



GRAINTEC A/S

PRODUCT PRESENTATION



ExproScan

Quality Control By
Computer Vision Technology



ExproScan

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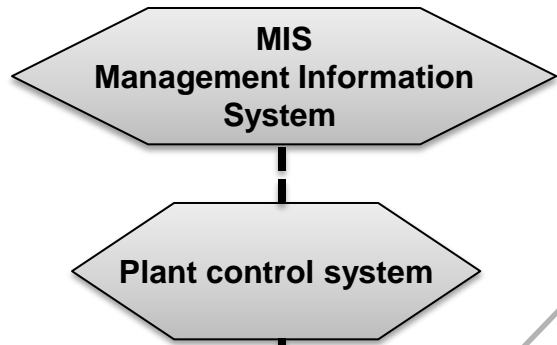
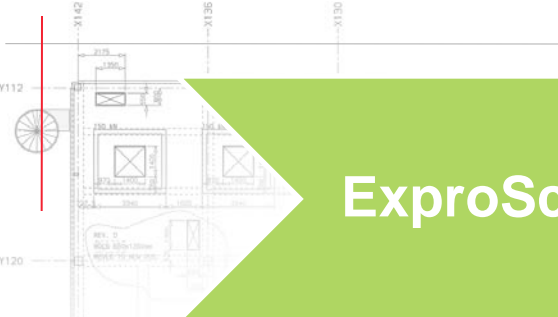


ExproScan



SHORT DESCRIPTION

- ExproScan is Computer Vision Technology for Feed Quality Evaluation of extruded products. Using camera technology it controls and evaluates the physical quality of the product.
- Well suited for product sizes \varnothing 2,0 – 20,0 mm
- ExproScan will partly replace the manual quality control in extruded feed/food production as regards dust and broken products, size, coating issues and foreign elements.
- The main hardware includes:
 - Sampling device to extract samples during production
 - Small belt conveyor with frequency control and speed encoder
 - Illuminated device, which illuminates the sample during testing
 - 2D and 3D cameras
 - Personal computer to provide disk storage of images and specific application programs
 - 19" pressure sensitive color monitor
- The software includes:
 - Microsoft C#.NET and Microsoft Visual Basic C++
 - Recipe/product based



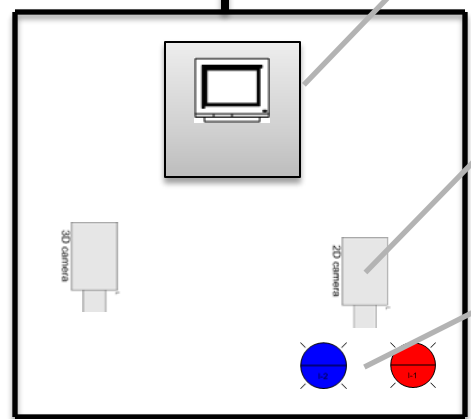
PC and colour monitor

Cameras

Illumination device

Sample product flow

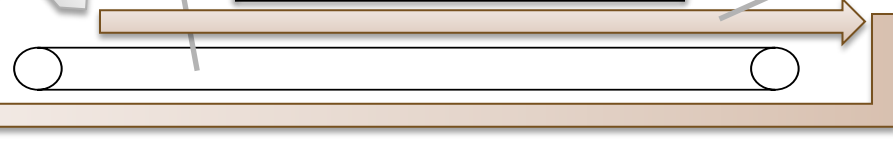
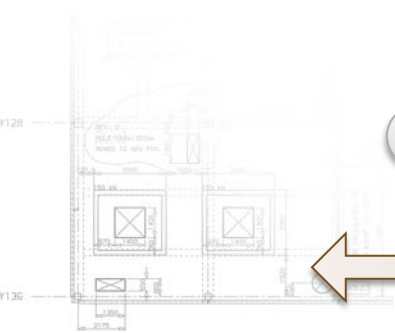
Ethernet connection



