
- 4 additional heating zones for melt pump and adapter
- 3 cooling zones with low pressure blower
- Screw compression 1:1, 2:1, 3:1, 4:1 with and without mixing zone, other on request
- RPM: 0-150 rotation/min
- Torque: 120 Nm, 300 Nm, 500 Nm
- Drive technology
- Servo synchronous motor
- 2.8 kW, 5.8 kW, 9.1 kW
- According to standard DIN EN 13900-5



# ON-LINE RHEOMETER OP5

#### PLANT OPTIMISATION & IMPROVED PRODUCT QUALITY

The OP5 enables certified measurements of the Melt Index (MI) and/or polydispersity of polymer powder or pellet samples. The OP5 gives overall control of many types of polymerisation processes to specific formulations as well as quality control in final product specifications.

The OP5 is logically situated in the plant analysis laboratory, which ensures best reliability and maintainability. Representative samples are transported from each reactor stage and from the finished product at the call of each analyser. The real time between the sampling and the measurement is 5 to 10 minutes.

Melt flow measurements are performed after the solid sample is melted and conditioned to the appropriate test temperature. The OP5 melting process minimises any changes to the structure of the polymer by making a very rapid transition from solid to liquid, without the negative effect of an extruder screw. The MFR measurement is a patented process accomplished through an exact control of the melt flow, in combination with a high precise, self developed melt pressure measurement. This method achieves results of a typically Base 3 – Sigma level of +/-1%. Simple, systematic correlations are applied to compensate the relationship between the OP5 and the lab test (both ASTM D1238 and ISO 1133).

Therefore, the on-line rheometer performs accurate and precise MI measurements, which enhance quality control. The fast sampling substantially reduces the delay time between the lab and production.

These unique features of the OP5 equipment open up the huge opportunity of process control through rheology.

#### THREE STEPS OF THE OCS SOLUTION

- 1. Incorporation of rheology into process control
  - To stabilise the process
  - To achieve full-time calibration
- 2. Sampling from the reactor and finished products
  - To represent process at key points
  - To achieve rapid response
- 3. Integration of measurements into Advanced Process Control (APC)
  - To gain advantage of ongoing process optimisation

#### PERFORMANCE CHARACTERISTICS

- Real time results in 5-10 min
- Only one calibration file for complete reactor family, no re-calibration during transitions necessary
- Optimum location in laboratory environment
- Real-time display with data trending as well as optical and acoustic alarm functions

#### **TECHNICAL DATA**

- Melt flow range
- 0.05 1000 cm^3/10 min
- Test temperature up to 240 °C
- Repeatability
- Base 3-Sigma level of +/-1%
- Pellet / powder consumption approx. 0.6 kg / h
- Power supply
- 400 VAC + N + PE | 50-60 Hz | 3 kVA
- Instrument air: 6 10 bar | 300 NI/min
- Size dimension
- (I x w x h) 1200 x 600 x 2050 mm
- Weight approx. 350 kg

#### **OPTIONAL**

- Pellet / Powder Transport System PTS
- Remote control function
- Device interface
- Ethernet 10 / 100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible



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# FULL NOTCH CREEP TEST FNCT

The FNCT is a widely used method to classify polyethylene materials in regards to their slow crack growth behaviour under accelerated conditions: ESCR (Environmental Stress Cracking Resistance). Depending on the chosen test conditions, the sample is held to a certain temperature (up to 95 °C) while a steady tensile load is applied to the sample.

Around the defined circumferential notch the time of crazing, crack growth and finally brittle failure is measured. The different test conditions and parameters are summarised amongst others to ISO standard 16770 to classify the material.

#### PERFORMANCE CHARACTERISTICS

- 15 sample stations with independent force application and data recording
- pH-value measurement
- No time limit on test periods, time resolution: 1s (real time)
- Operation via touch panel with data trending as well as optical and acoustic alarm functions
- Stable chemical resistance through stainless steel metal



#### **TECHNICAL DATA**

- Load range
- 4-6 MPa on samples 10 x 10 x 100 mm (or 6-9 MPa on samples 6 x 6 x 90 mm)
- Force
- Resolution: indefinite, approved for 0.1 N
- Calibration accuracy: better than +/-1%
- Fluid volume approx.: 55
- Level control: stainless steel float sensors and solenoid valves
- Temperature range: RT to 95 °C
- Accuracy: 1°C
- Input pressure range for demineralised water supply
- 0.2 8 bar (3-116 psi)
- Power supply
- 230 VAC | 50/60 Hz | 3 kVA
- Size dimension
- (I x w xh) 1430 x 810 x 1130 mm
- Weight approx. 510 kg

- Remote Control Function
- Device interface
- Ethernet 10/100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible
- Extension with TCT system



### SAMPLE TESTING ST4

The Sample Testing system ST4 is a compact table unit analysing transparent and nontransparent surfaces such as plastics, steel, paper and textiles for irregularities and contaminations in a laboratory environment or R&D centres. The system can be operated in the transmission or reflection mode depending on the material, transparent / non-transparent or a combination of both.

