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Want To Validate Your Metal Detection System Now What

METTLER TOLEDO

Agenda

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1. Definitions
2. Considerations
3. Metal Detection Basics
4. Q&A

Key Definitions

- Control Measure
- Validation
- Monitoring

Key Definitions

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CODEX ALIMENTARIUS
International Food Standards

World Health Organization

Food and Agriculture Organization of the United Nations

- **Control Measure:** Any action and activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level
- **Validation:** Obtaining evidence that a control measure or combinations of control measures, if properly implemented, is capable of controlling the hazard to a specified outcome
- **Monitoring:** The act of conducting a planned sequence of observations or measurements of control parameters to asses whether a control measure is under control

Comparison

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Highlight	HACCP	HARPC
Staffing	Diverse Team	Qualified Individual
Hazards	Chemical, Physical, Biological	Chemical, Physical, Biological, Radiological, Naturally Occurring, Intentional
Control Points	Critical Control Points CCP's	Preventive Control Points including: Process Controls and Allergen Controls
Validation	Evidence of Effectiveness	Evidence of Effectiveness
Monitoring	Critical Limits	Not all controls will have specific limits
Assessment	Annually or Significant Change	Every 3 Years or Significant Change

Considerations

- Sample Size / POD / FRR
- Production Needs/Limitation

Considerations

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POD = Probability of Detection = $\dfrac{\text{Rejected Test Samples}}{\text{Total Samples Inspected}}$ X 100%

FRR = False Reject Rate = $\dfrac{\text{Total Reject – Correct Reject}}{\text{Total Samples Inspected}}$ X 100%

Metal Detection

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Detection Capability

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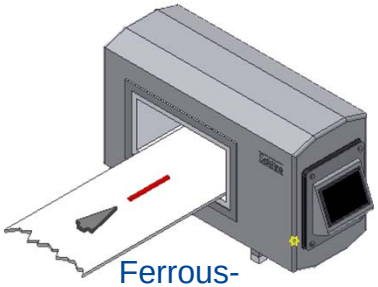
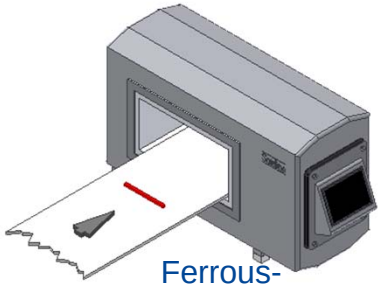
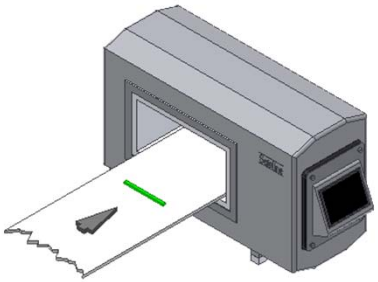
Metal Type	Magnetic Permeability	Electrical Conductivity	Ease of Detection
Ferrous (iron)	Magnetic	good electrical conductor	easily detected
Non-Ferrous (aluminium, brass, copper, lead)	non-magnetic	generally good or excellent conductor	relatively easily detected
Stainless Steel (various grades)	usually non-magnetic	usually poor conductors	relatively difficult to detect