Belt conveyor

Sampling device

M



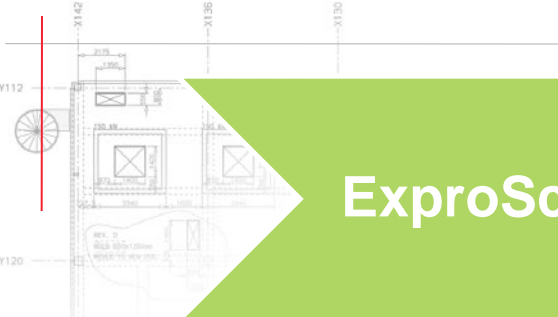


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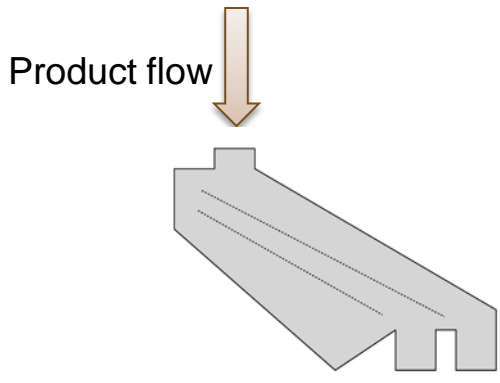
FEATURES

- Control and analyze the dust quantity in final product
- Control and analyze broken product quantity in final product
- Detect foreign elements in the product, for instance un-ground grains visible on the surface of the product
- Control and analyze coating issues
- Trace blood products in the product
- Control the size of the product (length x width x height)



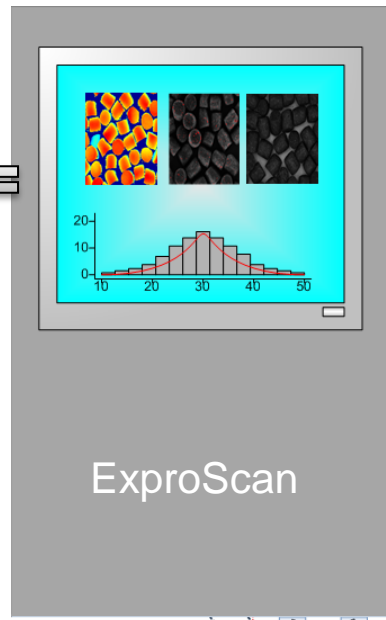
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SYSTEM LAY-OUT AND DIMENSIONS