#### PERFORMANCE CHARACTERISTICS

- Teach-in function to remember defined defect types for later analysis
- Easy accessible for maintenance and replacement of samples
- Open database to any standard file format

#### **TECHNICAL DATA**

- 3CMOS line scan camera, 25 μm / 50 μm
- Inspection width: 0,8-200 mm (adjustable)
- Inspection length: 0,8-400 mm (adjustable)

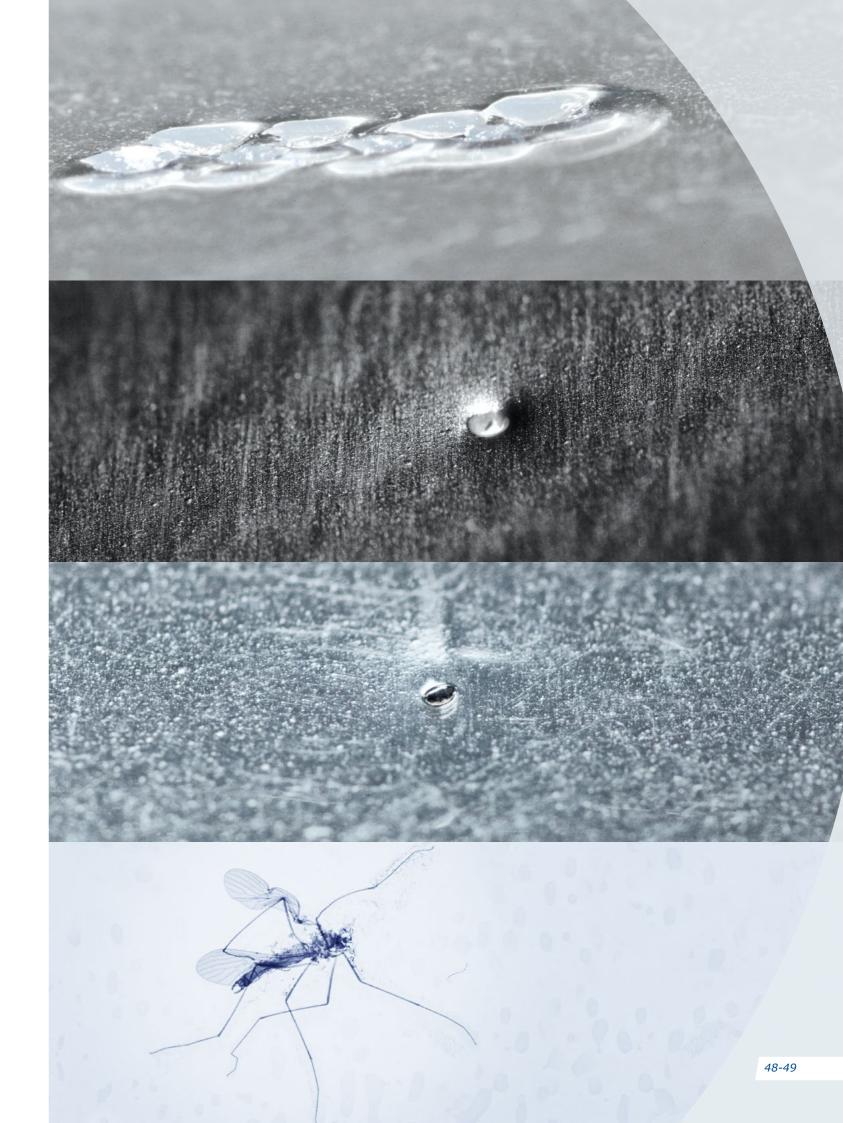
#### Lighting

- Special LED line construction
- Reflection, transmission or combined
- Lighting width: 250 mm (other on request)

#### Device interface

- Ethernet 10/100 BASE T
- Customer interface per industrial computer (Windows OS)
- 110/230 VAC | 50/60 Hz
- (l, x w x h) 850 x 500 x 720 cm





# MULTIPLE PLAQUE ANALYSER MPA100

The OCS MPA100 system is a compact table unit consisting of a special high-resolution camera and a special lighting unit to detect impurities on the surface of transparent and opaque plaques in the laboratory and R&D centres.

After the samples are fixed in the magazine (up to 20 flat blanks), a robot system automatically cleans each plate from dust and then places it in the measurement chamber. All images of the camera are analysed and stored by a special image evaluation software.

