



# Enhancing Production Stability: The Role of AOI Across Flexible Packaging Production Processes

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*Dr. Schenk Industrial Surface Inspection*



# Industrial Surface Inspection

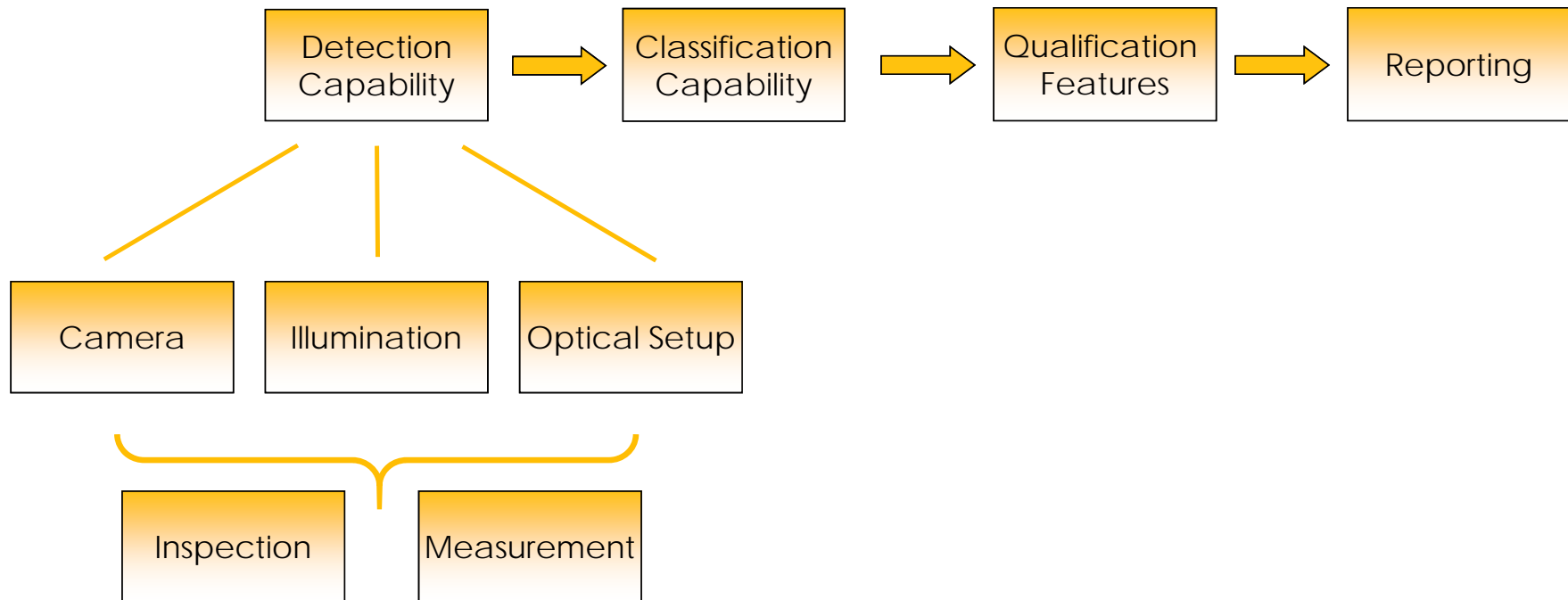


Production facility in Graefelfing





## Automated On-Line Inspection (AOI)





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# System Introduction

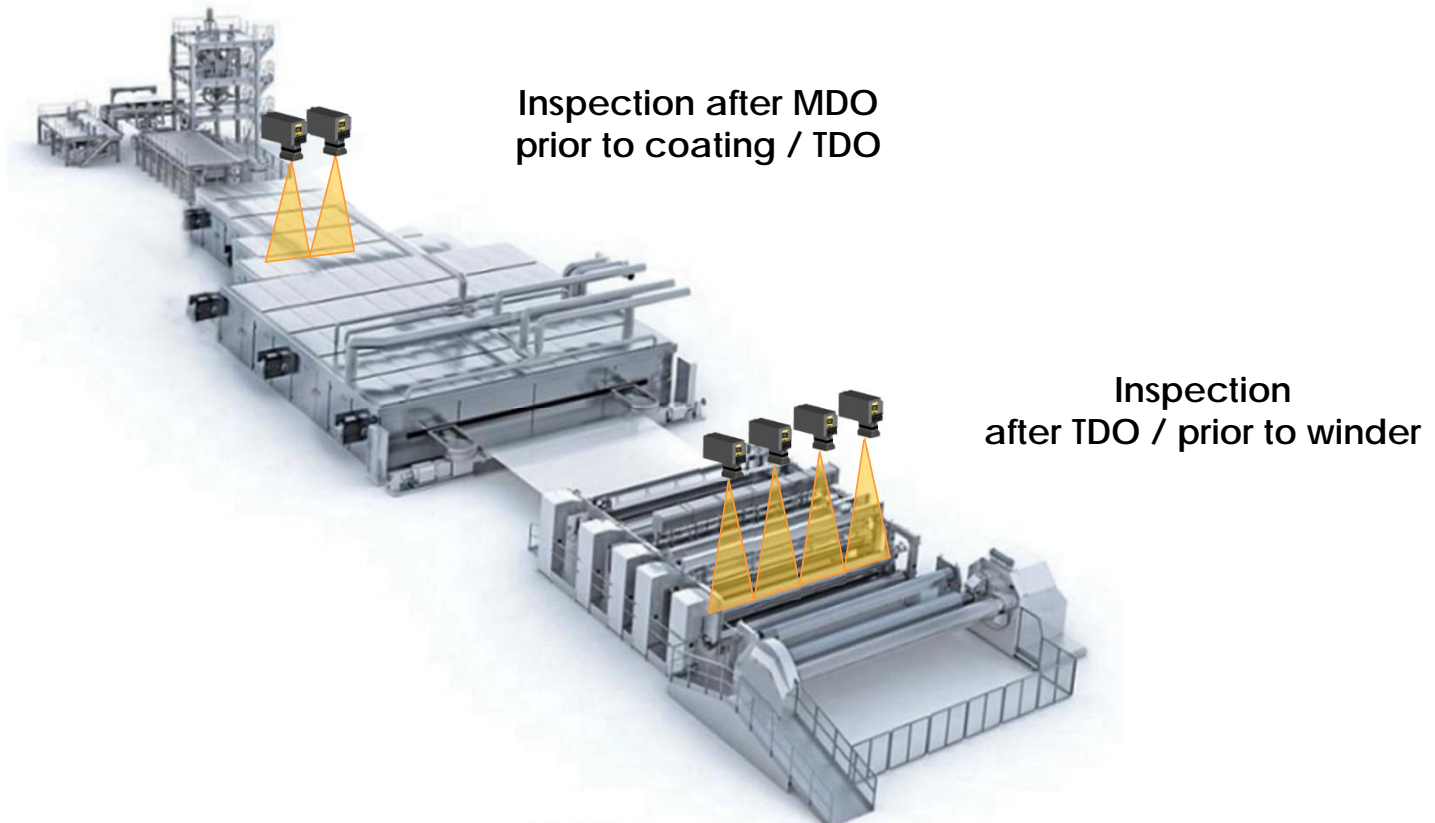


## AOI System Design Hardware



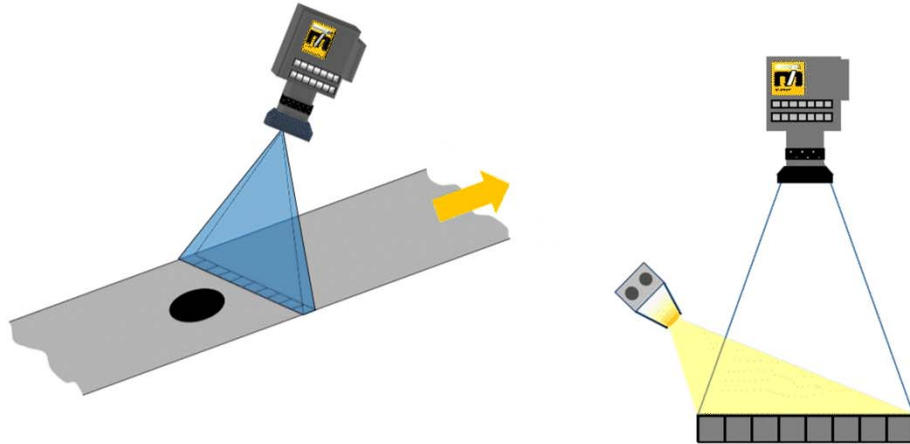