Product flow

Ethernet connection to plant PLC



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Approx. 1,500 mm

Final product sifter

Dimension:
Length: ~ 1,500 mm
Height: ~ 1,500 mm
Width: ~ 600 mm

Sample flow 0.2 – 2.5%

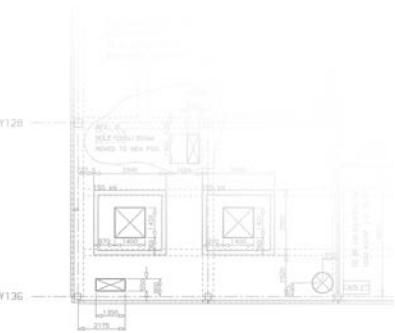


Belt conveyor with variable speed drive



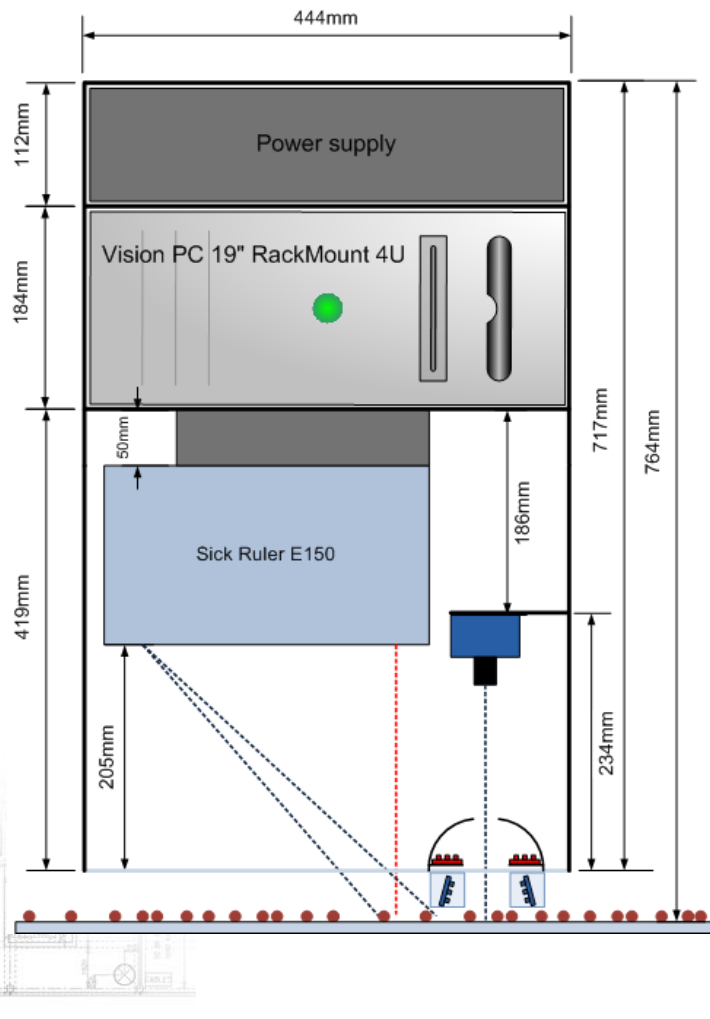
Sample flow to be returned to product flow

Approx. 1,500 mm



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DIMENSIONS CABINET



- The cameras, lights and light controls, computer and 19' pressure sensitive color monitor, power supply etc. are mounted into a stainless steel cabinet above the belt conveyor
- The size of the cabinet is (HxWxD): 750 x 500 x 500 mm
- Via Ethernet it is possible to connect the Vision PC to customer I/O process control system (Process Controller - PLC – or Process SCADA PC)

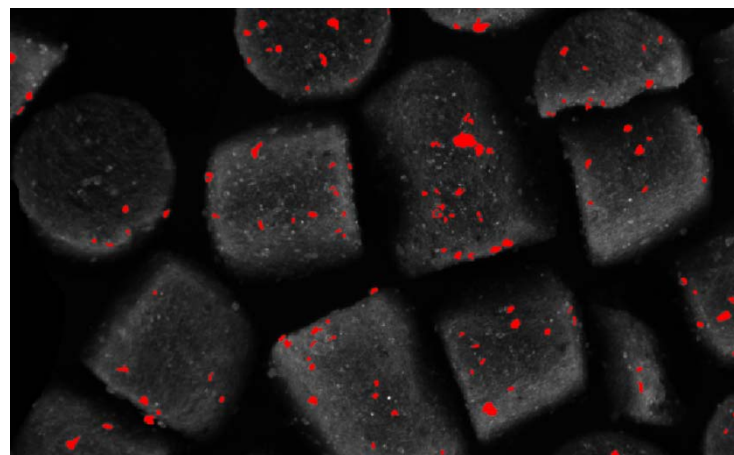
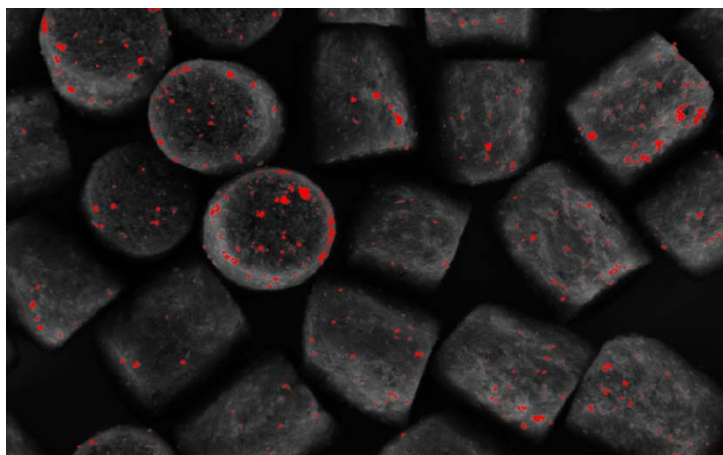