#### **PERFORMANCE CHARACTERISTICS**

- 20 independent plaques in one rotating magazine
- Flat blank cleaning of every sample through ionised air
- Real-time defect analysis displayed in various forms

#### **TECHNICAL DATA**

- 3CMOS area scan camera, resolution from 25 μm
- Inspection range: 36 x 24 mm (other on request)
- Special LED red flash light, reflection or transmission mode
- Diffuse matrix lighting (optionally)

- Device interface
- Ethernet 10/100 BASE T
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, SQL, file transfer, PROFIBUS implementation to other fieldbus-systems possible
- Power supply
- 110/230 VAC | 50/60 Hz | 16 A
- Size dimension
- (I x w x h) 950 x 500 x 600 mm
- Weight approx. 60 kg



### LIQUID ANALYSER LA20

The OCS Liquid Analyser counts and classifies contaminations in transparent liquid substances. The system is capable to detect particles, fibres and other contaminations and to classify them into different colour, size and shape classes.

The system consists of a dosing pump, which injects the liquid in-between a lighting and camera unit placed opposite to each other. With a high-performance image processing computer an unlimited number of adjustments for many different kinds of material can be defined and stored.

#### **TECHNICAL DATA**

- 3CMOS camera, resolution from 20 μm (other on request)
- High power LED white light spectrum
- Pump flow rate: 30 μl/min –
   2.7 l/min
- Power supply
- 115/230 VAC | 50/60 Hz | 0.5 kVA | instrument air: 2 bar
- Size dimension
- (I x w x h) 280 x 780 x 220 mm
- Weight approx. 30 kg

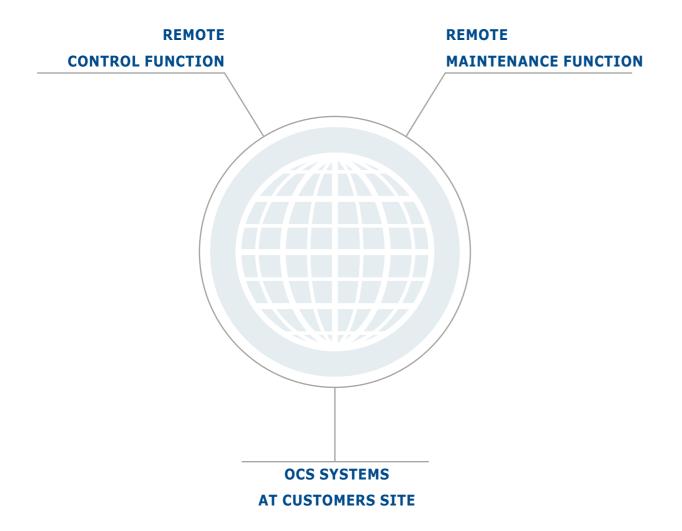
- Remote Control Function
- Customer interface per industrial computer (Windows OS)
- Ethernet 10/100/1000 BASE T, USB, RS 485, RS 232, digital and analogue I/0
- Communication protocol
- MODBUS RTU, MODBUS TCP/IP, OPC, file transfer, PROFIBUS/PROFINET implementation to other fieldbus-systems possible



# REMOTE CONTROL FUNCTION & REMOTE MAINTENANCE FUNCTION

The remote control function enables the customer to operate their OCS systems from all over the world. With the World Wide Web and newest technologies it is possible to handle settings fast and safe via diverse external devices.

With the remote maintenance function it is also possible to connect running OCS systems at customers' site with our professionals based in Witten, Germany, for an external allround support during operation and maintenance.



### RETURN ON INVESTMENT (ROI)

#### **IMPROVE QUALITY**

By constancy, on-time re-adjustment, alarm functions, fast reaction, remix/transition, general plant overview, error prevention.

#### **BE EXCELLENT**

OCS is an establishment of people passionate about quality, who share the ideas, talent and tools to optimise your process incredibly.

#### **SAVE COSTS**

With the prevention of ongoing contaminated batches during the running process, an investment in an OCS testing system generally pays off after less than one year.

#### **MINIMISE YOUR SCRAP**

The production performance is increased significantly, through real time analysis and their direct influence on the plant.

#### **THINK GLOBAL**

OCS as the global voice of quality offers services in 38 countries and growing, with flexible professionals and representatives at site.

# OCS - OPTICAL CONTROL SYSTEMS THE GLOBAL VOICE OF QUALITY





#### **OCS Optical Control Systems GmbH**

Wullener Feld 24 58454 Witten Germany

Fon +49 2302 95622 - 0

Fax +49 2302 95622 - 33

info@ocsgmbh.com www.ocsgmbh.com