## System Configuration





## How a line scan camera works?





# Defects & Inhomogeneities in Base Film

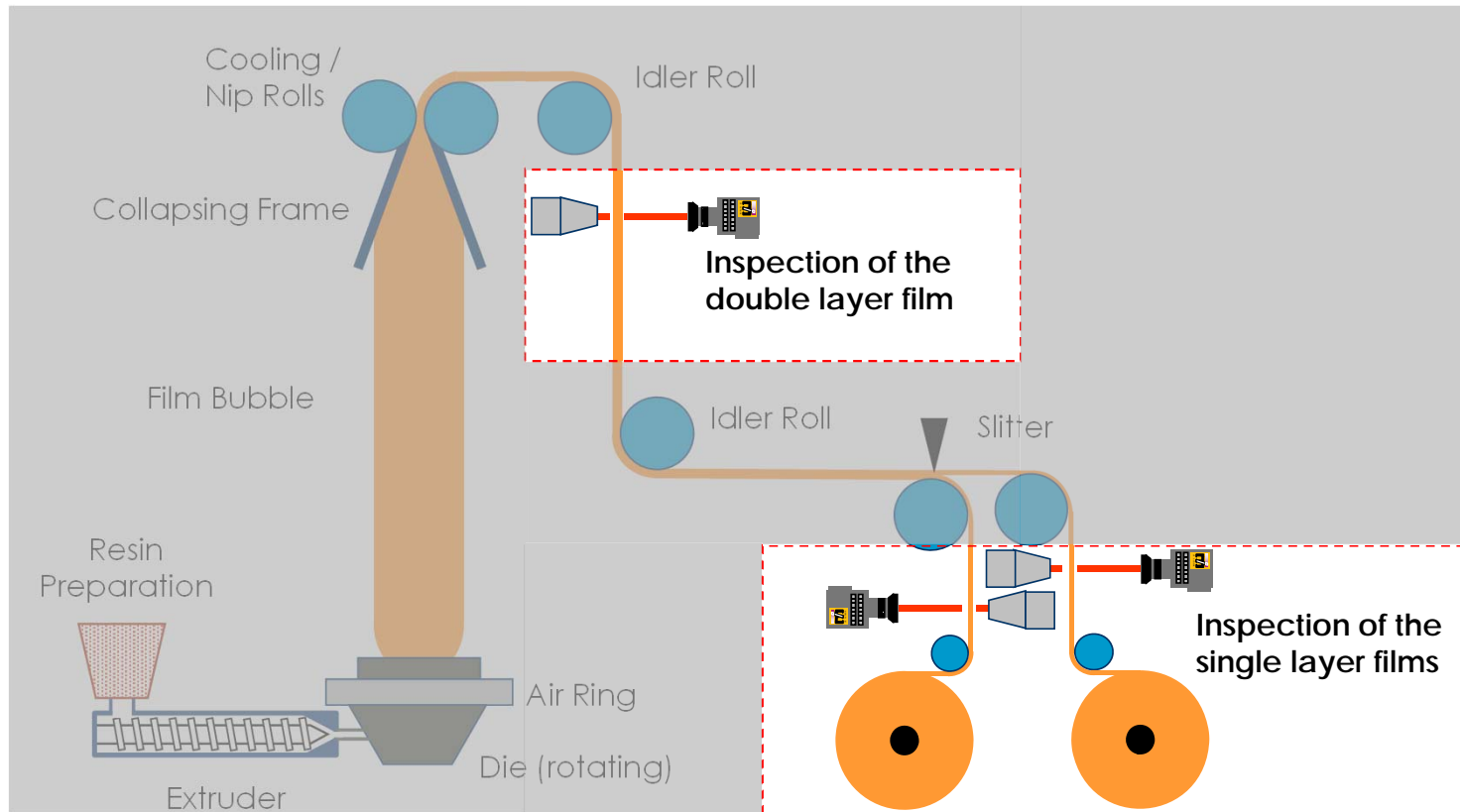


## Flexible Packaging Inspection

- Typical tasks for flexible packaging film inspection include:
  - **Extruded / blown film inspection**
    - PE, PET, APET, EVA, PLA, POF, etc.)
  - **Extruded / cast film inspection**
    - (CPP, PA/PE, LDPE/LLDPE, etc.)
  - **(Bi-)Oriented film inspection**
    - (OPP/OPET, BOPP/BOPET, etc.)
