

30. Hofer Vliesstofftage 2015

Advanced polymer film inspection systems
for process analysis and yield optimization
– full integration into the production

Presented by:

Dr. Michael Kohlert
Mondi Gronau GmbH

Oliver Hissmann
OCS Service GmbH

Contents

- Introduction
- Web Inspection Technology
- Integration within Mondi Gronau
- OCS Historical Data Manager
- Summary



Solutions for

- Polymer Industry
- Films & Converting Industry



More than 2.500 Inspection Systems installed worldwide

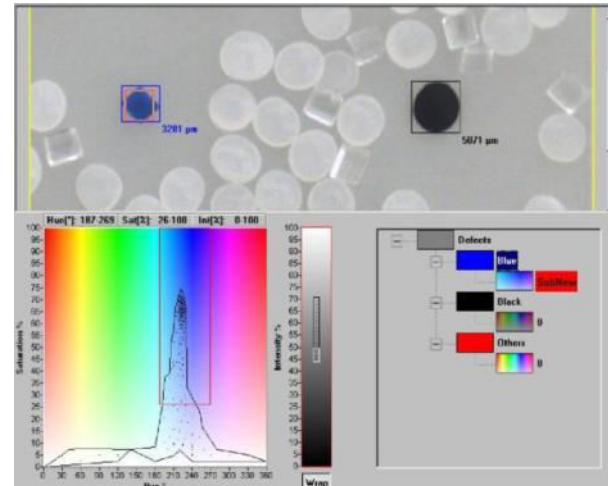
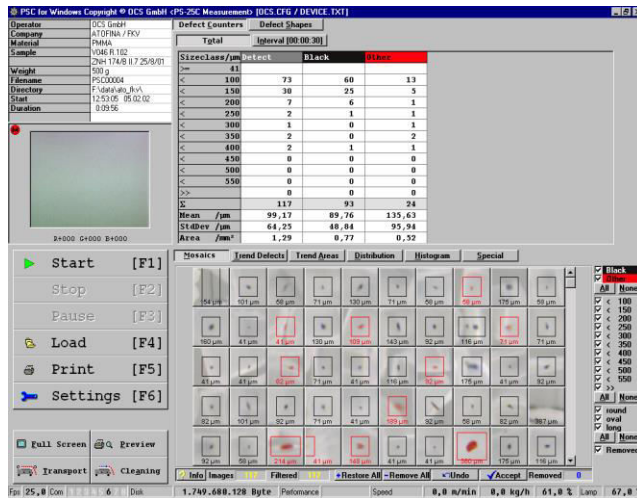
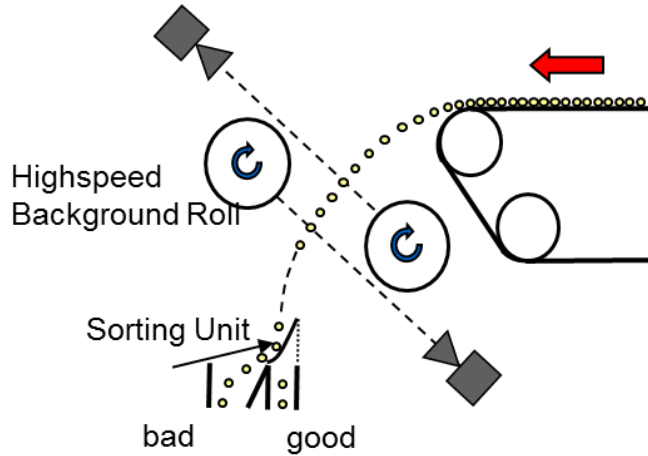
OCS Quality Control Equipment



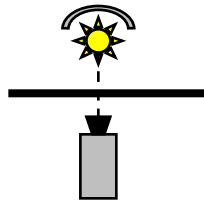
High speed pellet
scan system PS400C
Scans and sorts up to
800 kg/hour

