



Utilization of Filter sheets for the clarification of wine...

(DE and DE Free Filter sheets)

Kentucky Wine Conference

January 5, 2012

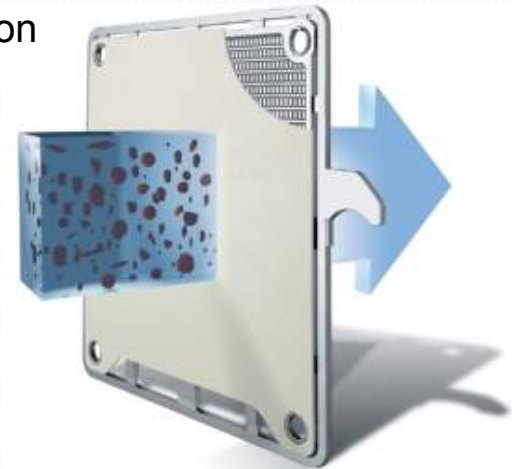
Bob Spadafora

AFTEK INC.

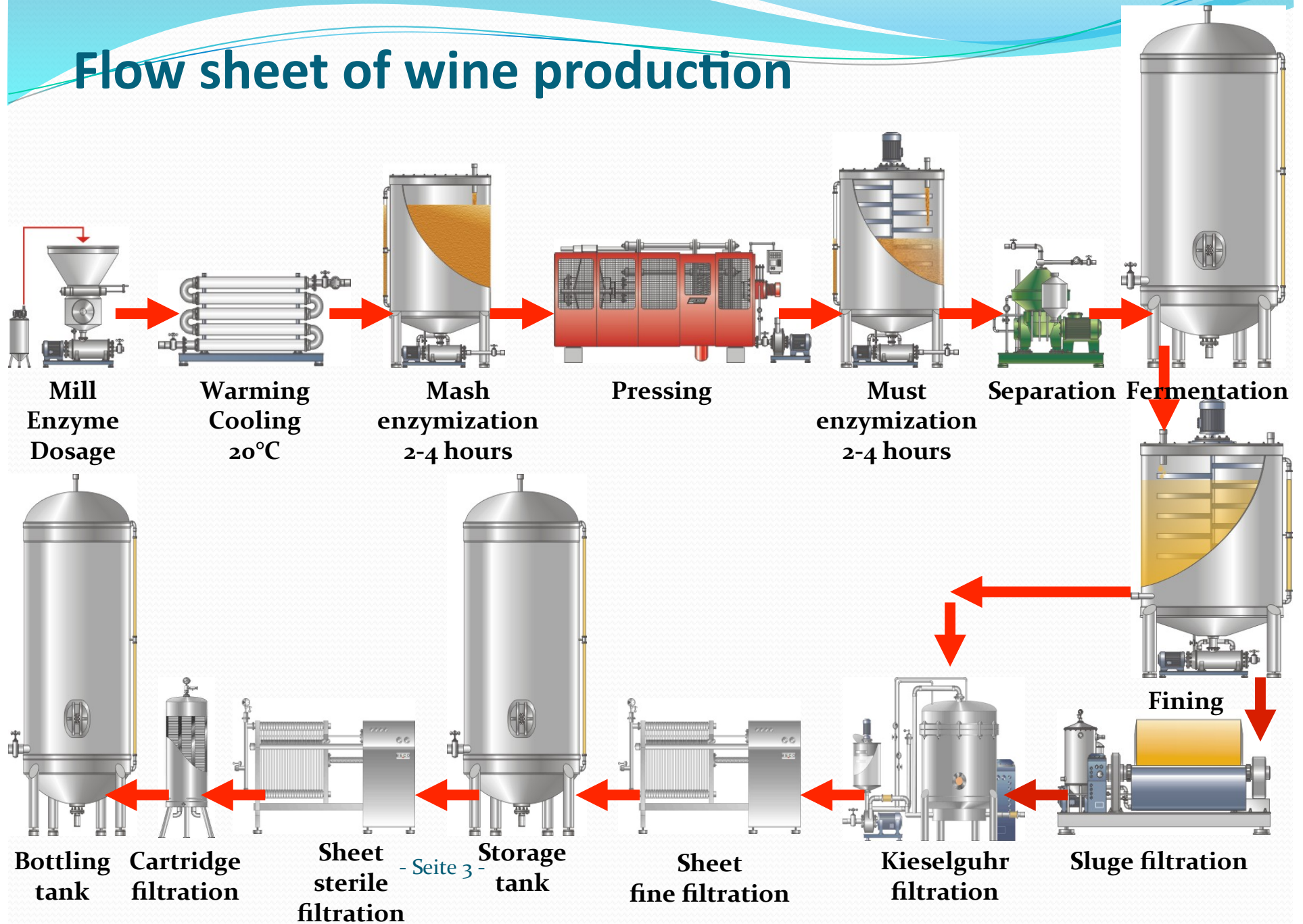
ROCHESTER, NY

Filter Sheet History, “101”

- ▶ 1947: Production of depth filter sheets from asbestos and cellulose
- ▶ Since 1974: Production of sterile depth filter sheets from cellulose and kieselguhr/perlite (minerals)