  - **Coated / laminated /metallized film inspection**



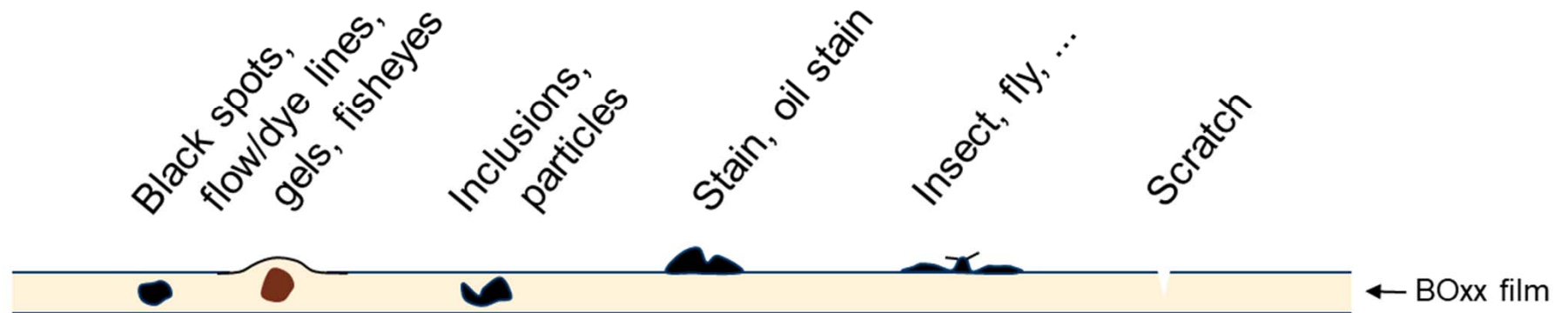
## System Integration





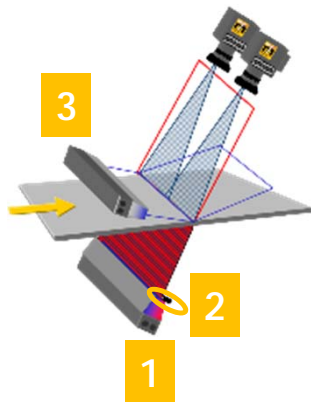
## Defects in Base Film

### Examples for local defects in base films

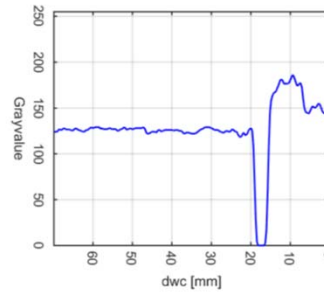
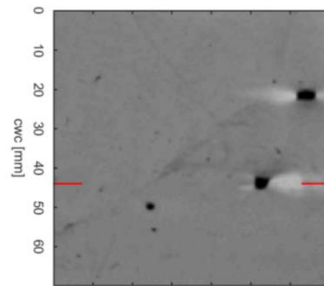




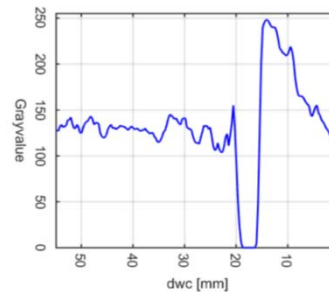
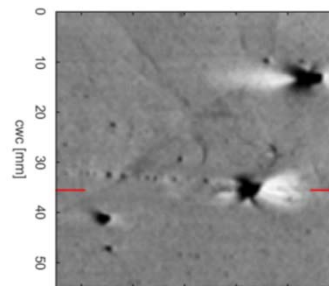
## Defect: Dark gel



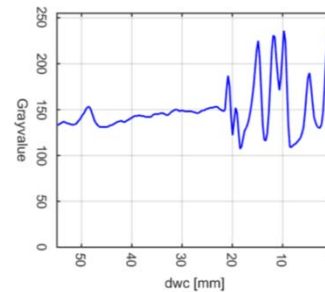
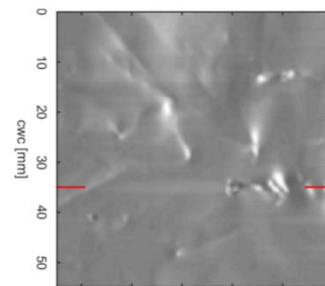
Transmission  
Brightfield **1**