Examples of our wide range of products

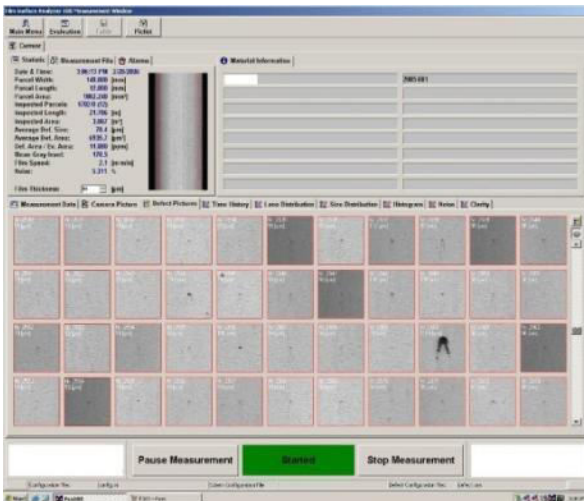
Pellet Analysis



Online Cast Line with Gel Counter

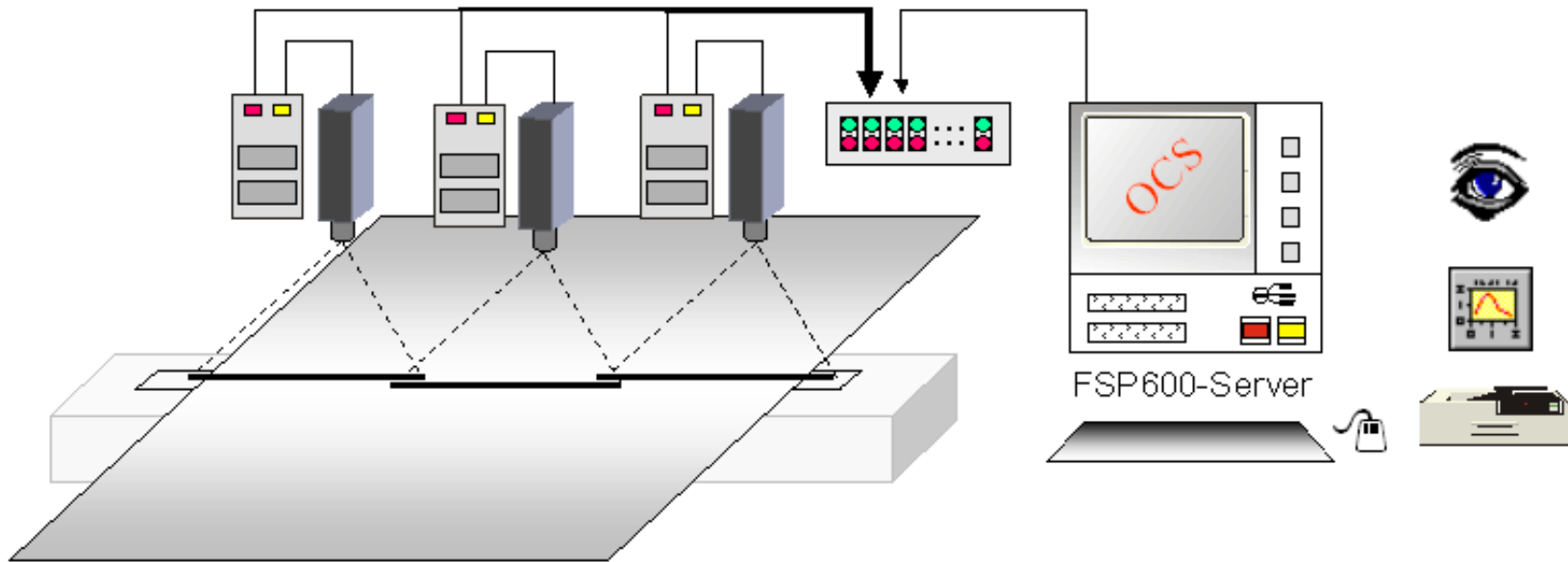


Transmission



Web Inspection System FSP600

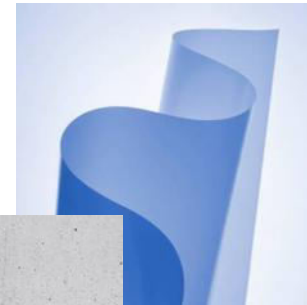
Embedded Multiple Camera Solution



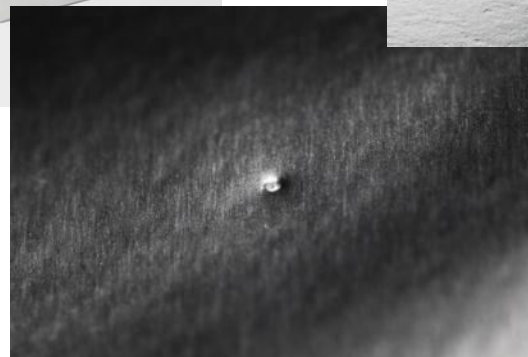
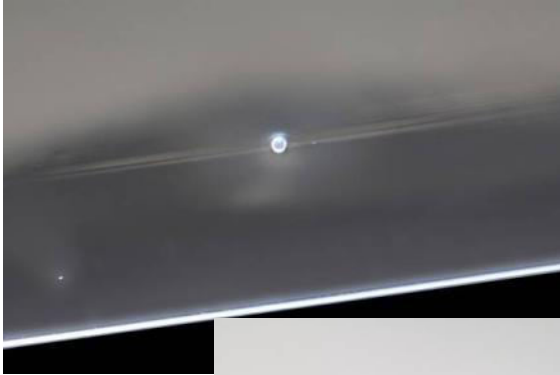
Web Inspection in Film Extrusion

100 % Optical Control of the Web

- Photo of every defect
- Position of every defect
- Database Interface
- Reports
- Alarms

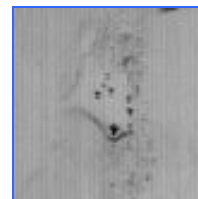
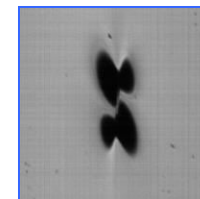
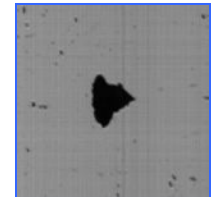
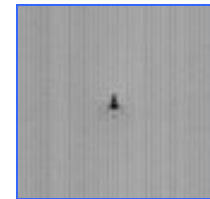
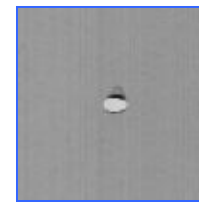
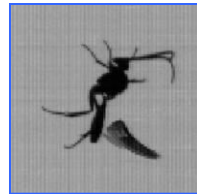


Definition Defect Types



Defect Types

- Gels
- Black Specs
- Contaminations
- Die Lines
- Insects
- Calander Defects
- Oil Stains
- Air Bubbles
- etc.



Origin of Defects

- **Extrusion Line** 20 %
(screw geometry / dead zones)
- **Resin** 25 %
(contamination, recipe)
- **Production Process** 15 %
(extruder temperatures, screen change)
- **Pellet Transport** 40 %
(external/internal)

Benefits of Online Control

- **Process Control**
(Optimisation, capacity, cleaning, waste)
- **Raw Material**
(Optimisation material + recipe, control material)
- **Product**
(better quality, customer satisfaction/relation, less claims, more competitive products)