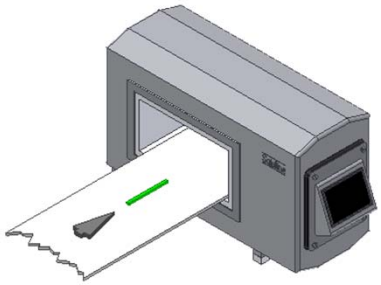
Ferrous-Easy



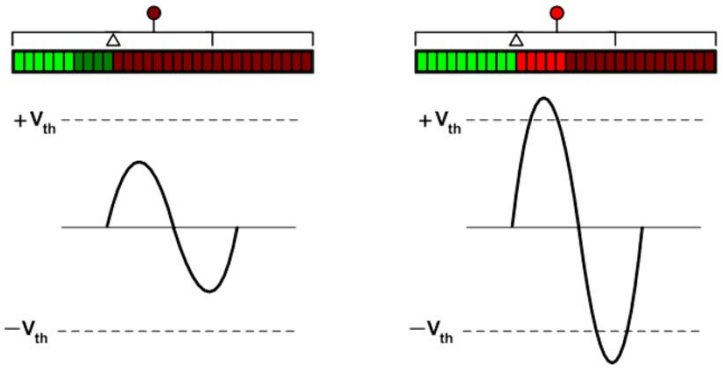
Ferrous-Difficult



Non-Ferrous-Easy



Non-Ferrous-Difficult



Factors affecting sensitivity

- Detector Size
- Product Condition
- Metal Type
- Orientation

Aperture Size

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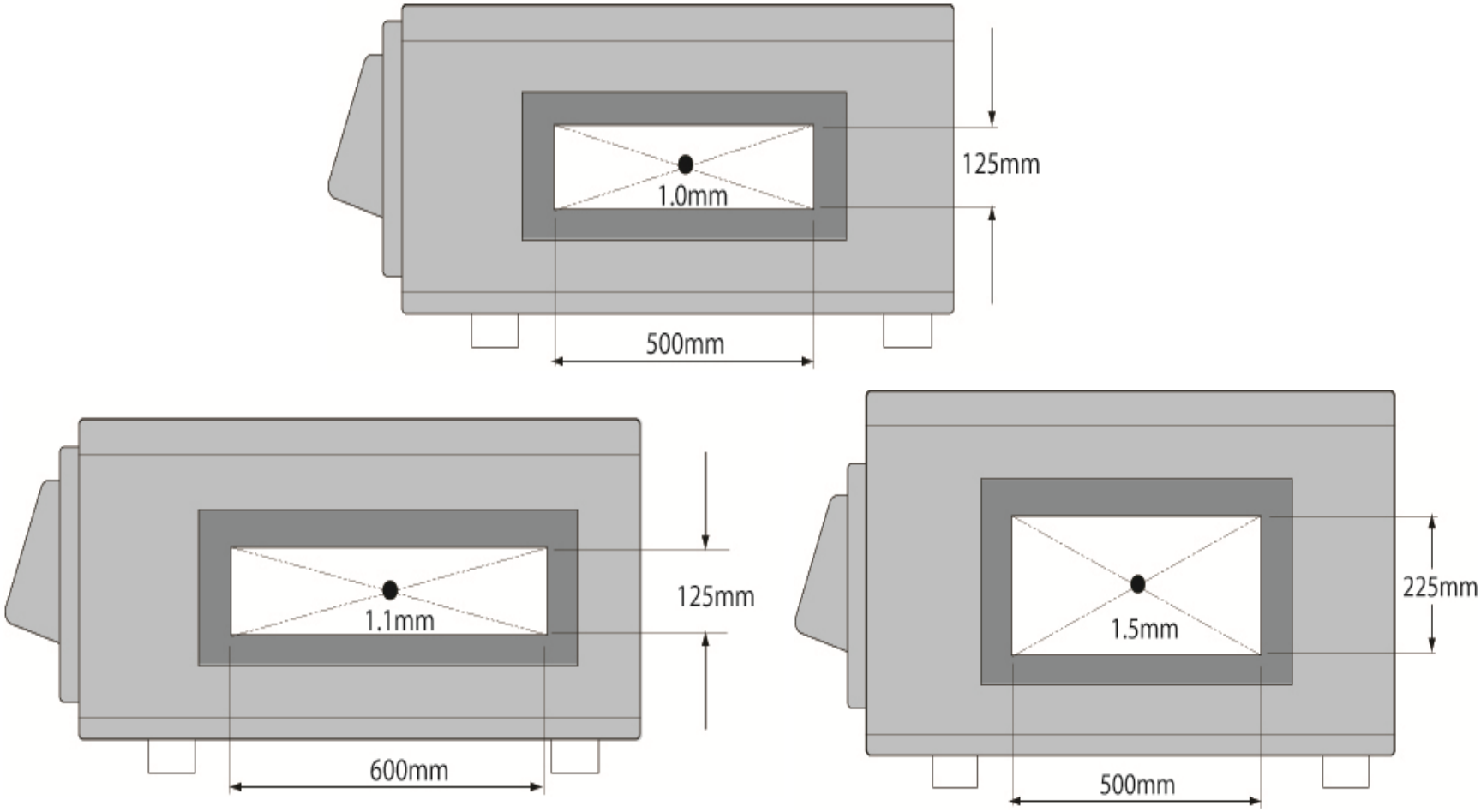

Vast majority of metal detectors are manufactured to order.
Dimensions of the product are fundamental in the performance of the detector