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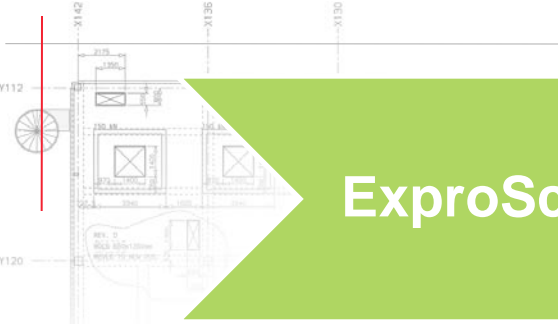
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DUST CONTROL



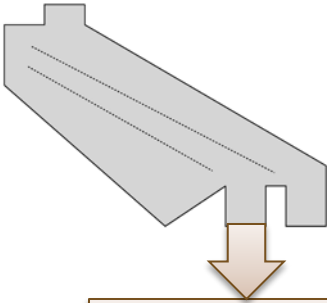
The red color indicates dust particles. It is possible to detect whether the final product contains dust and on what level (% indication)



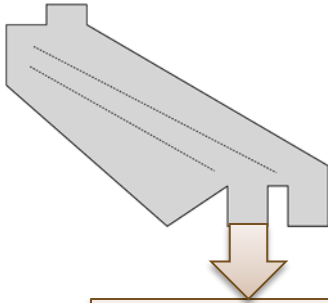


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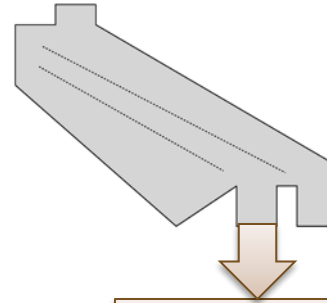
DUST CONTROL



Ø 2.0 mm pellets
After sifting:
0.43 % dust



Ø 9.0 mm pellets
After sifting:
1.69 % dust



Ø 12.0 mm pellets
After sifting:
1.94 % dust

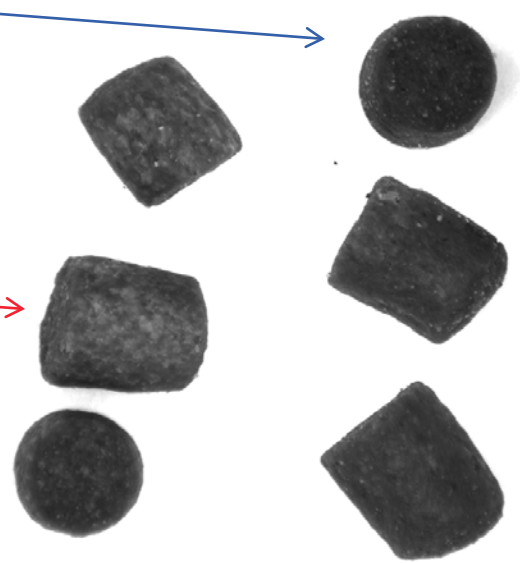
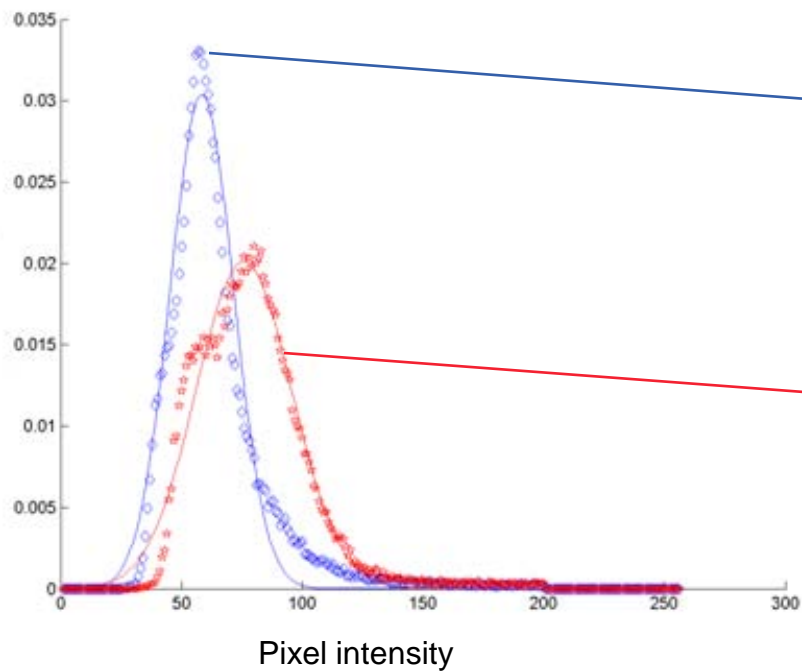
The ExproScan detects dust content in feed with very high accuracies!