Transmission  
BF Knife-Edge **2**



Reflection  
Darkfield **3**



AWD17290-0



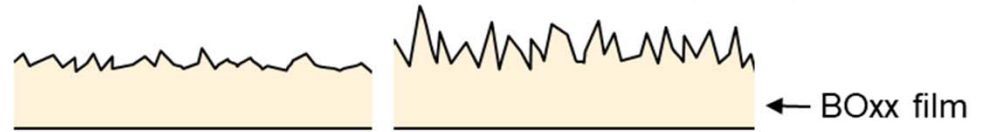
## Inhomogeneities in Base Film

### Examples for inhomogeneities in base films

Coating inhomogeneity

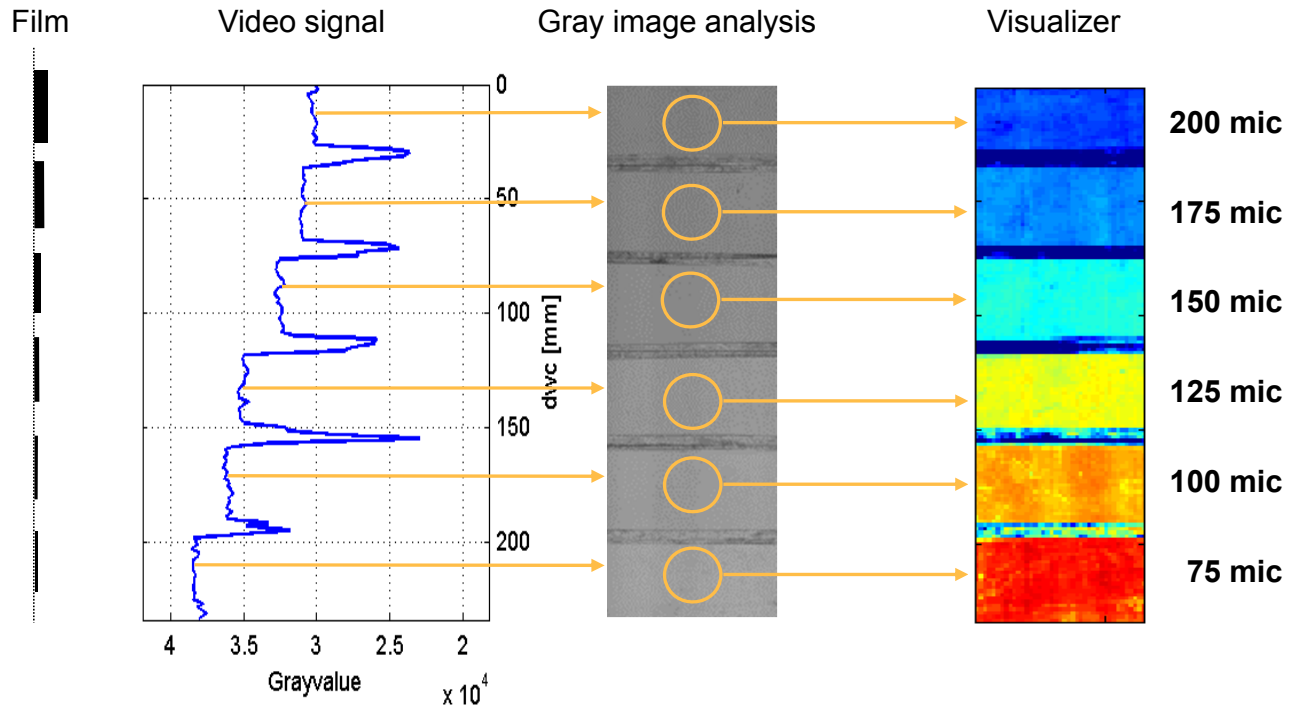


Variation in film surface topology (haze)