- ▶ 1988: Complete change to DE/ PERLITE production
- ▶ 2008 – Time to go “green”- DE FREE!



Flow sheet of wine production





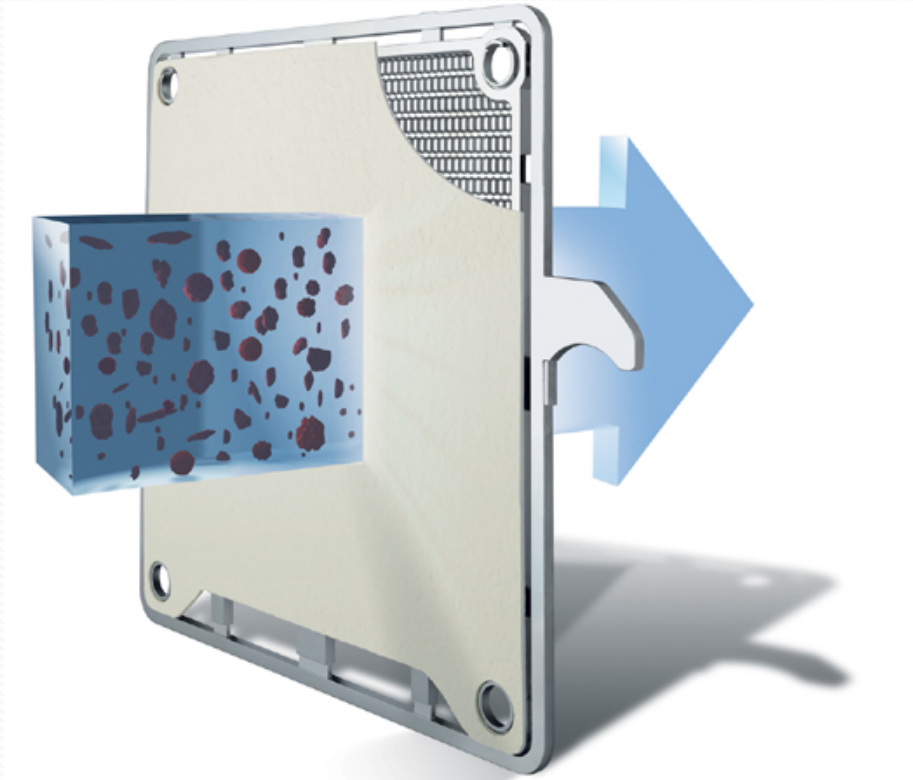
Importance of Filtration with Filter sheets

- ▶ Gentle wine preparation for bottling
- ▶ Low cost of filtration
- ▶ Wine filtered through depth filter sheets, has a special brilliance
- ▶ Effective and economical protection of membranes at the final filtration step

