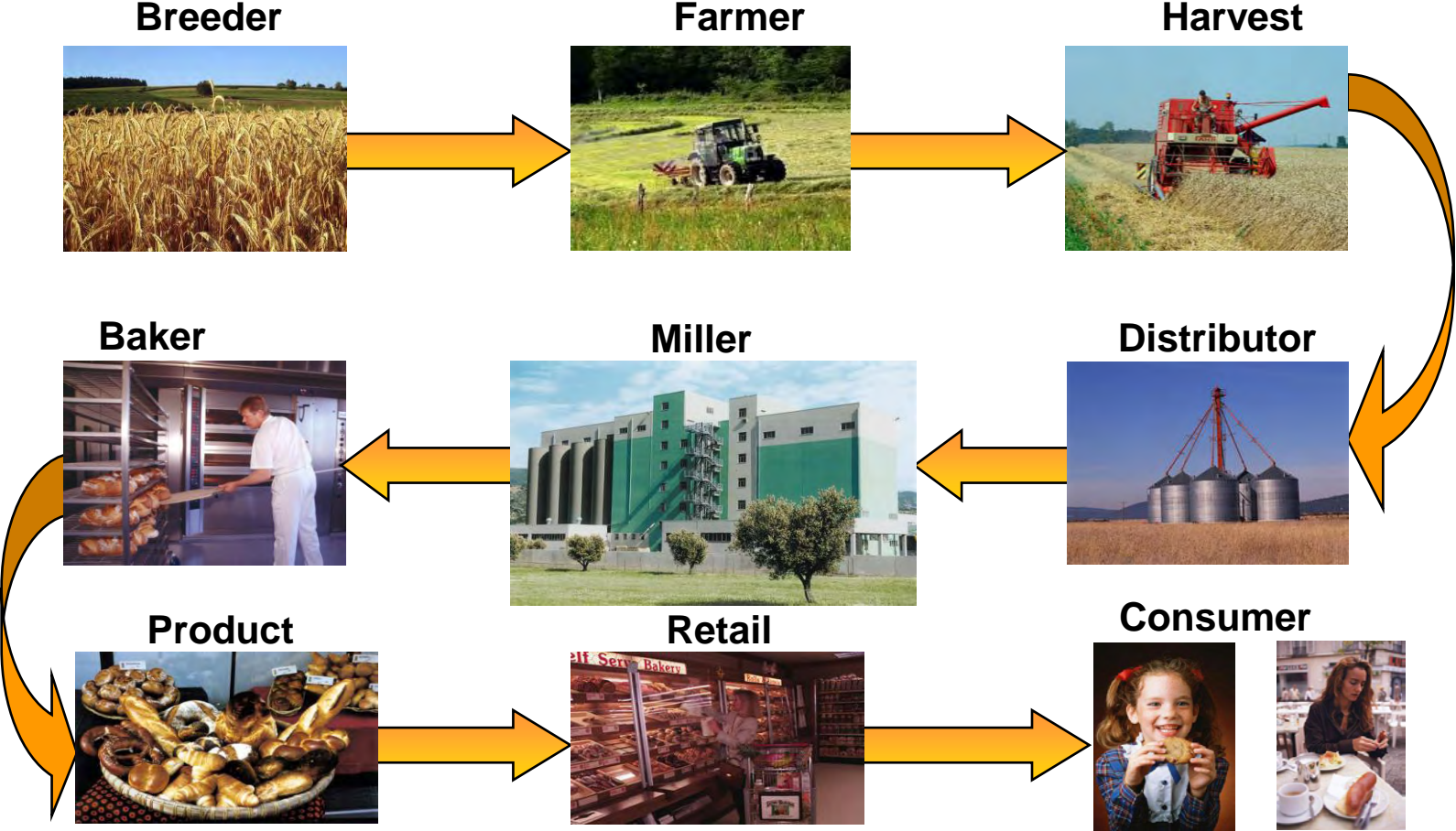


# Ultimate Product Safety and Quality in Grain Milling

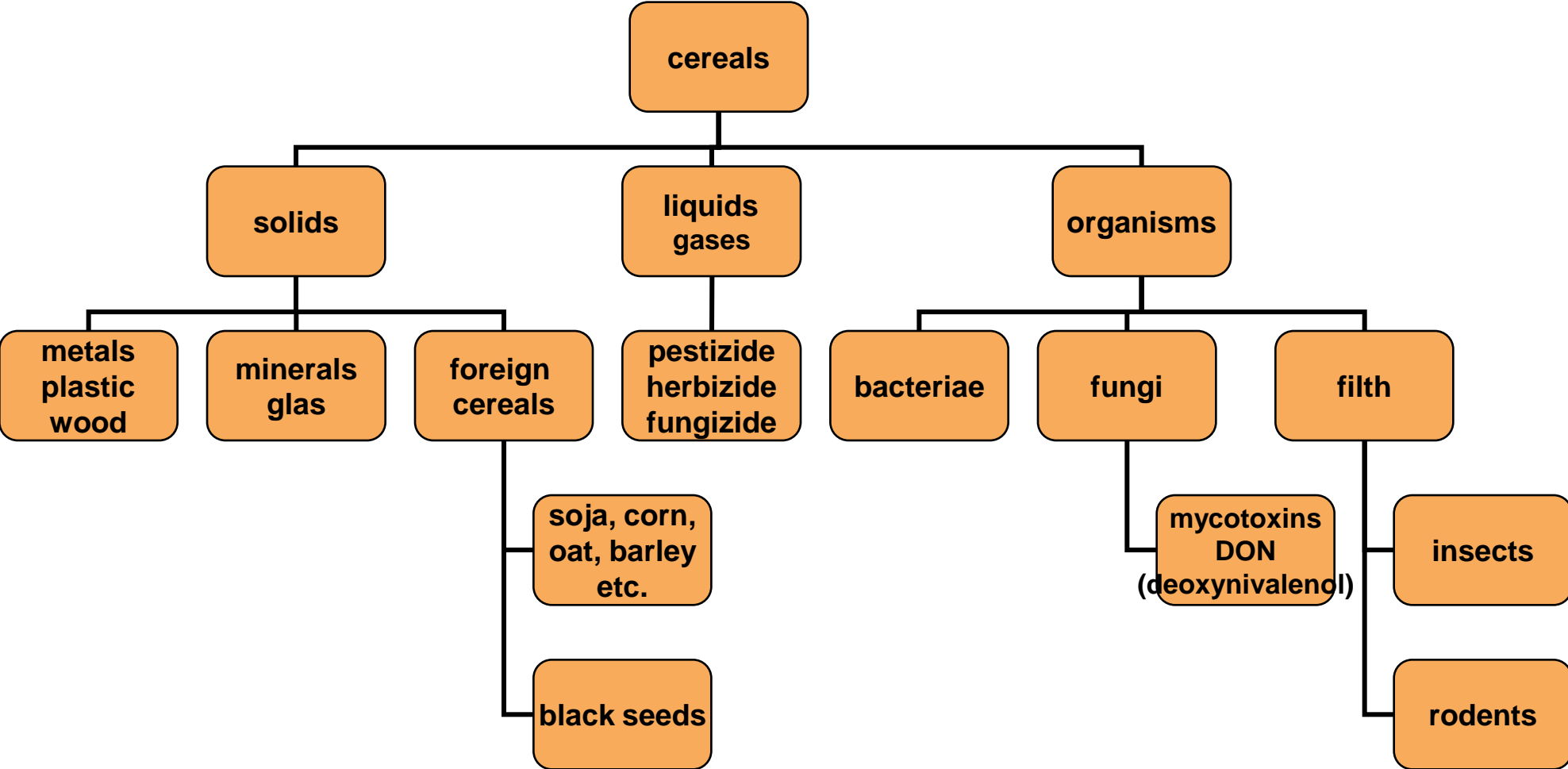
Walter Bruggmann



# The miller in the center of production chain



# Contamination threatens food safety



Separation

Magnets &  
Metal Detectors



# ***Metallic contamination from where?***

- **found in raw material**

nails, screws, nuts, wire etc., metal parts from packaging, machines, transport storage facilities



- **process equipment**

mesh and screen fasteners, knives, wear and tear parts, buckets and pallets from conveyors



- **maintenance work**

residues from welding and grinding, sheet metal, lost tools and accessories



- **personnel**

necklaces, rings, buttons, pens, combs etc.

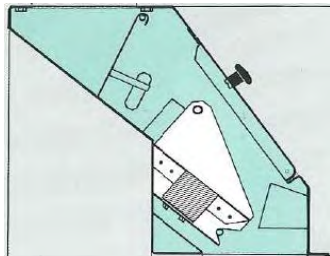


# Magnets for the separation of ferrous metals.

drawer magnet



MMUA

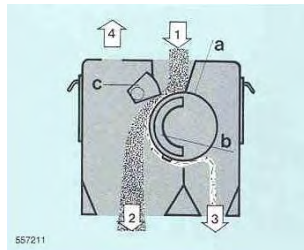


- for cereals
- little space required

drum magnet



DFRT



- for cereals
- self-cleaning

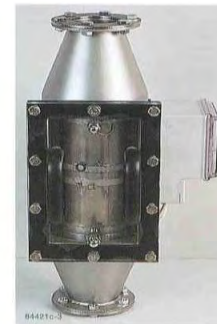
magnet for spouts and pneumatic transport lines