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COLOUR CONTROL



Under diffuse light the product is scanned in order to detect coating quality:

Blue : Pellets with uniform coating

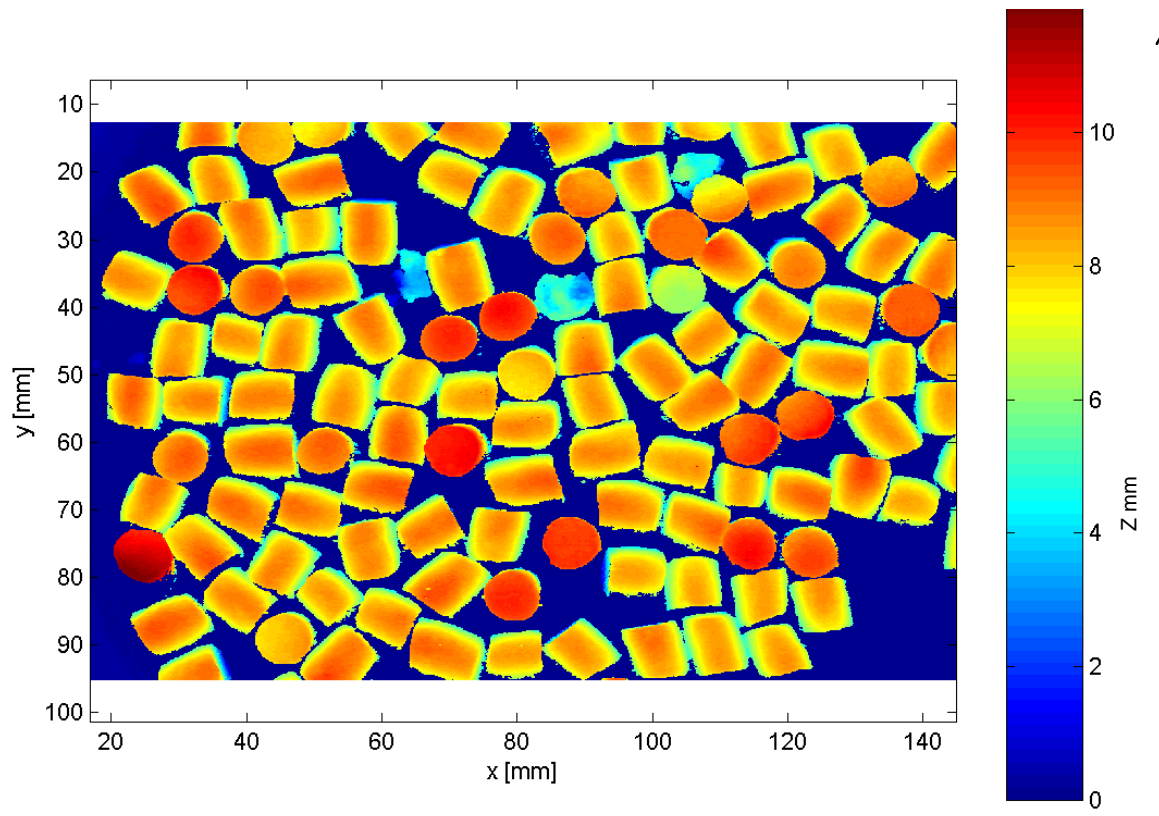
Red: Pellets with non-uniform coating



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SIZE CONTROL