Advantages of using Filter Sheets

- ▶ High contaminat removal capacity
- ▶ Low tendency to blockage
- ▶ High flexibility by a wide spread program of filtersheets
- ▶ Size and throughput of the filter can be changed by increasing or decreasing the number of filter plates
- ▶ A multi step filtration is possible by the installation of a change-over plate

Filter Sheet Filtration Principles

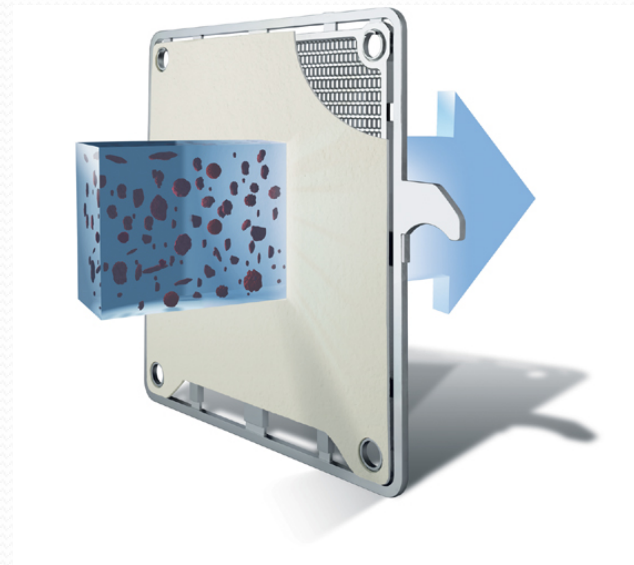


Filtration

Separation of particles
from liquids



Different
filtration mechanisms



How Depth Filter sheets

work :

DE filled and 100% Cellulose

▶ Depth Filtration

Separation of particles and microorganisms inside the matrix of the sheet

▶ Adsorption

Separation of particles and microorganisms due to different electrocinetical charges of the sheet material and the particles and micoorganisms of the wine to be filtered out

▶ Surface Filtration

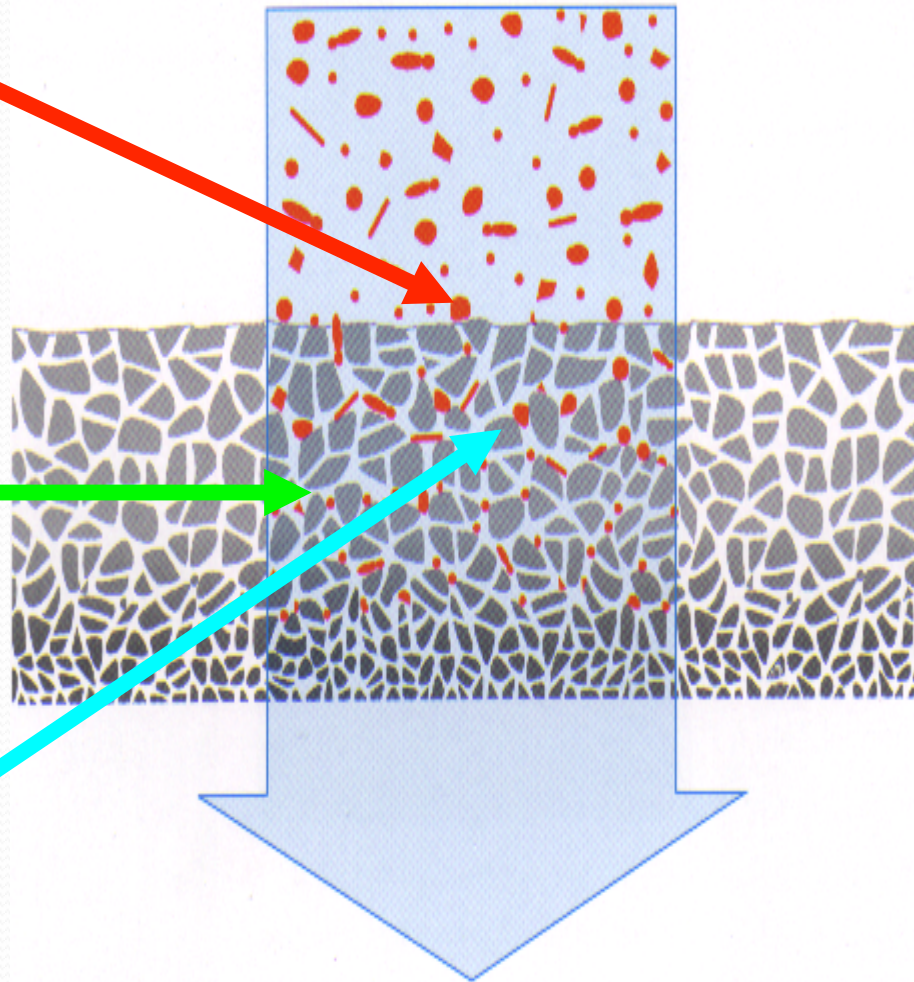
Separation of particles on the surface because of size