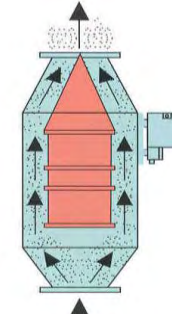
MMUD



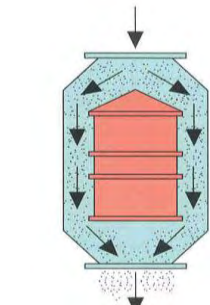
- for cereals
- high capacities



MMUP



MMUD



- for flour
- and bran

# ***Metal detectors for the separation of ferrous and non-ferrous metals.***

- separation of non-ferrous metals and stainless steel
- continuous, automatic separation of unwanted foreign objects
- flexible installation



metal detector for  
small packing



metal detector  
for unpacked material  
installation into spouting

# Efficiency in Cleaning, Grading and Surface Treatment





# ***High capacity density-grader Gravomat***

***sharply divides between  
fractions of high and  
low density:***

***sound wheat and  
contaminated wheat***

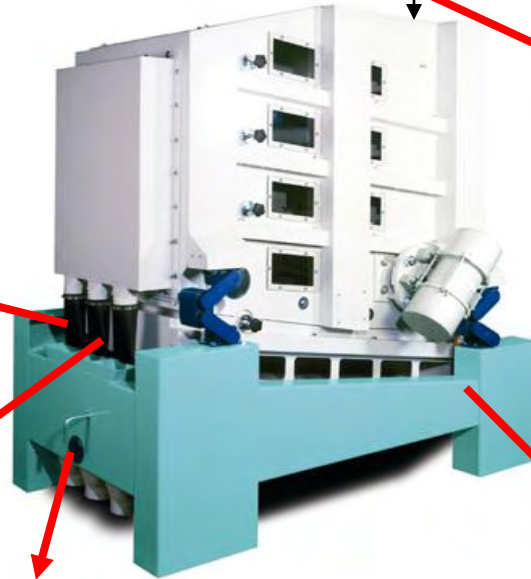
***sprouted wheat***

***(quality shifting)***



# Grading by gravity separator.

Product inlet



Heavy product 60.0% / 21.1%  
37.9gr. 1000 kernel w.  
82.0 kg/hl

Mixed product 100% / 35.2%  
37.2gr. 1000 kernel w.  
80.8 kg/hl



Heavy product 1

CD84\_12778

CD84\_12776

Heavy product 22.3% / 7.9%  
37.7gr. 1000 kernel w.  
81.4 kg/hl

Mixed product 12.6% / 4.4%  