## Monitoring Film Thickness

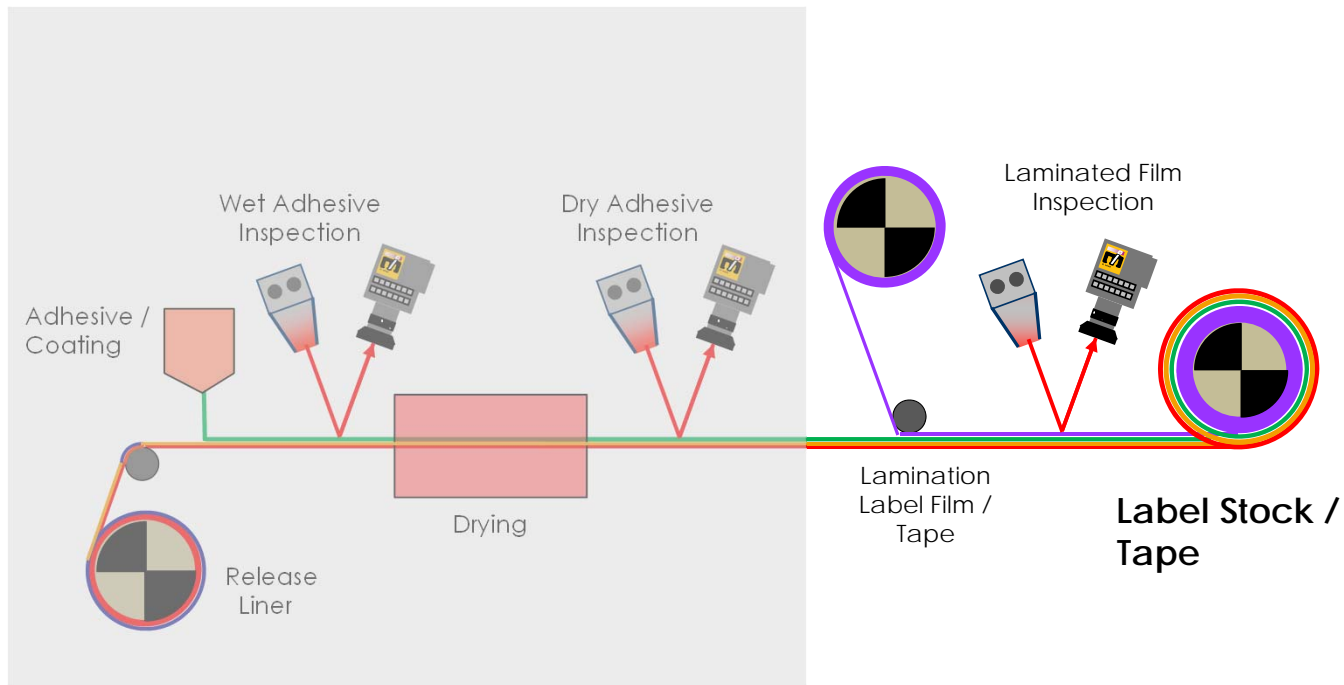




# Defects & Inhomogeneities After Converting

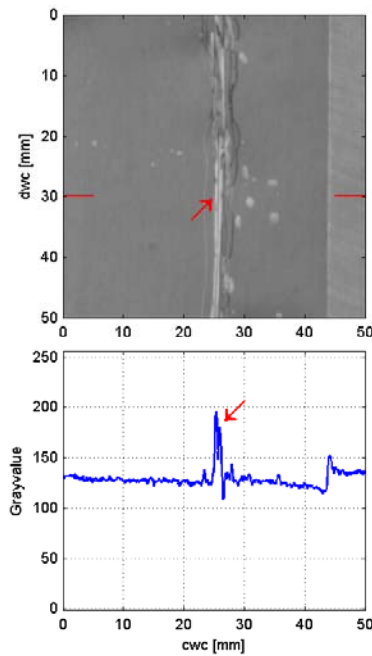
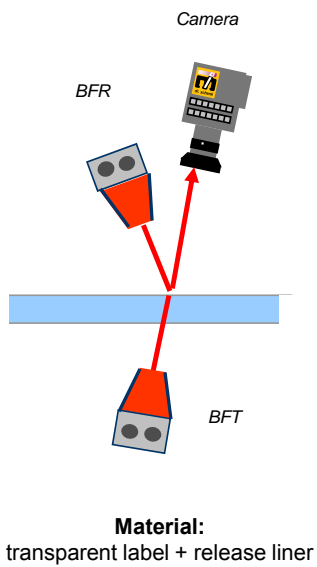


## Adhesive Coating, Label Stock + Tapes

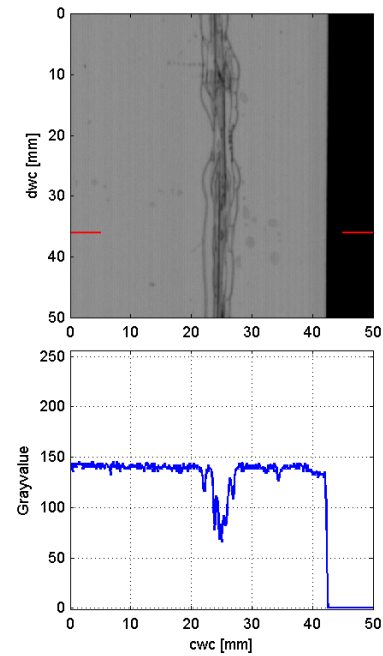




## Defect: wrinkle



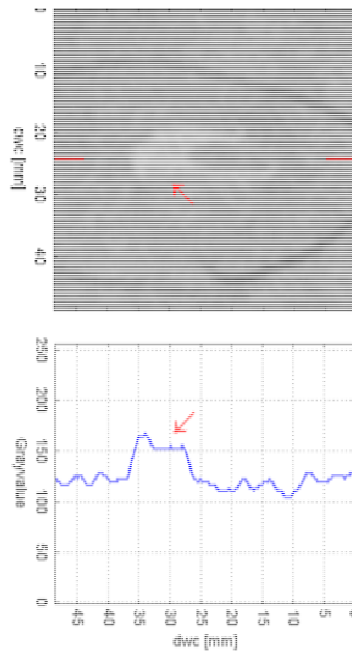
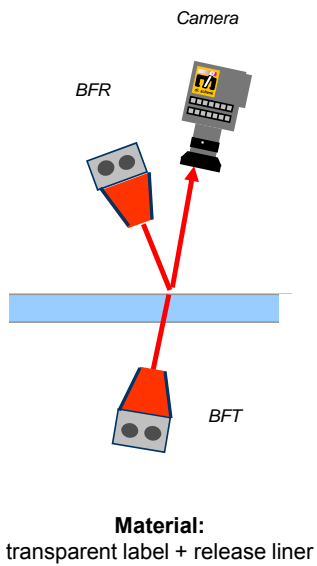
Brightfield Reflection