Three *degrees* of sheet filtration

Surface Filtration

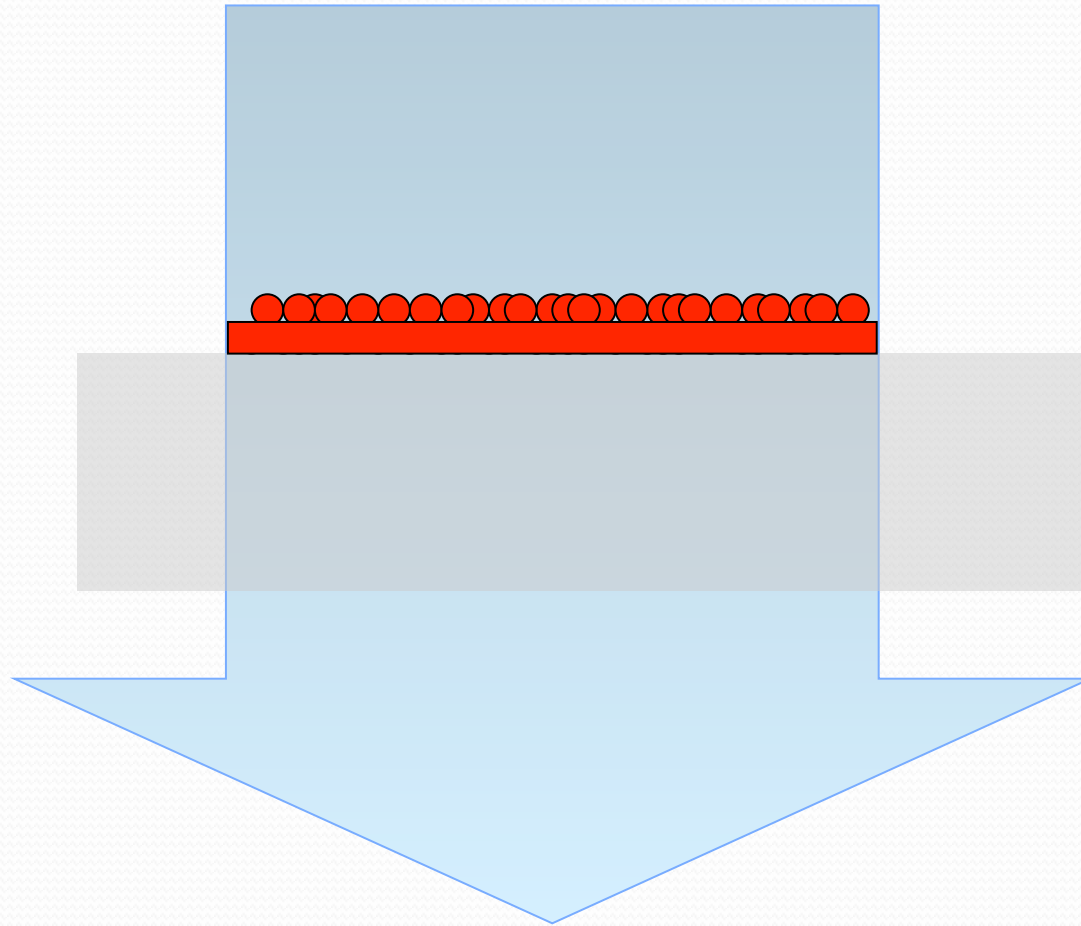
Adsorption