37.2gr. 1000 kernel w.  
79.7 kg/hl

Light product 5.1% / 1.8%  
23.6gr. 1000 kernel w.  
65.0 kg/hl



Heavy product 2

CD84\_12780

Mixed product

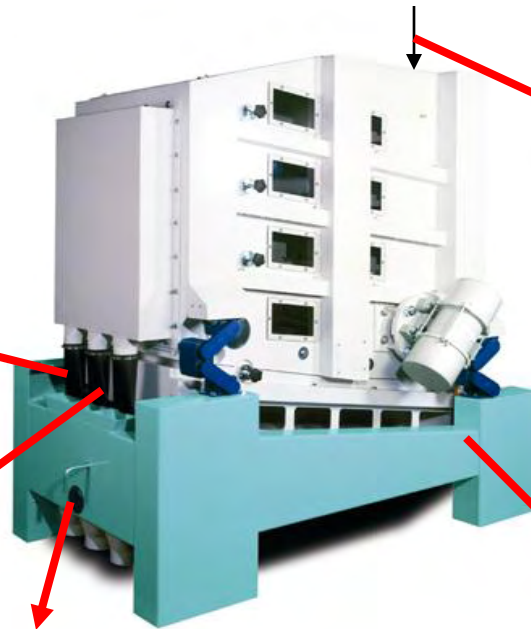
CD84\_12781

Light product

CD84\_12678

# Grading by gravity separator.

Product inlet



DON 1.0 ppm

Heavy product 1

CD84\_12778

DON 4.0 ppm

2 mm

CD84\_12776

DON 1.1 ppm

Heavy product 2

CD84\_12780

DON 4.0 ppm

Mixed product

2 mm

CD84\_12781

DON 51.4 ppm

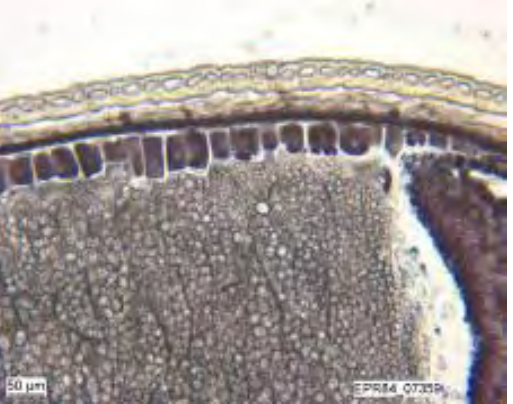
Light product

2 mm

# Light Peeling Process.

DC-Peeler "friction"

Before  
Light Peeling



After  
Light Peeling



# ***Application of different surface treatments.***

## **Scouring**

- To produce standard flour from healthy wheat
- Application with the lowest energy- and investment

## **Light Peeling**

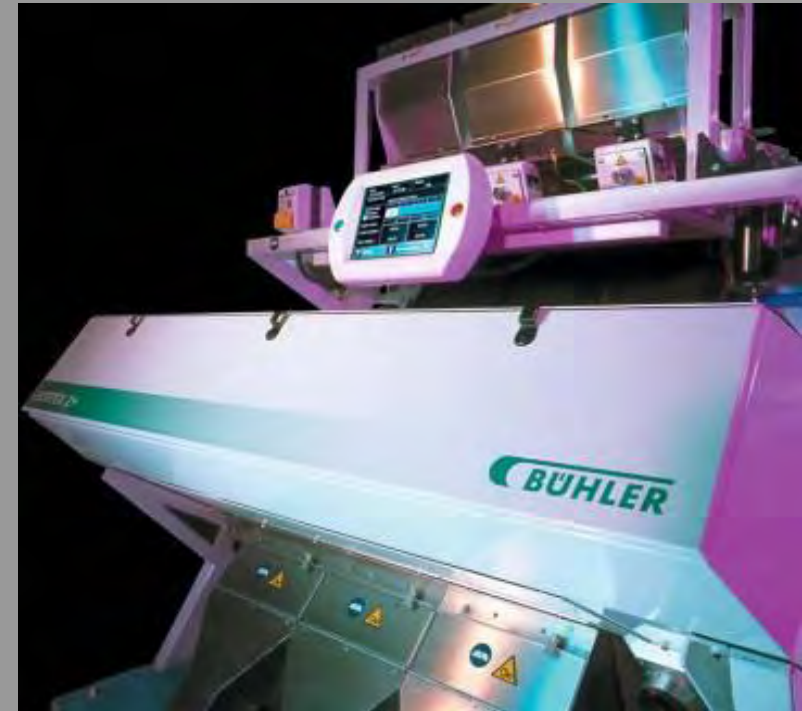
- For a higher product safety, lowering of bacteria count
- Application for improved surface cleaning compared to conventional scouring

## **Peeling**

- Products with higher value:
  - Whole-wheat and special flour, grain for breakfast cereals, etc. ...  
(stringent contamination requirements)