Position of metal in the aperture

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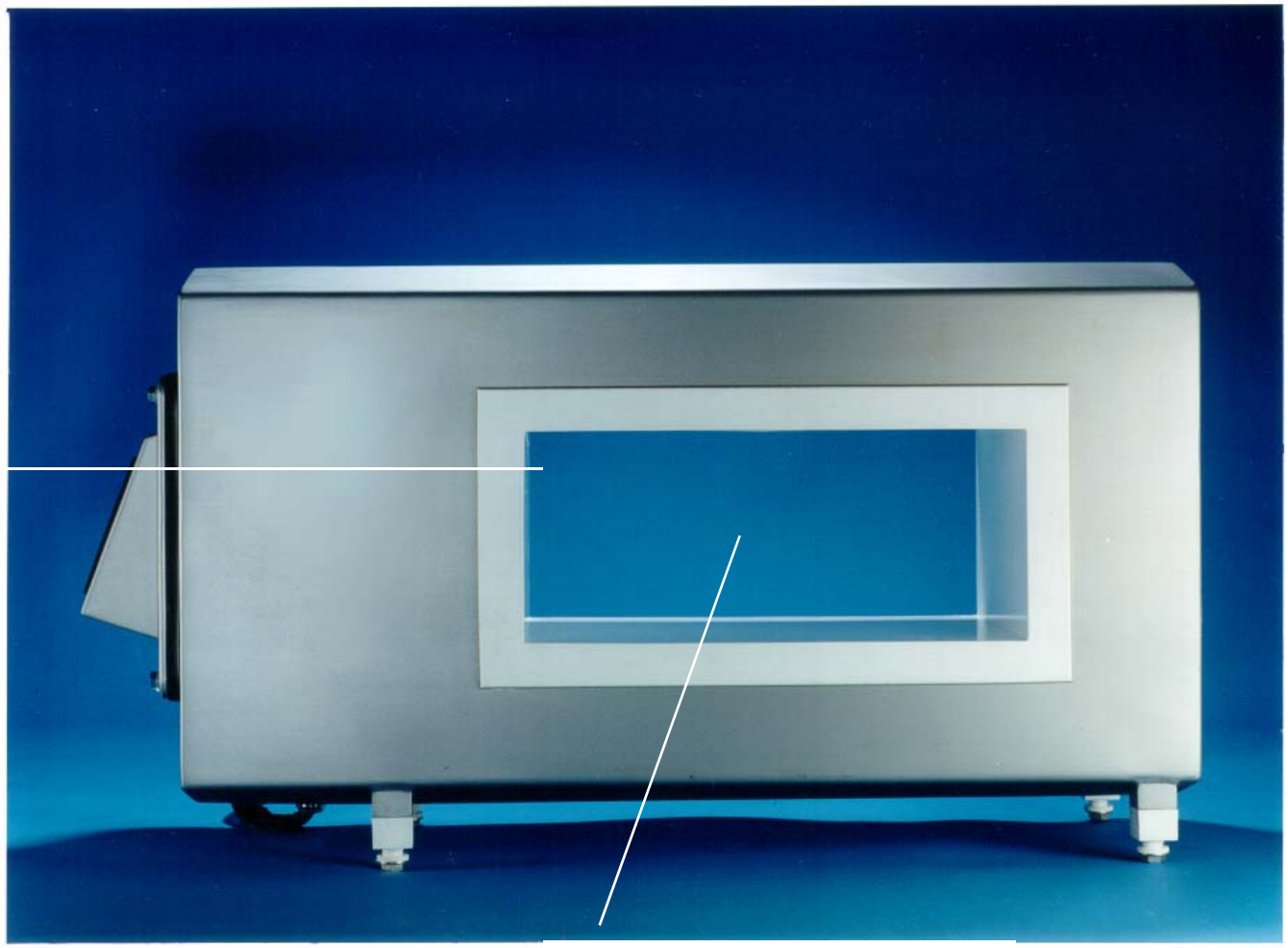

Access to Center

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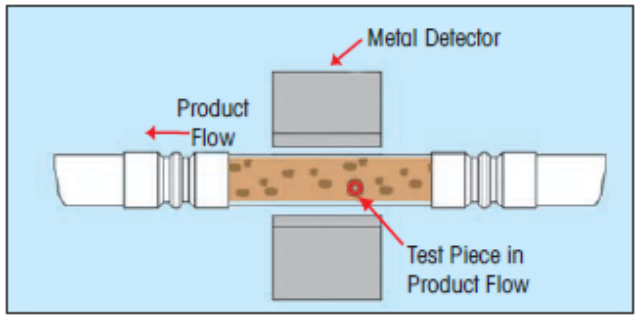