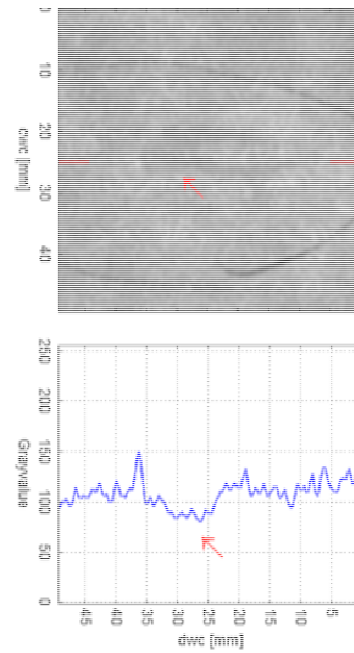
Brightfield Transmission



## Defect: void in adhesive coating



Brightfield Reflection

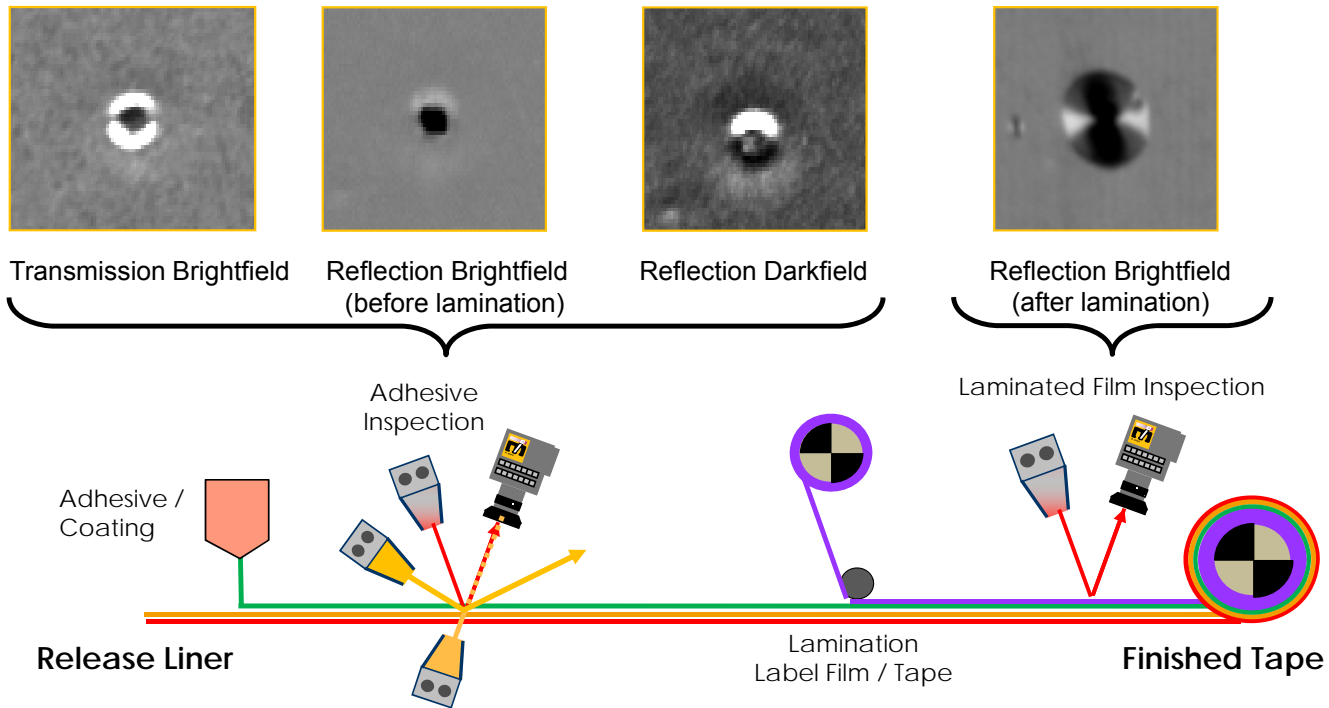


Brightfield Transmission



## Defect: bubble

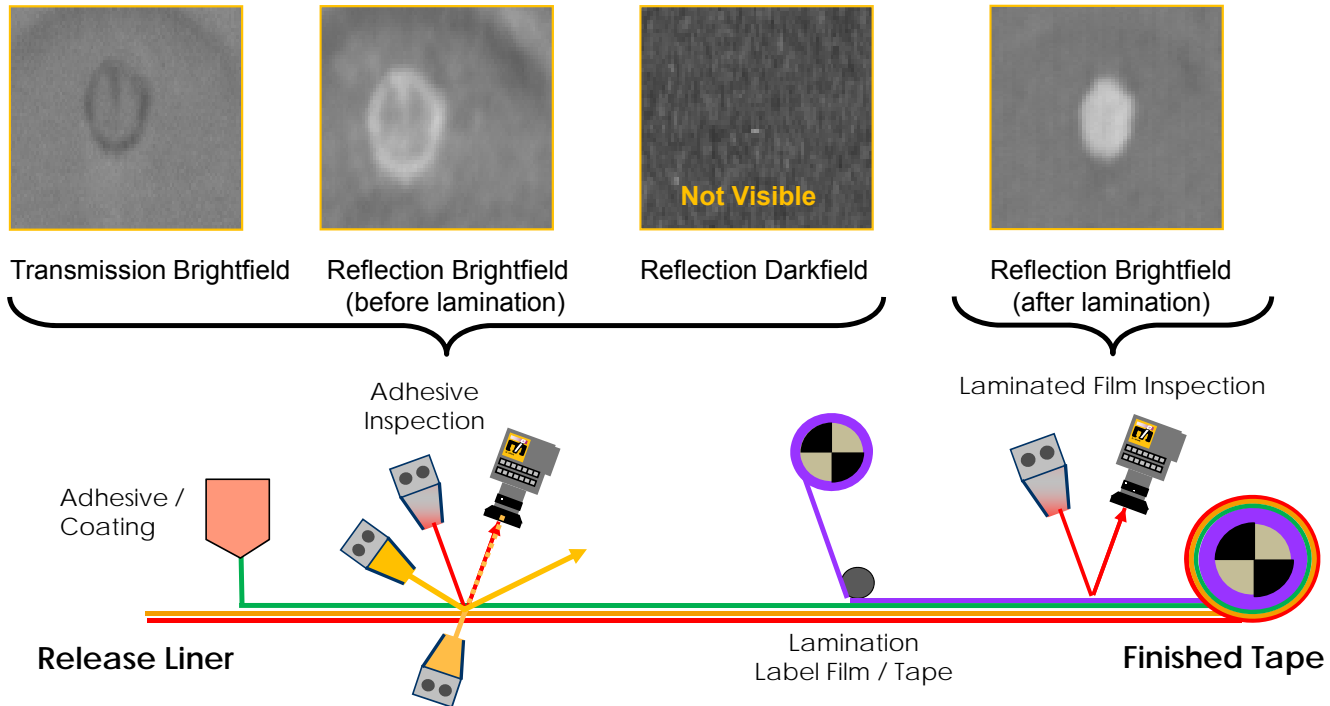
**Material:**  
adhesive tape  
(with release liner)