Depth Filtration



Filtration Mechanisms

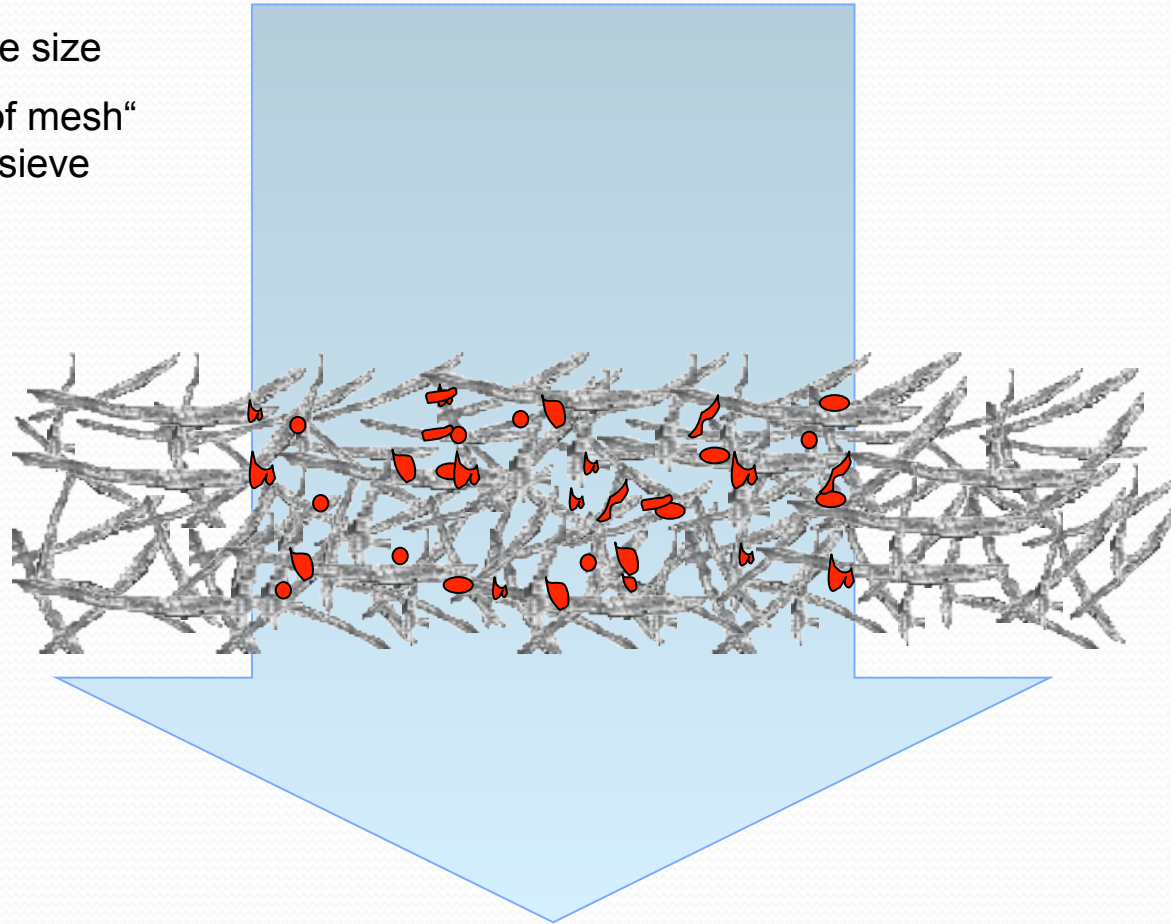
Surface Filtration