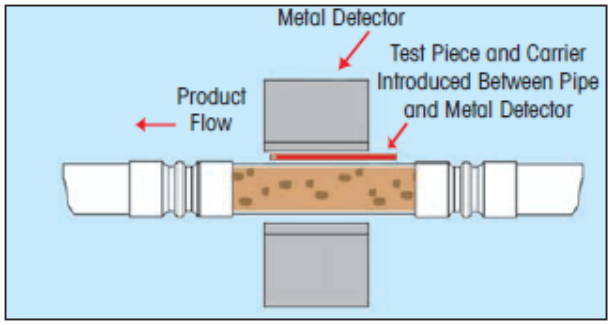

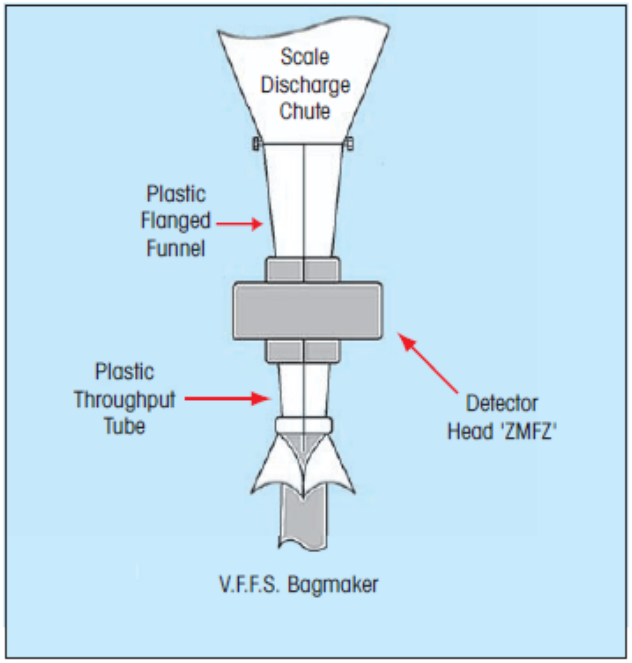

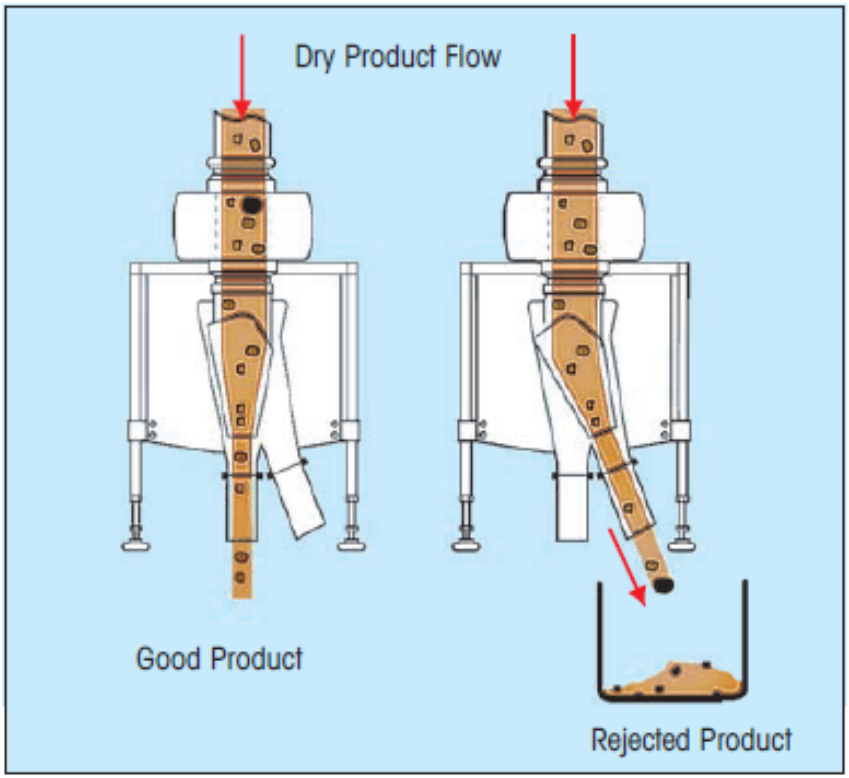

Other Areas to Validate

- Capability
- Range of Sensitivity
- Reject Operation
- Fail Safe Items

Reject Timing

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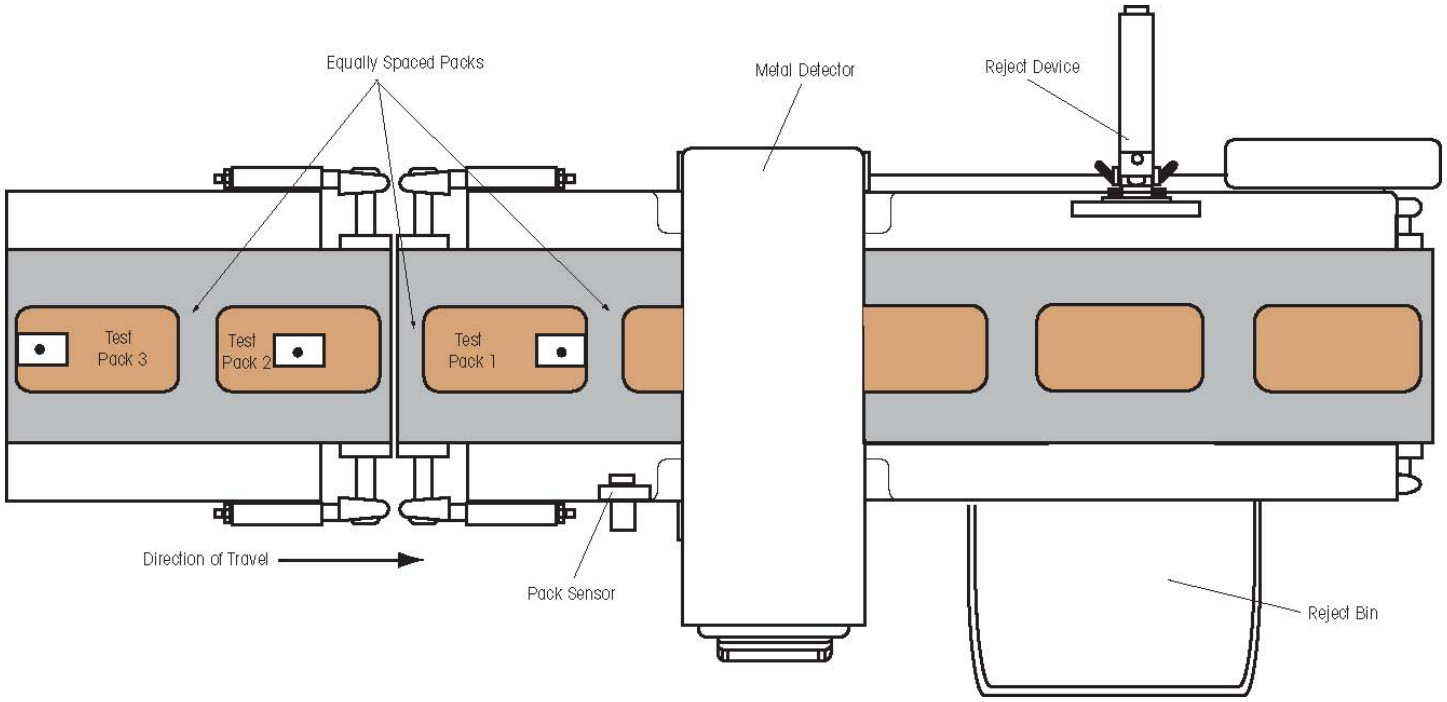
- All three test packs placed onto the line one after the other.
  - The spacing between the packs should be at the normal distance that products travel down the line.
  - The line may be stopped to facilitate placing the packs on the line if necessary.



Testing is considered successful when all test packs have been detected and rejected.