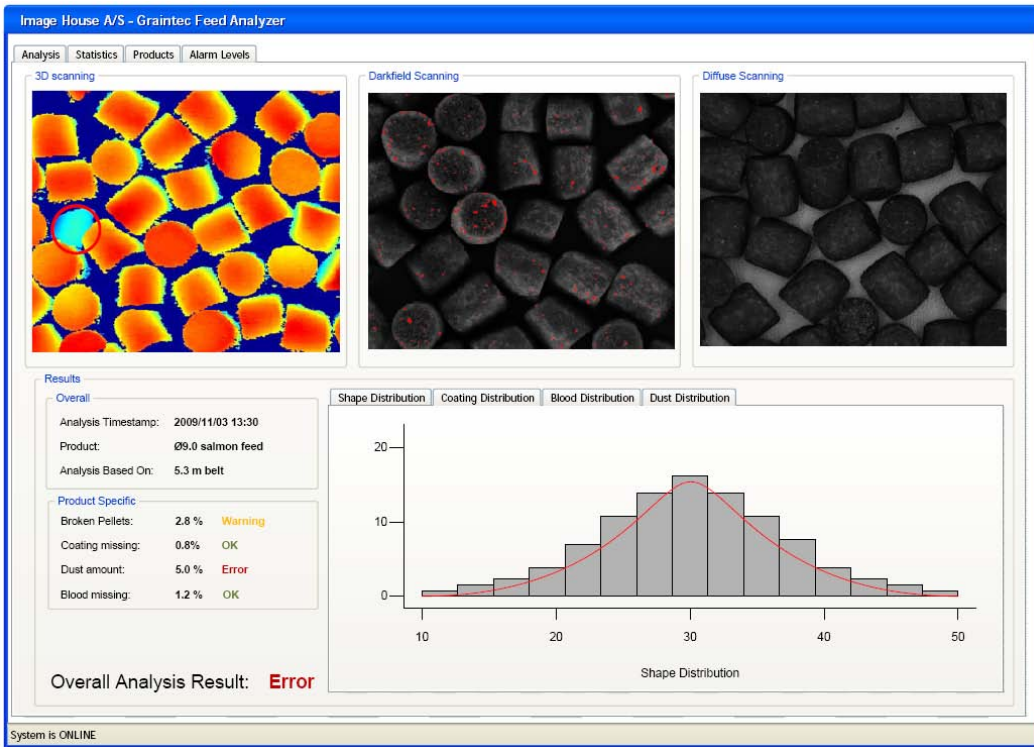
The picture shows a 3D scanning of a 9.0 mm product. The colour indicates the height of the product. Please note that the light blue colour shows broken products. It is possible to set alarm levels for broken products and sizes.