Sortex

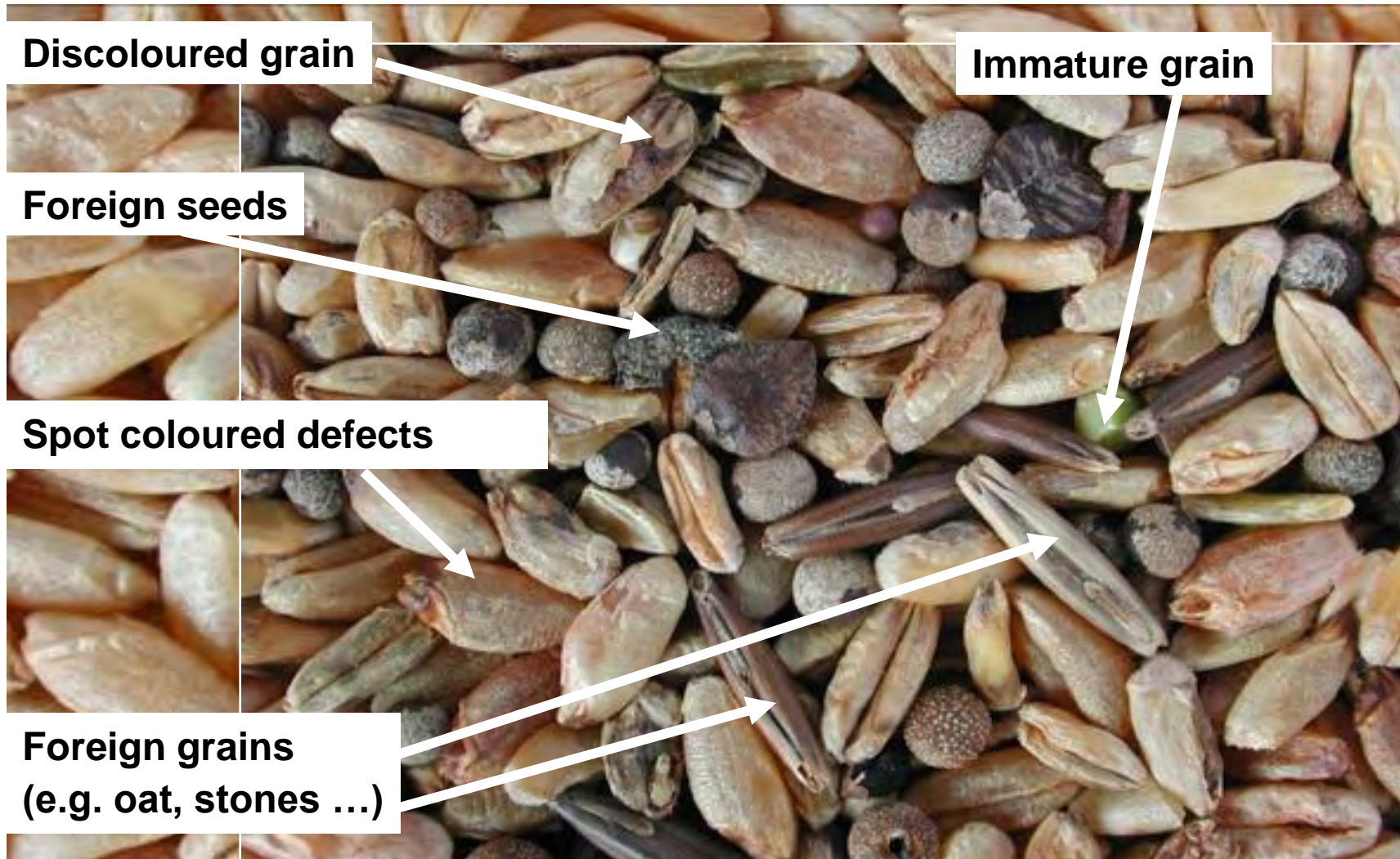
Optical Colour  
Sorter



# *The new Sortex Z+.*



## *Separated defects by dark sort.*



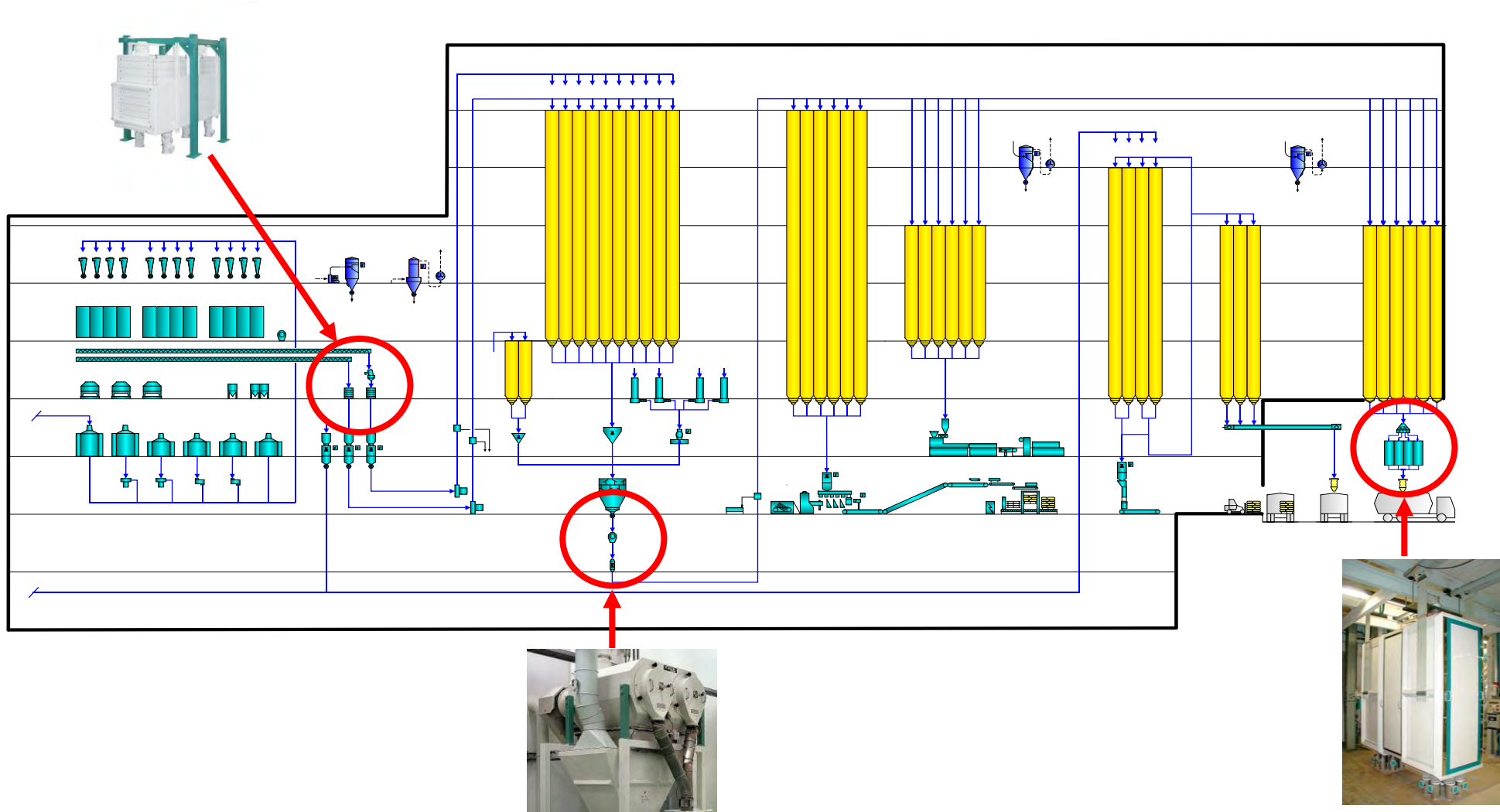


Sifting

Re-bolting



# Re-bolting in mill, packing and bulk loading.



De-activation

Sterilator

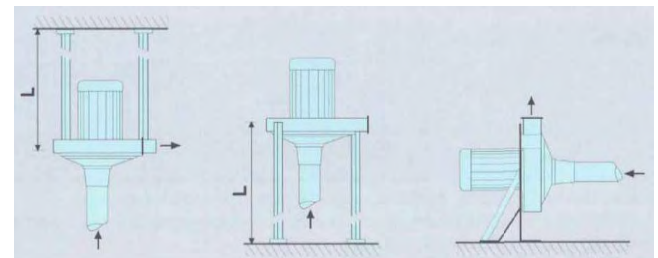


# ***Sterilator for treatment of finished product.***

## *Applications:*

- installation into pneumatic conveying line or spouting
- flexible installation horizontal / vertical/ suspended / standing on floor
- for flour and semolina
- high capacities up to 40 t/h
- high efficiency of > 99 %, barrier between mill and flour silo
- maximum product safety by installation ahead of bulk loading or packing
- improved shelf life of finished product