Filtration Mechanisms

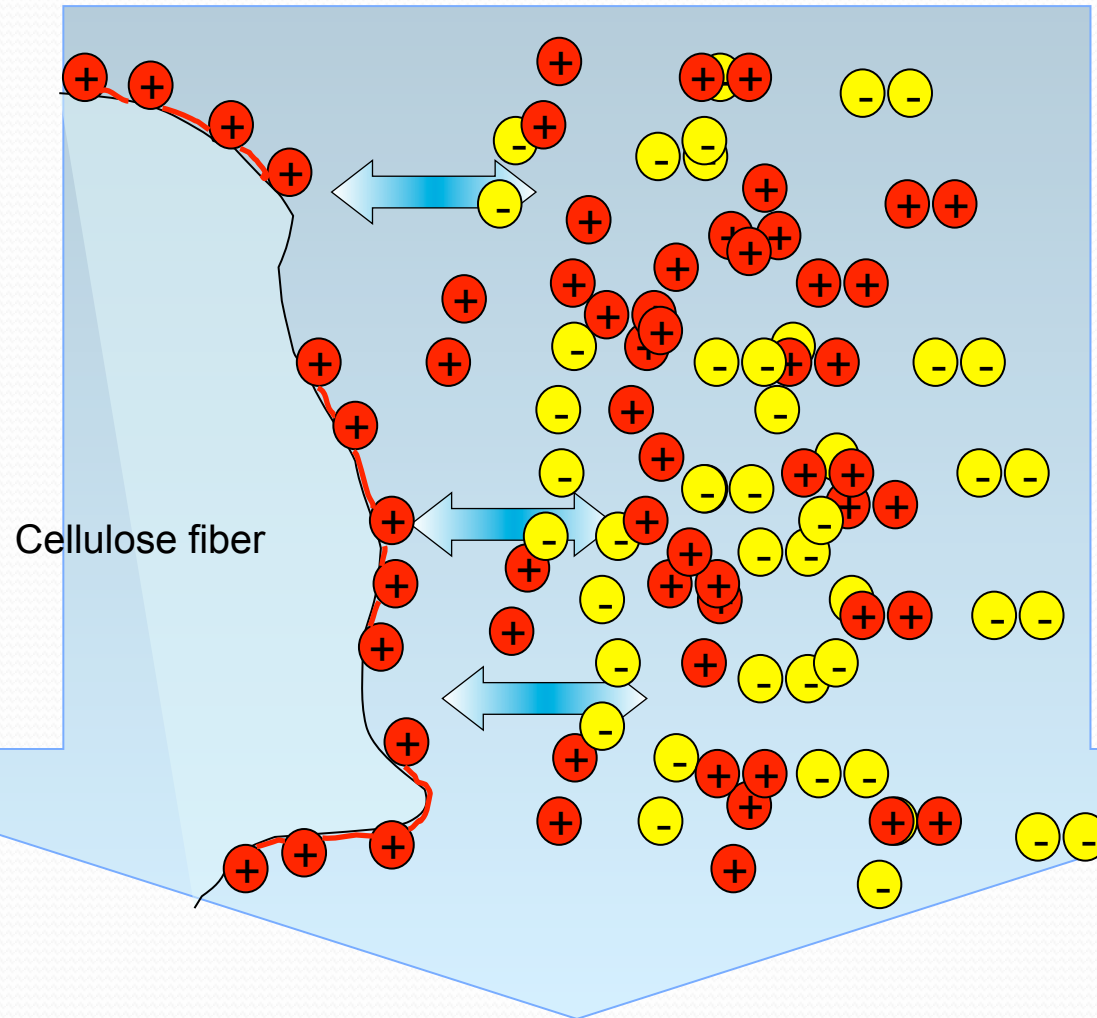
Mechanical (depth) Separation

- ▶ Particle size