TDO Films

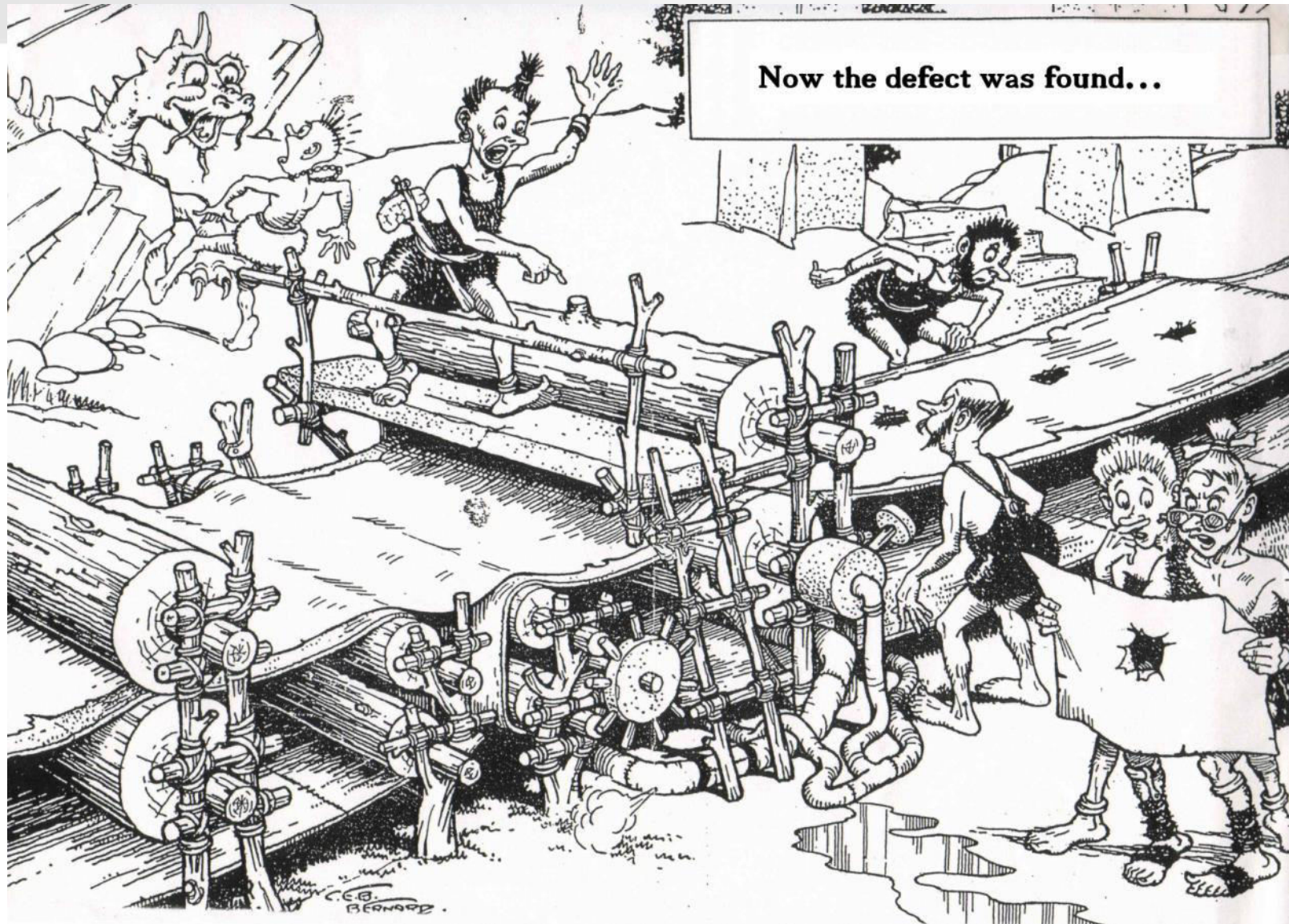


Web Inspection on Slitter and Cast Film Line



Closed Frame Blown Film





Film Grading

12:30:46 Kalendar 09

FSP600 Breitbahn Inspektions System (c) OCS GmbH, Witten - [OCS F55 Inspektionssystem - Rezept : BC-Standard.ini / MTB_K09_Clear01.sta]

Datei Einstellungen Ansicht Service Fenster Hilfe

F1 - Auftrag start
 F2 - Auftrag stop
 F3 - Auftragsdaten
 F4 - Rezept
 F5 - Folienbreite
 F6 - Mosaik

Note: 1,4

- Stippe < 1 mm²
- Stippe < 3 mm²
- Stippe > 3 mm²
- Schwarzer Punkt < 1 mm²
- ▲ Schwarzer Punkt > 1 mm²
- ◆ Loch < 3 mm²
- ◆ Loch > 3 mm²
- ◆ Faser / Struktur/Wachs
- ◆ Verbrennung
- Fehler > 15 mm²

Gitter

Aktive Alarmer -> 0

Tabelle	Defekt Map	Mosaik	History Production	Zeitverlauf	Laneverteilung			
4,054mm ²	1,057mm ²	1,014mm ²	1,762mm ²	5,379mm ²	6,523mm ²	4,187mm ²	1,101mm ²	2,028mm ²
1,233mm ²	3,527mm ²	1,101mm ²	0,176mm ²					