## Defect: missing coating

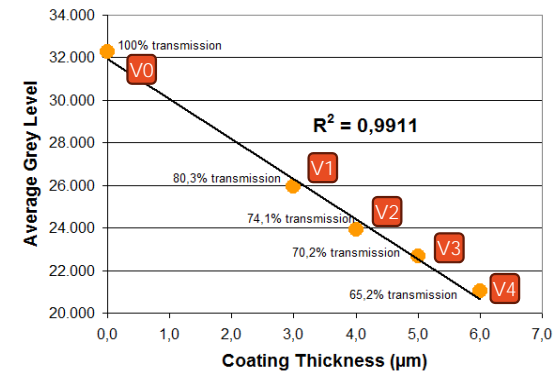
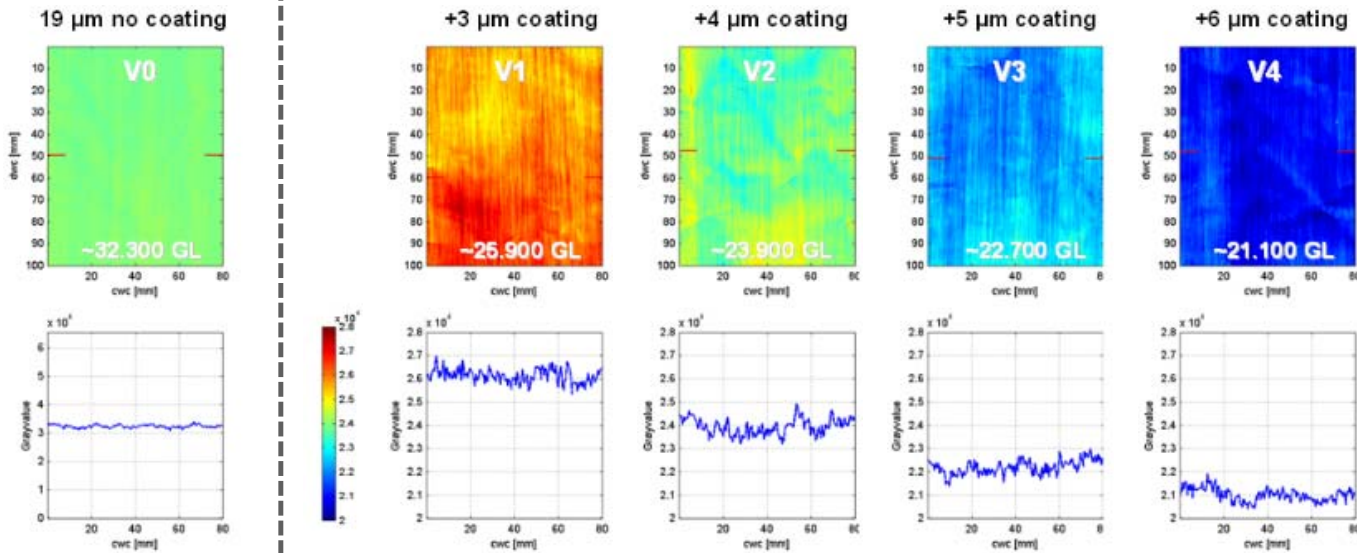
**Material:**  
adhesive tape  
(with release liner)





## Variation in coating layer thickness

PET with coating





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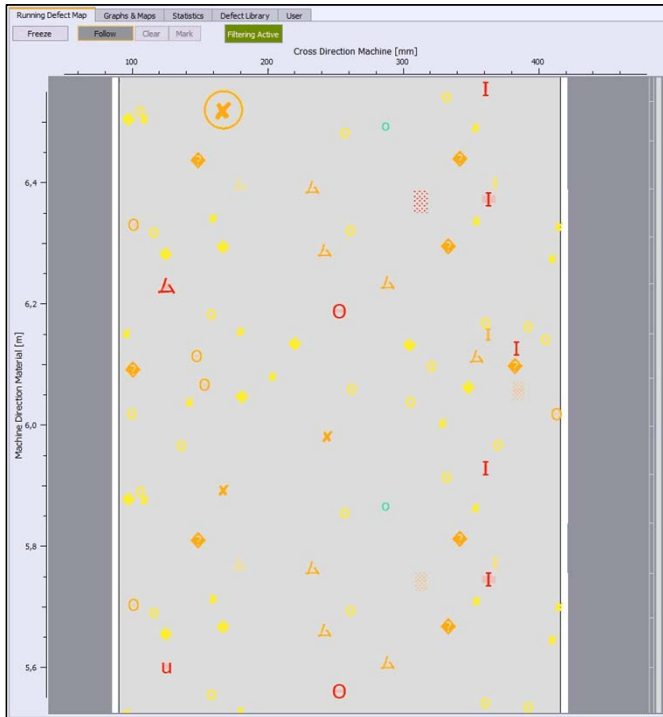
# Software