- ▶ „size of mesh“
of the sieve



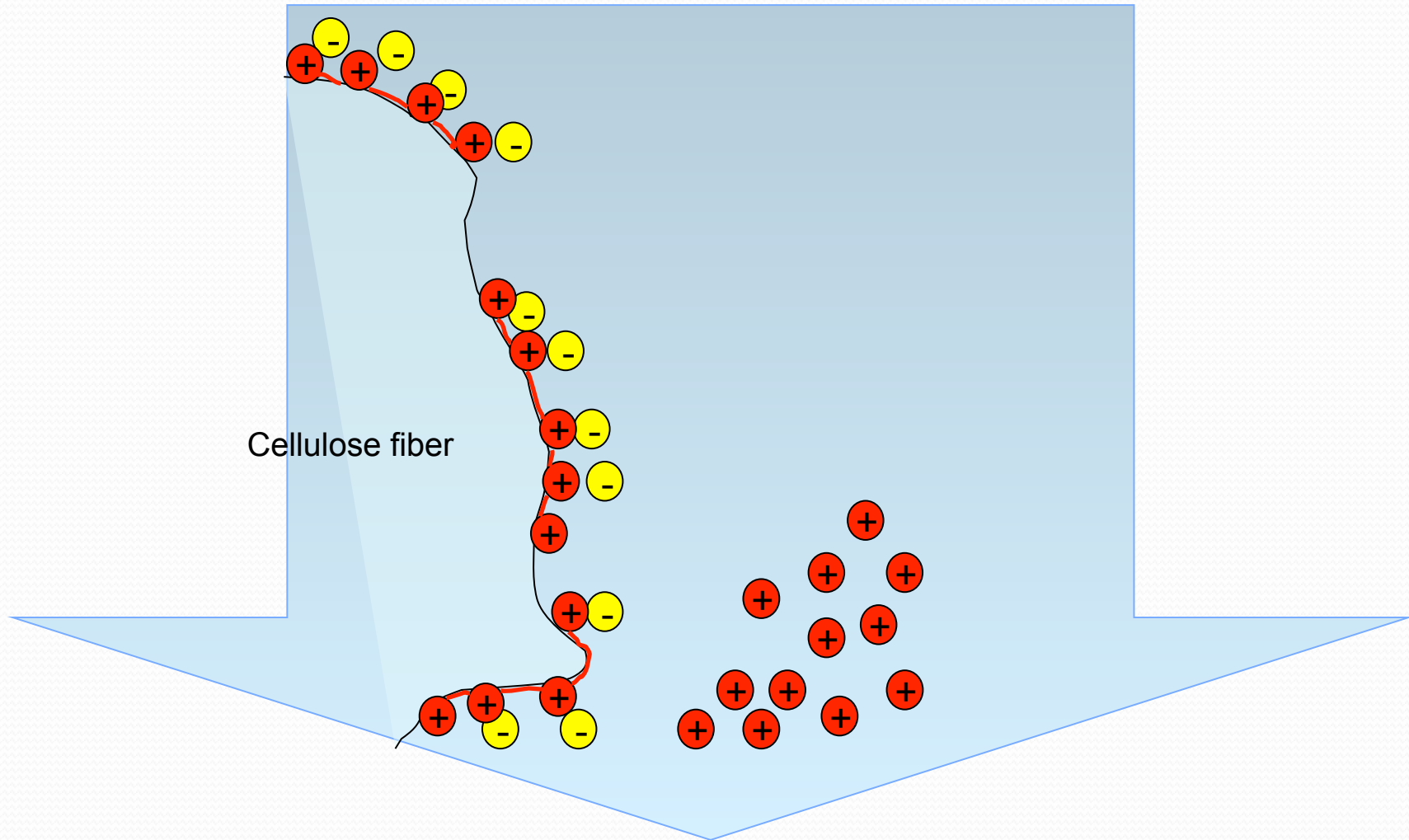
Filtration Mechanisms