2522 m Rolle 4 | 0.21 m | 0.42 m | 0.63 m | 0.84 m

2622 m

2722 m

2822 m

2922 m

3022 m

3122 m

3222 m

3322 m

3422 m

Antriebsseite **Filmbreite 1,050m Edge : 0,665m** **Heizseite**

Stations : 3 (1) Configuration OK!! Gap 0 0 0 (0 -> 0) Disk space : 43,0 GByte (D:\Daten) Printjobs : 0 Def:24 Mos:0 (0MByte)

Quality Control OCS Viewer

The image displays four screenshots of the OCS Viewer V1.02 software interface, arranged in a 2x2 grid. Each screenshot shows a different date and time, representing a sequence of quality control checks.

- Top Left (18:16:12 Kalender 06):** Shows a control panel with buttons for 'F1 - Auftrag start', 'F2 - Auftrag stop', 'F3 - Auftragsdaten', 'F4 - Rezept', 'F5 - Folienbreite', and 'F6 - Mosaik'. The 'F6 - Mosaik' view shows a grid of data points. The status bar at the bottom indicates 'Aktive Alarme -> 0'.
- Top Right (18:16:12 Kalender 07):** Similar to the first screenshot, but with a different 'F6 - Mosaik' view showing a different pattern of data points. The status bar also indicates 'Aktive Alarme -> 0'.
- Bottom Left (18:15:16 Kalender 12):** Shows a different 'F6 - Mosaik' view with a distinct pattern of data points. The status bar indicates 'Aktive Alarme -> 0'.
- Bottom Right (18:15:52 Kalender 13):** Shows another 'F6 - Mosaik' view with a different pattern of data points. The status bar indicates 'Aktive Alarme -> 0'.

Each screenshot includes a control panel on the left with various buttons and a main display area on the right showing a grid of data points. The status bar at the bottom of each window indicates 'Aktive Alarme -> 0'.

OPTICAL CONTROL SYSTEMS

The Solution For The Polymer & Converting Industry

Find the right way ...



Mondi Gronau GmbH



Jöbkesweg 11
48599 Gronau, Deutschland

Staff: ~900 employees

Mildenerger & Willing -> Nordenia -> Mondi



Facts & Figures



Product Segments

Technical Films

Label Films

Lamination Films

Packaging Films

Hygiene Components

Elastic Laminates

Elastic Films

Frontal Tape

Hygiene Films

Surface Protection /
Decorative Films

Protective Films

Functional Films

Decorative Films

Facts & Figures



We serve the following industries:

- Food and Beverages
- Hygiene and Toiletries
- Medical and Pharma
- Automotive
- Wood and Plastic
- Steel and Metal

Facts & Figures



References

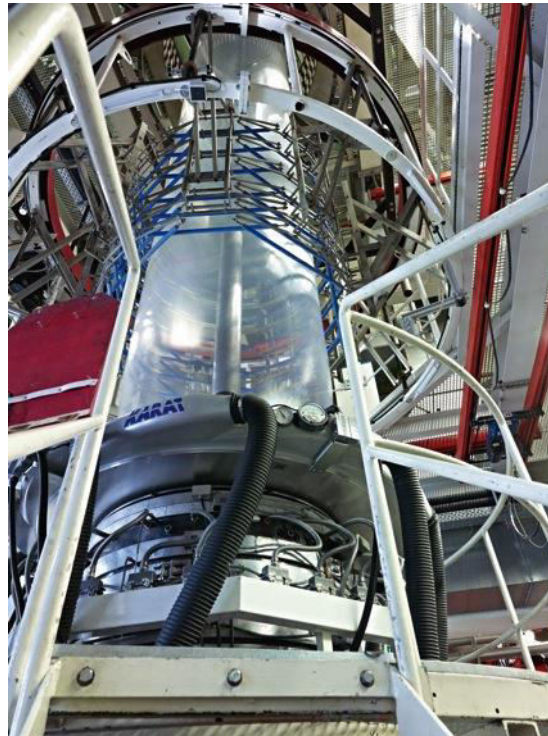


Facts & Figures

Mondi Gronau GmbH

- Compounding
- Blown Film Extrusion
- Cast Film Extrusion
- Rotogravure Printing
- Coating /Siliconizing
- Lamination
- Roll-Slitting