Reject Confirmation

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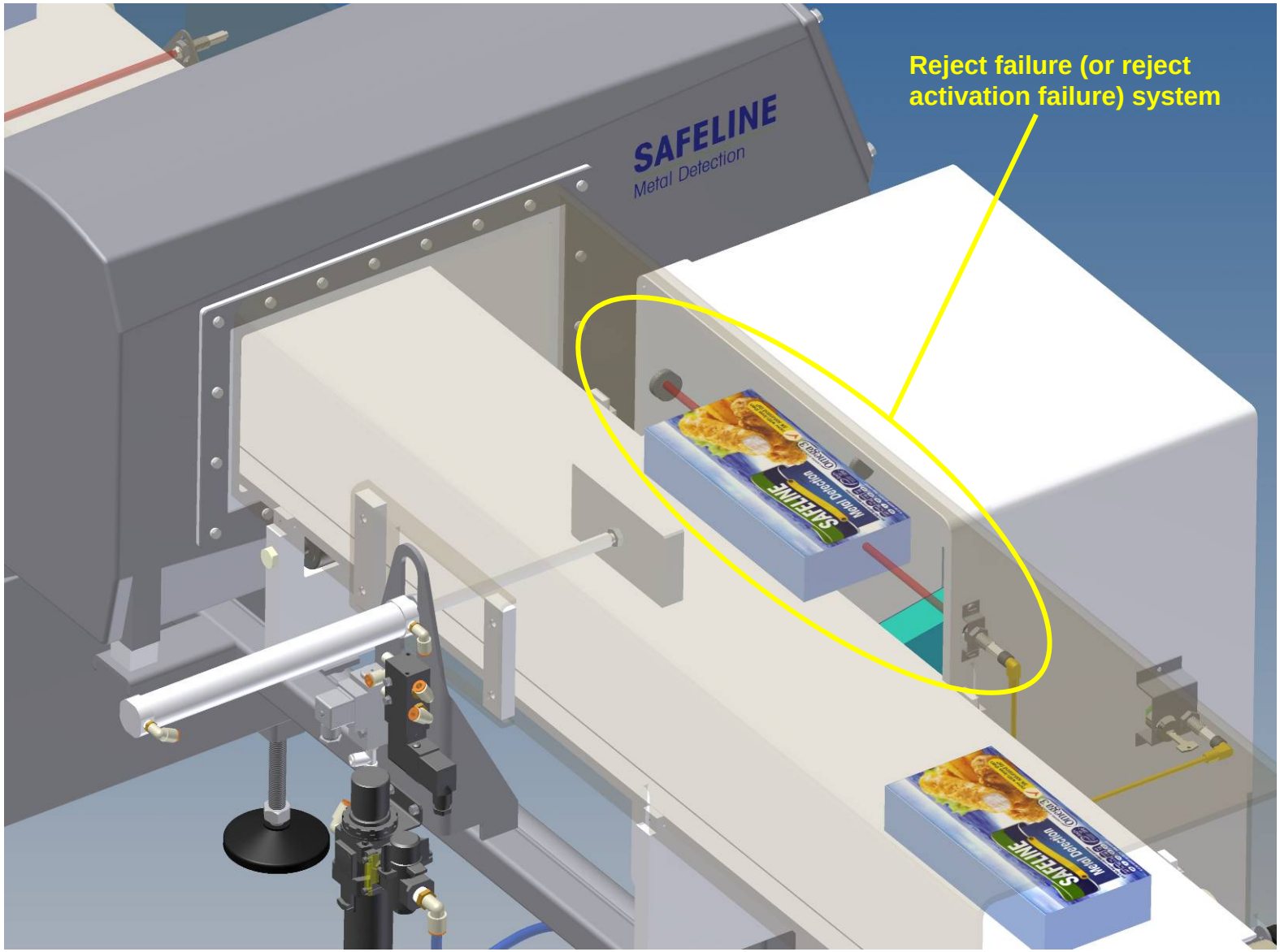

Fail-safe Systems – Shut Down the Conveyor

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Fail-safe Systems – Shut Down the Conveyor