## Software Clients

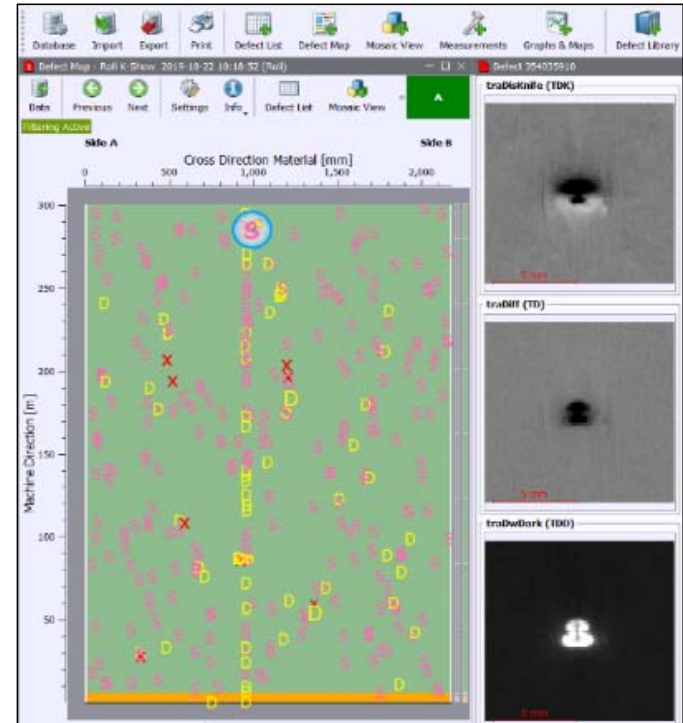
### Visualization Client

VIZ



### Production History Client

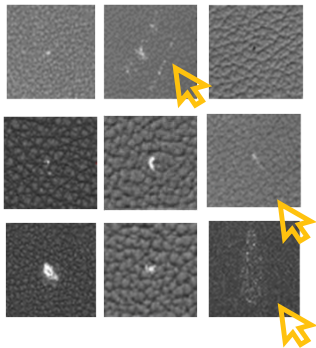
PHC



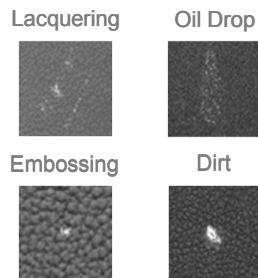


# Training a Classification Model

Unknown data



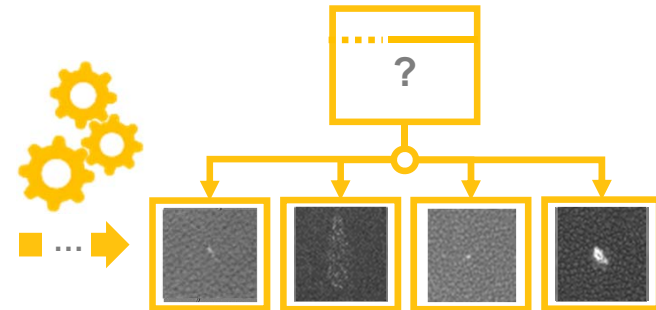
Target classes



Defect library

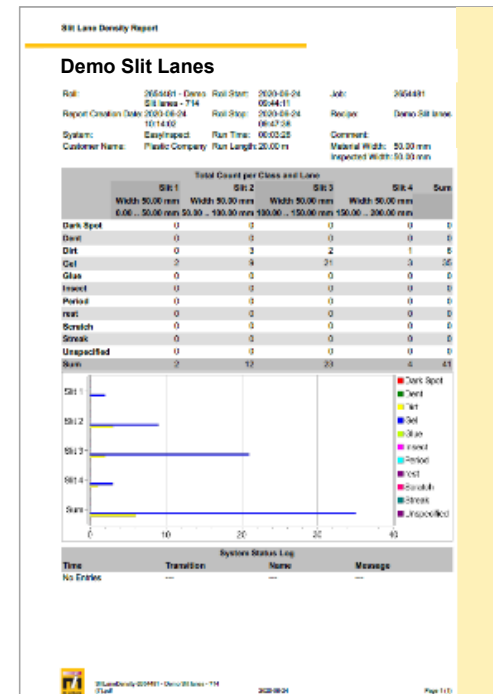
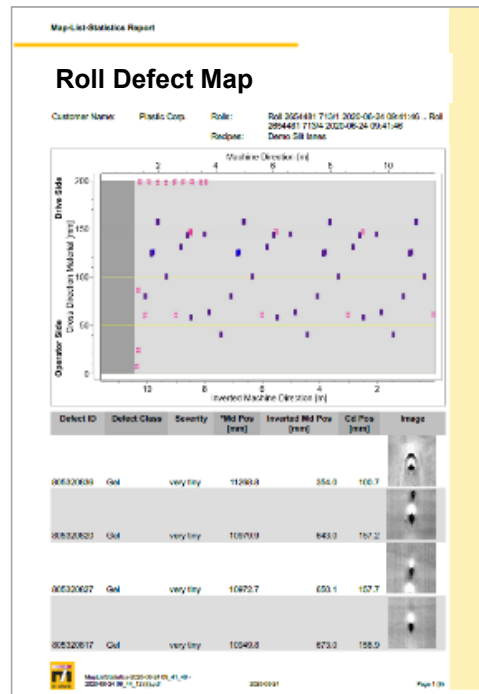
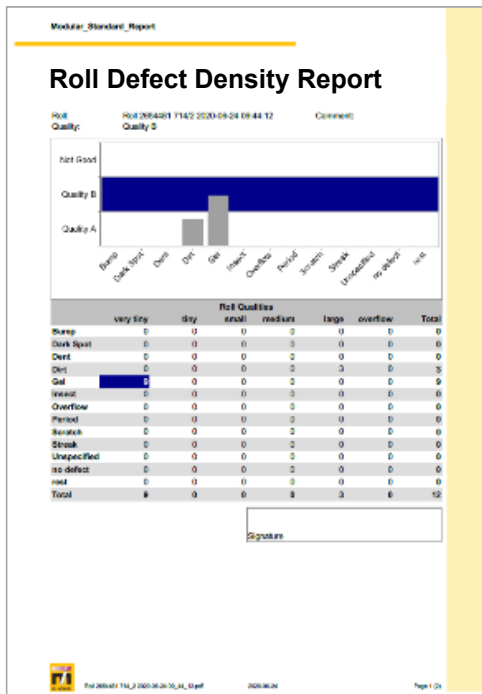



Classification model





# Roll Reports



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## Any Questions ?...

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