-> 60 processing machines



Extrusion Lines



- Monoextrusion
- Coextrusion n - Layer
- Film thickness: 10 – 300 μ m
- Film width: 850 – 3.000mm

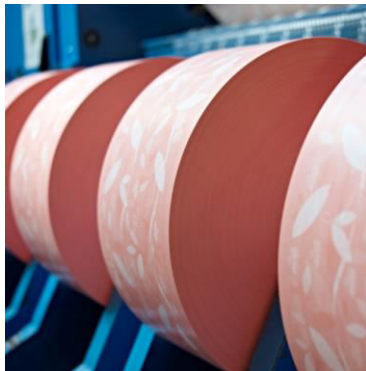


Further Lines

- Coating / Siliconizing



- Slitting



- Rotogravure Printing



- Lamination



Quality Assurance

- Thickness measurement
- Tensile measurement
- Hysteresis measurement

- Bending stiffness
- Elmendorf tear test
- Seal bond strength

- Friction measurement
- Colour measurement
- Opacity measurement

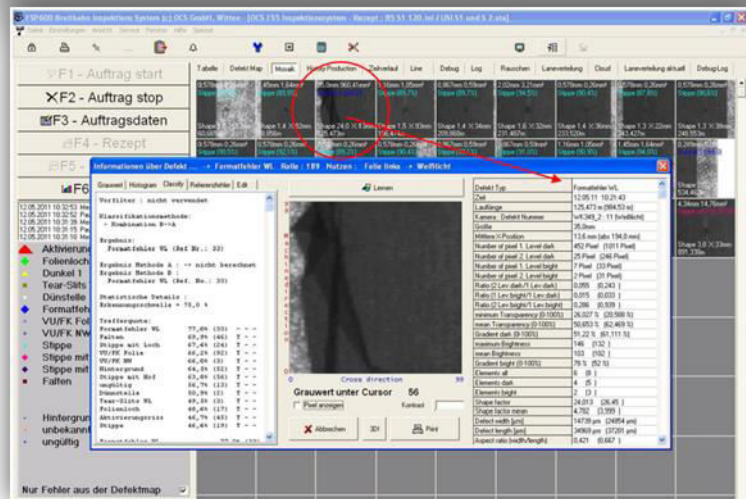
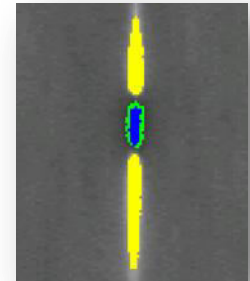
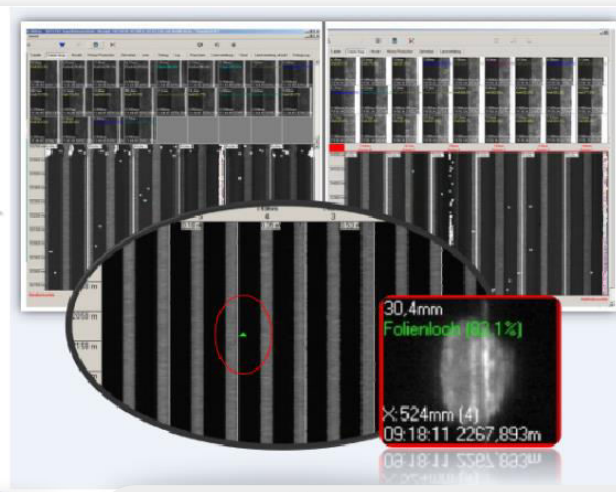