Sterilator MJZG  
for finished products



Monitoring

Online NIR  
Systems



# DA-online measuring.

## Application:

### ■ measuring properties in flour:

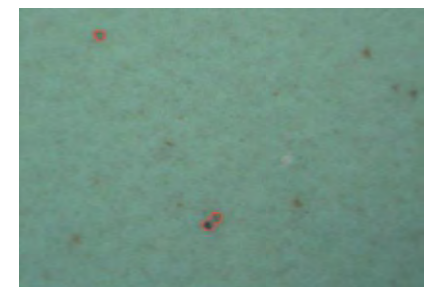
- protein
- moisture
- ash

### ■ measuring properties in semolina:

- protein
- moisture
- ash
- color (Minolta) L, a\*, b\*
- specks

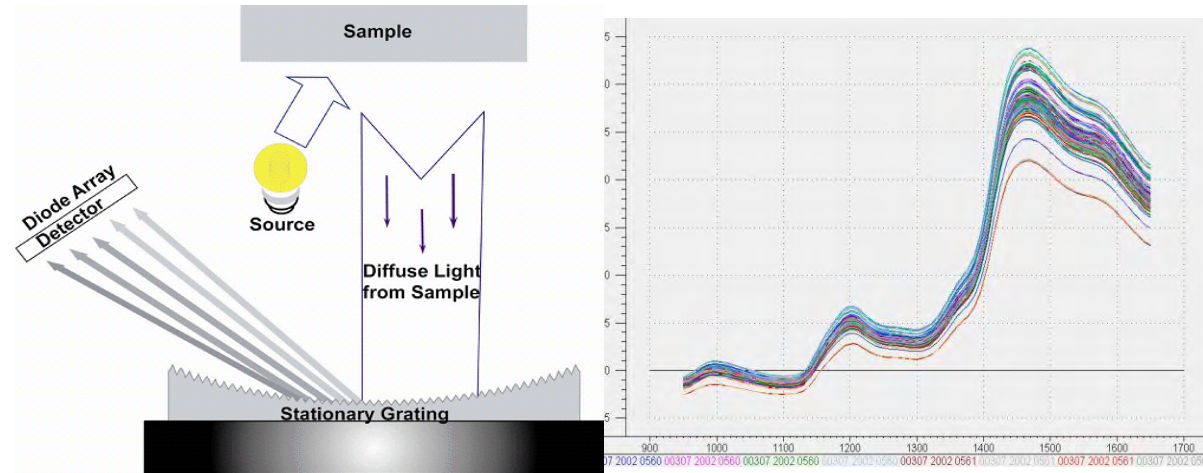
### ■ indication of:

- starch damage
- water absorption



# Buhler DA-online measuring system.

*components and working principle:*



## ■ MYRB

- screw discharge  
(no vibrations)
- optional CCD camera for  
color measuring (Minolta)

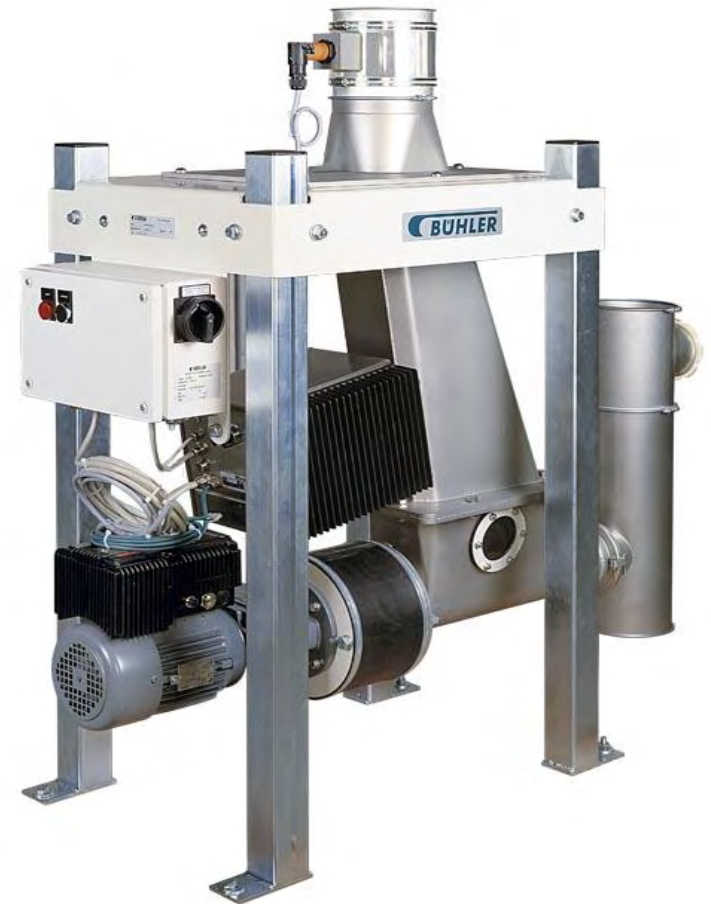
## ■ DA-online measuring

- Diode-Array-technology
- graphic display of NIR-spectrum
- short-interval measuring cycles
- no moving parts

# DA-online measuring.

## *Product safety and benefits:*

- continuous real-time recording of product-specific properties (protein, moisture, ash, starch damage, water absorption, optional color / specks)
- constant quality of finished products
- reduction in laboratory control work
- uninterrupted quality control and accurate traceability
- closed-loop systems for optimizing of finished product quality and extraction (ash, gluten)





# ***Product safety and quality go beyond policing and safety measures***

- ***employ machines and equipment of highest design standards:***
  - which are conducive to failsafe operation
  - which allow a constant, high performance and reproducibility of settings
  
  - which facilitate easy cleaning and maintenance
  - featuring suitable surface coating and materials