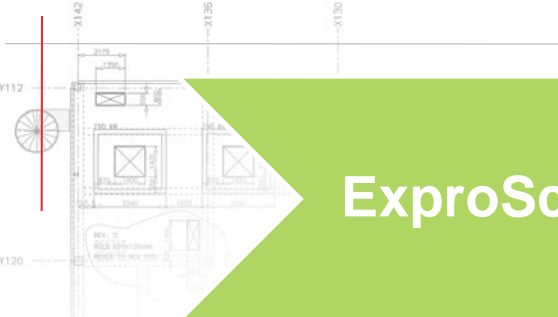
ExproScan



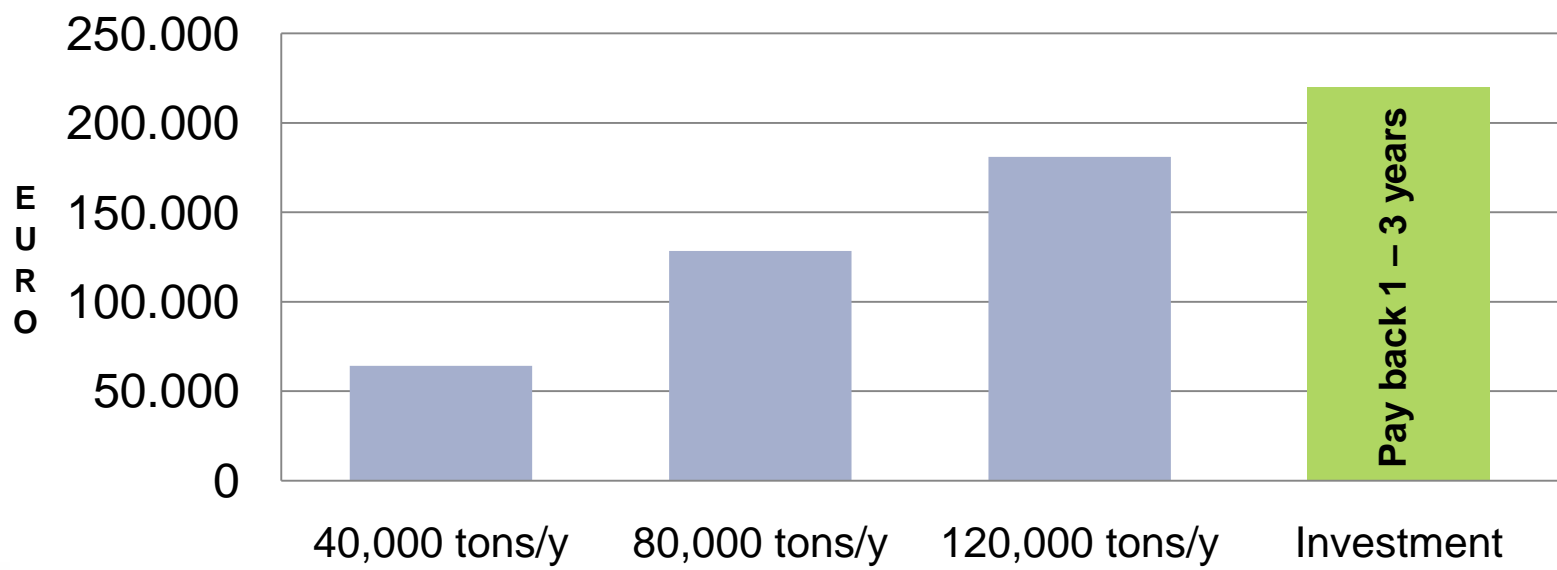
SOFTWARE



Software is developed in Microsoft C#.NET and Microsoft Visual C++.
The screen shows a recipe/product specific analysis of the product scanings.
It is possible to set alarm levels for dust, broken pellets, color and size.
The system will be supplied with a recipe handling program.



Annual Savings



Savings on costs of reprocessing products (rework) and customer complaints are based on a production of salmon/trout feed. It is based on re-processing cost of € 107per ton and a reduction of re-work volumes and customer complaints of 1.5%.





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MAINTENANCE

- Monthly checks:
 - Clean windows
- Quarterly checks:
 - Back-up of data is recommended
- Other items
 - New bulbs (5 years life time)
 - No calibration is required (The system will give an alarm in case of problems related to size scanning of the products)



ExproScan

PRICE SUMMARY

Specification	Price in EURO
Sampling device, belt conveyor, scanning hardware, connections	Incl.
Scanning software (Microsoft C#.NET and Microsoft Visual C++)	Incl.
Intellectual property rights, design, engineering, documentation	Incl.
System testing and commissioning excl. travels, board and lodging	Incl.
Total excl. the items and services mentioned below	€ 165,000.-