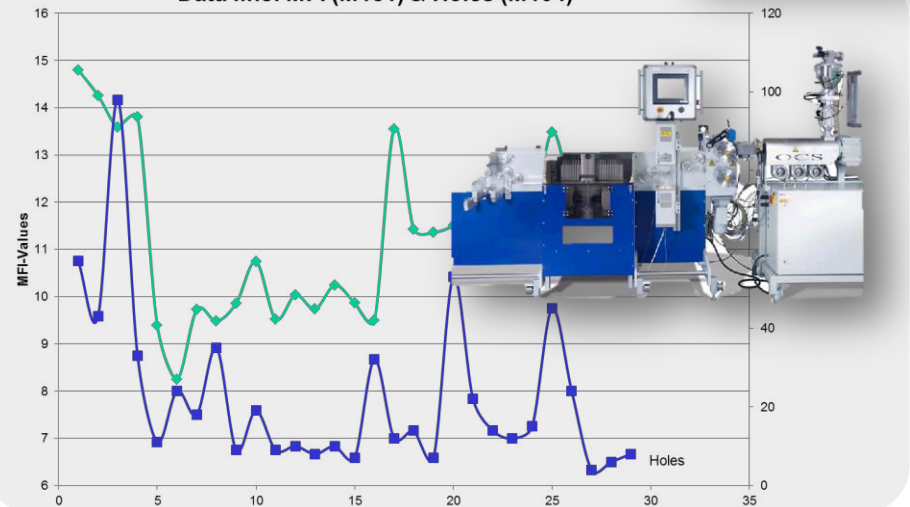
Monitoring

Optical Control Systems

34 In-Line OCS Systems



Data line: MFI (M181) & Holes (M104)



Integrated into Production



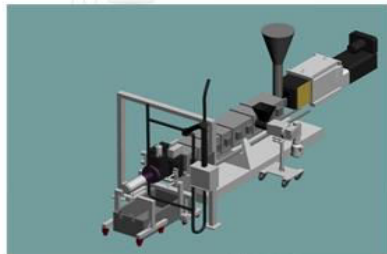
Elastic Film Process

3-Stage Polymer Process

Granulate



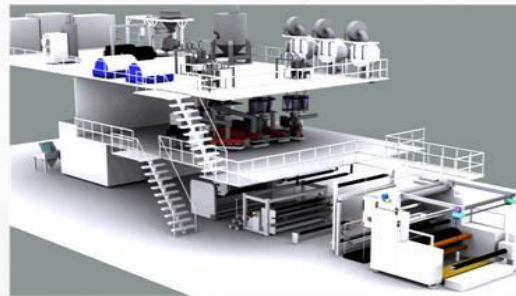
Machine 1
(Compounder)



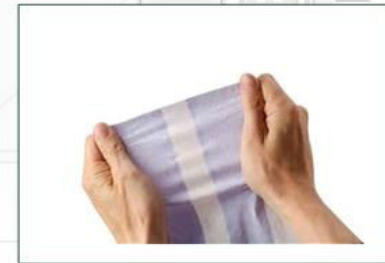
Film 1



Machine 2
(Extrusion line)



Film 1 + Film 2



Machine 3
(Laminator)



Elastic Film Process

3-Stage Polymer Process

Granulate



Machine 1
(Compounder)



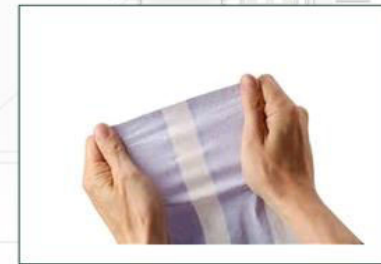
Film 1



Machine 2
(Extrusion line)



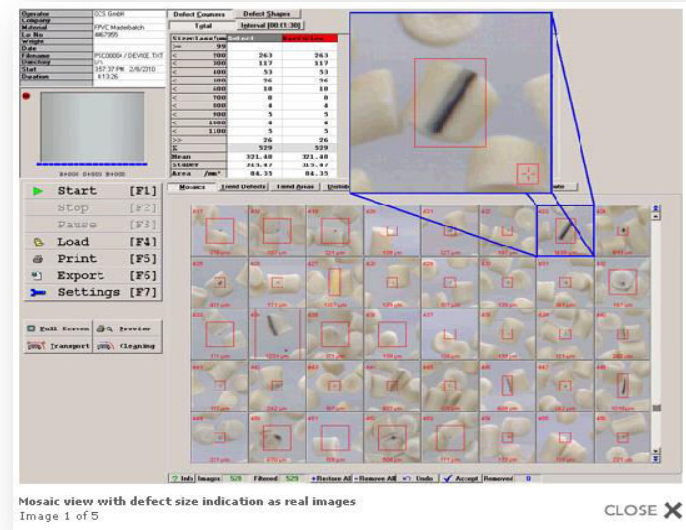
Film 1 + Film 2



Machine 3
(Laminator)