***Some examples.....***

# Antares, The New Art of Milling



# *Antares - Four-Roller Mill MDDR.*



**From the design concept**

**→ to reality**



# *Powerful.*

## Constant grinding action

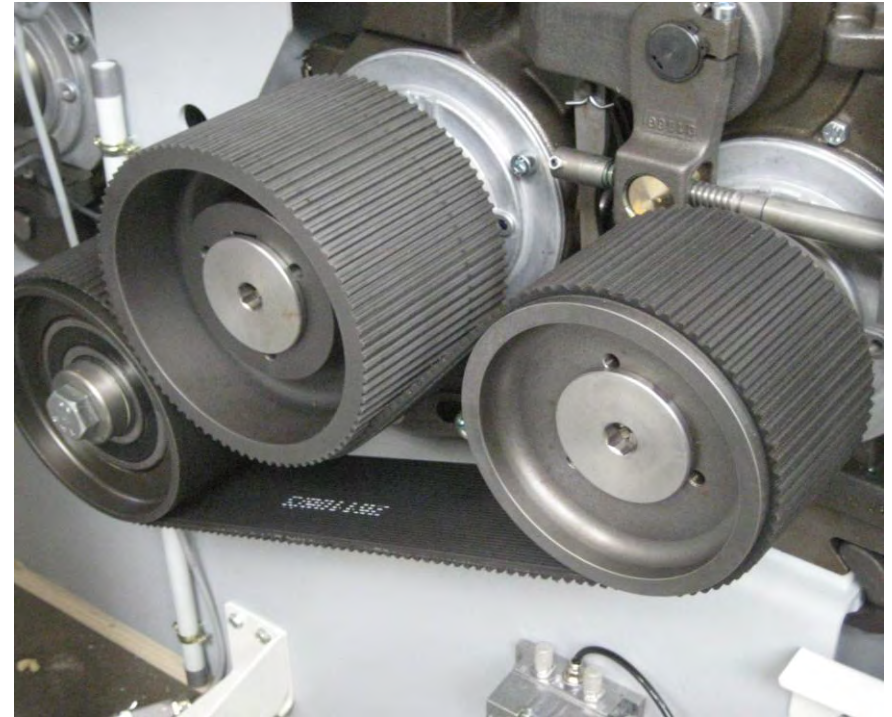
- Stable roll pack with self-contained forces
- Precise settings
- Pneumatic engagement and disengagement
- Automatic roll gap adjustment (optional and retrofit possible)



# ***Solid.***

## **Oil-free belt transmission Easy maintenance**

- Heavy duty profiled timing belt
- Identical belt length for all passages
- Adjustable belt for different roll diameters
- Single belt system for easy maintenance



# *Hygienic design for ultimate sanitation*

- stainless steel in product area, ss **insulated panels outside**
- swing-up cover
- swing-out feed module for **residue-free emptying** of the feed room
- **oil-free drives**



# *Cleaning made easy.*

No hidden spots,  
easy access!



# Safe operation.

- Checking and modification of operating parameters
- Centralized connection panel at the bottom of the roller mill
- Profibus or RS-485 interface for communication with the mill control system
- All internal wiring is done at our works





# ***“Cockpit” control system for roller mills.***

## **Central Controller with Data Collector**

- Data of all roller mills will be centrally collected
- Survey can be done at data collector
- All parameters and settings can be saved and recalled
- Operator manuals electronically stored



# Sirius, The New Dimension in Sifting





**“Sirius”**  
**“swing’n in the mill”**

# Sanitation

- Stainless steel housing
- No coated surface within product area
- Completely insulated compartments
- Smooth profiles
- Insulated bottom plate



# ***NOVA sieve***



# NOVAPUR – The New Sieve Generation

**PUR outer frame with stainless steel insert frames  
(as a new standard or as a retrofit for older sifter models)**

- **No wood in the process**  
→ **food safety**
- **Easy and quick cleaning**  
→ **less maintenance**
- **Tight sieve stacks**  
→ **product purity**
- **No joints or fasteners**  
→ **product safety**
- **Sieve area: 0.404 m<sup>2</sup>**  
→ **high performance**



# ***NOVAPUR – The New Sieve Generation***

## **PUR outer frame**

- Resistant against abrasion
- Less residual product, due to the smooth profile
- Ultimate food safety (no wood / fasteners)



# Safety measures:



- control raw material & finished product
- establish defined & standardized processes
- optimize plant & building design for better hygiene



- employ continuous online monitoring systems
- establish preventive maintenance schedules
- document QC, pursue traceability (ISO, HACCP)
- train and inform staff adequately



# ***Summary of benefits from measures taken***

- **prevents damage to reputation and image (loss of trust, negative media reports etc.)**
- **prevents expensive product returns (compensation, transport costs, mix back or waste refusal)**
- **early detection of product flaws saves money (the earlier you detect flaws the lower the financial costs to solve the problem!)**
- **traceability and comprehensive documentation creates total transparency**
- **unplanned interruption of production and costly damage to plant and equipment can be reduced to a minimum**



**BÜHLER**











Thank you and enjoy wonderful Arushal!

Tasty, Healthy, Safe.