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Bin Level

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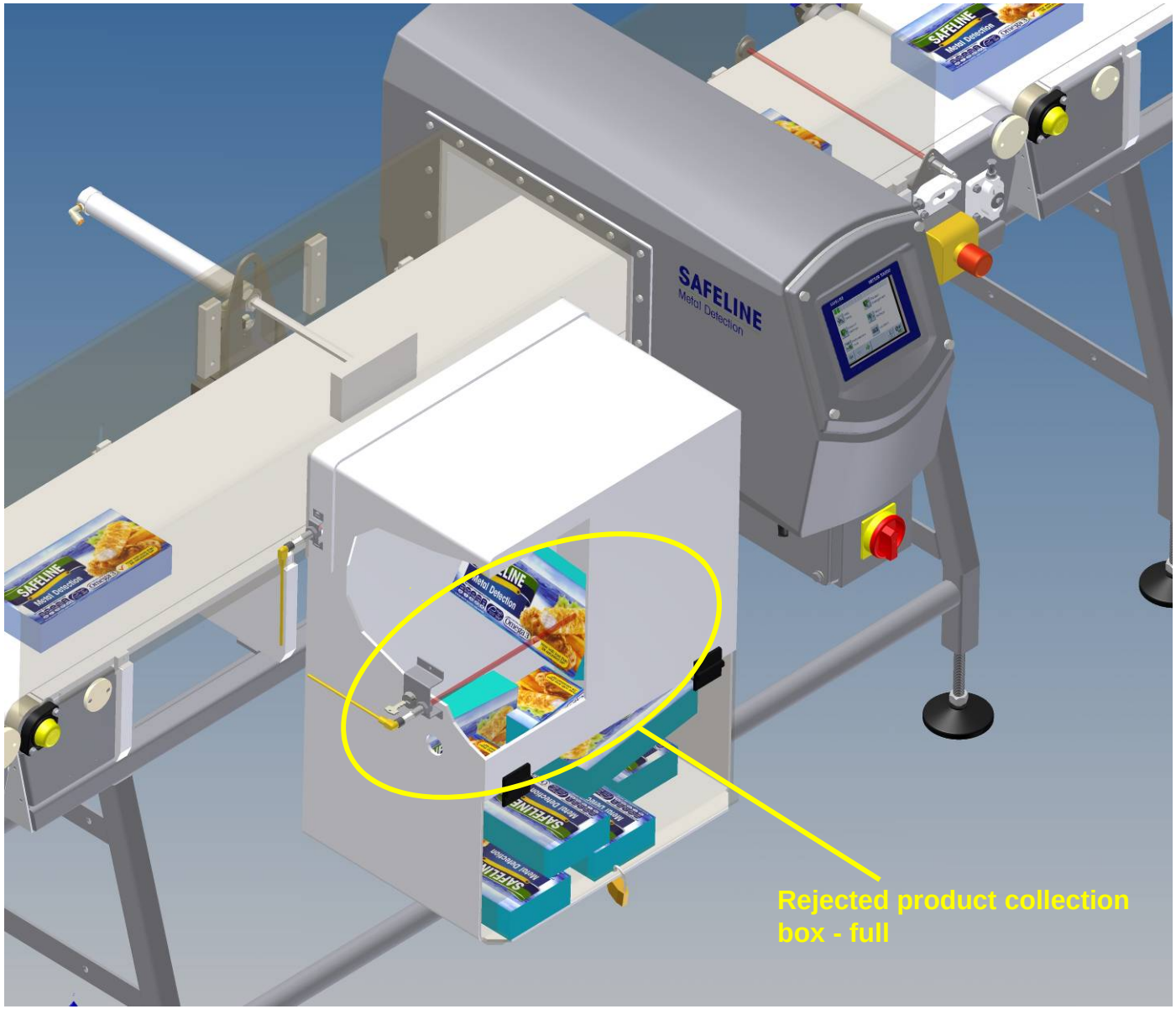

Information & Q&A

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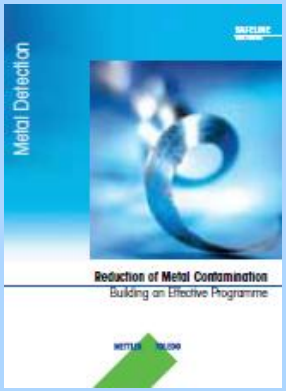
Application Literature

- Hundreds of application descriptions
- For all relevant industries

Technology Guides

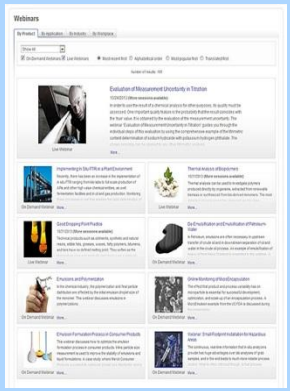


- In-depth technical information
- Get started with a new technology

White Papers

- Technology overview
- Industry best practices

Webinars



- On Demand Webinars
- Live Webinars

User Newsletters

- Industry specific information
- Case studies

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