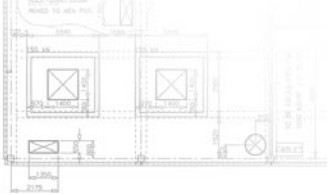
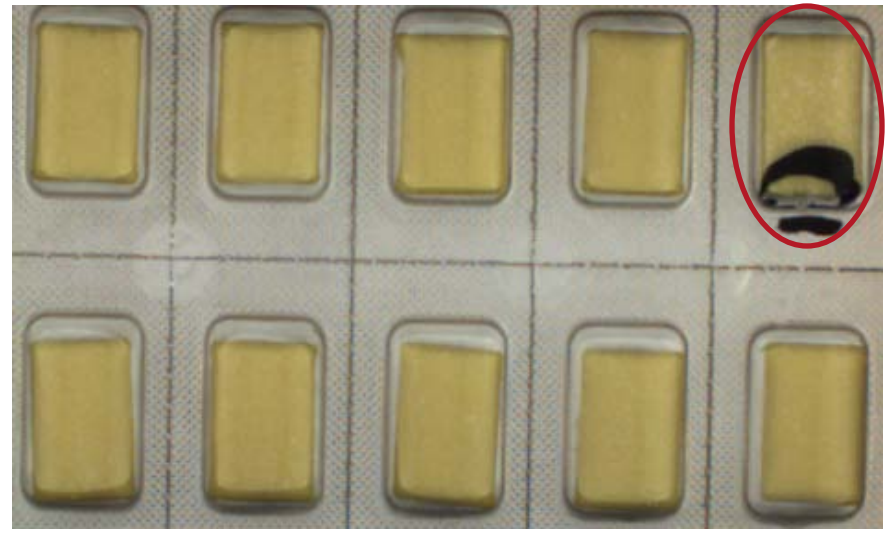
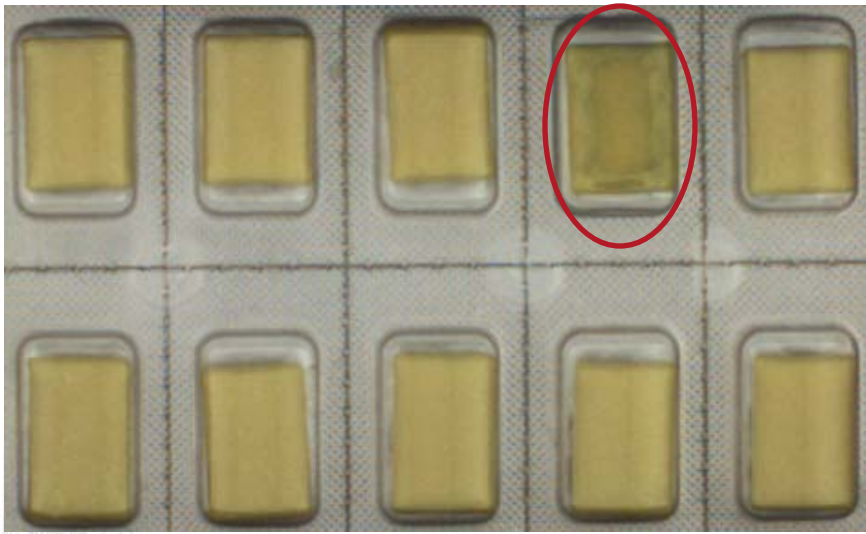
- Excl.:
 - Sample flow return conveyor if required
 - Electrical power connections, cables and switches
 - Packaging and freight to destination
 - Travels, board and lodging for commissioning engineer(s)
 - Electrical and mechanical installation works
 - Integration towards plant PLC and MIS systems
 - Above items can be included after a detailed plant survey



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SIMILAR SYSTEMS IN THE PHARMACEUTICAL INDUSTRY

- ➊ Typical blister inspection
 - Color control
 - Size control
- ➋ Images below show examples of color control



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