Compounder Stage



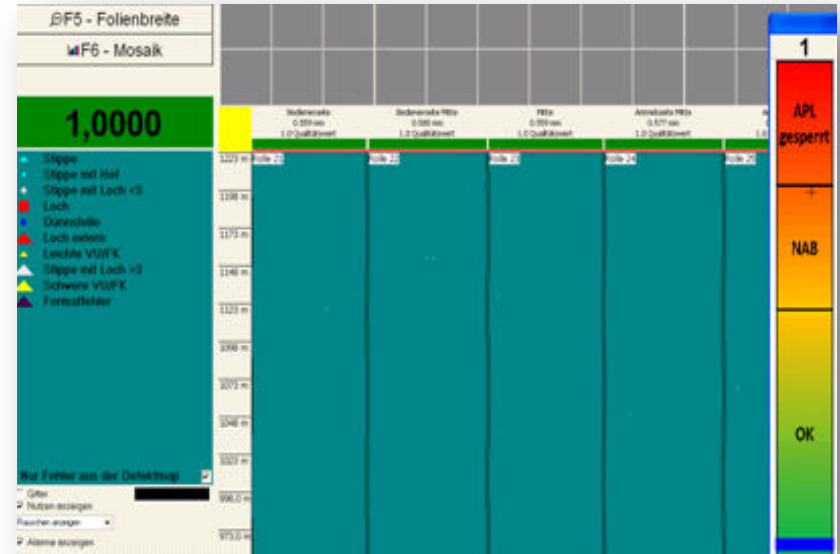
Source: OCS GmbH

Pellet Scanning System PS400C

- Raw Material Surface Detection
- Colour Analysis



Elastic Film

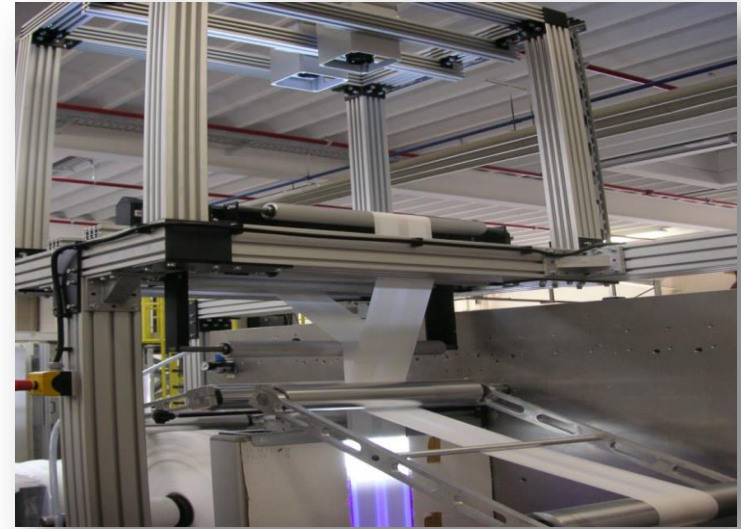


Transmission
Light System

- Quality Index
- Traffic Light System



Lamination Rework



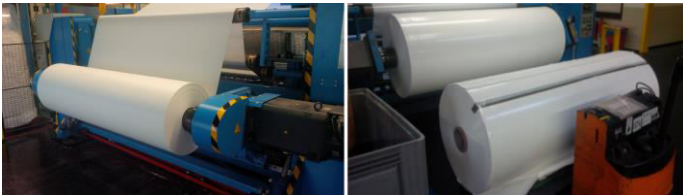
Transmission Light System

- Rework Inspection
- Laminated Film Surface Detection
- Nonwoven + Elastic Film



Benefits Mondi Gronau GmbH

Good Product



Waste Product



Benefits

- Reduction of Waste Material
- Advanced Quality Monitoring
- Customer Satisfaction
- Yield Optimization



Thank you !