Adsorbtive Separation



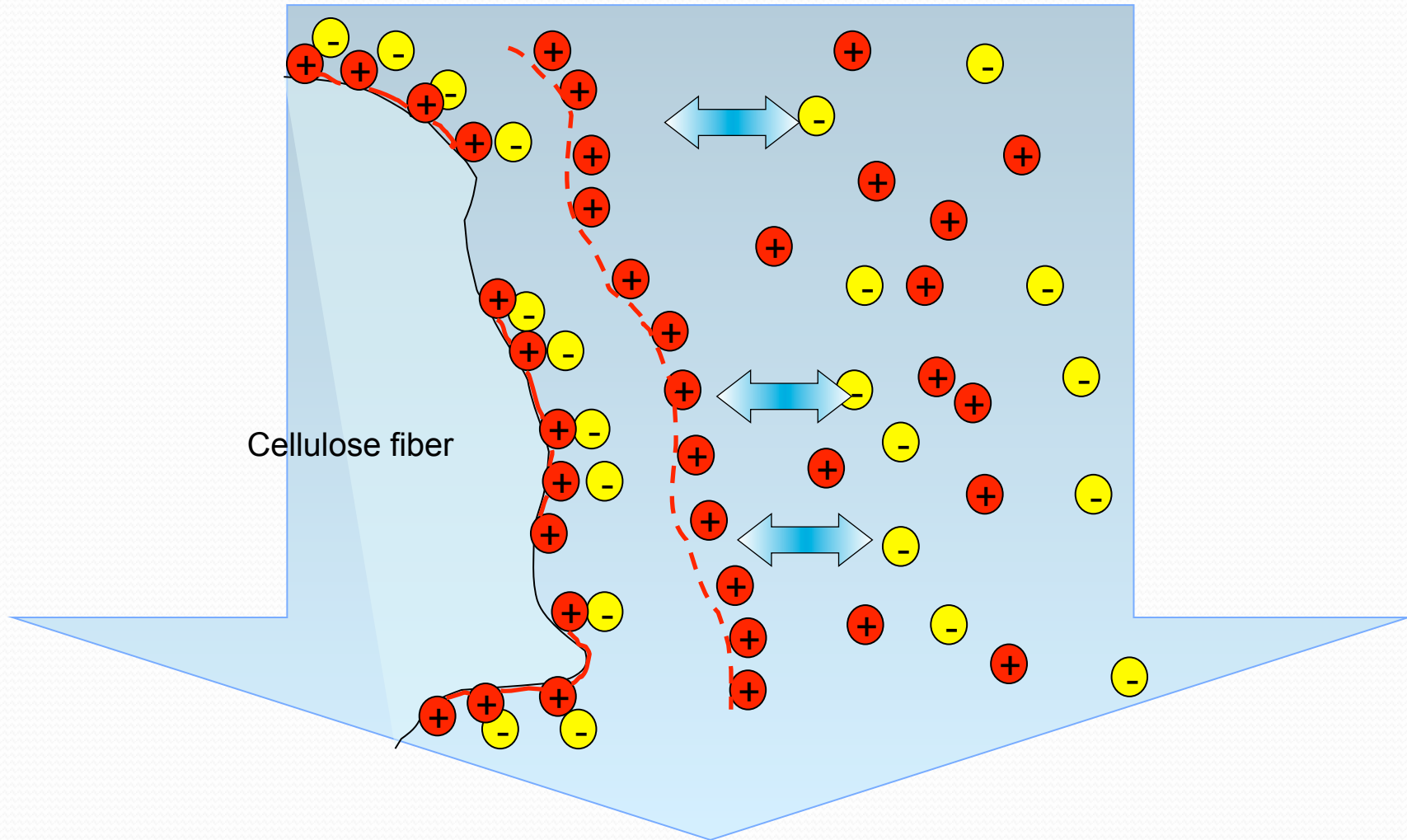
Filtration Mechanisms

Adsorbtive Separation



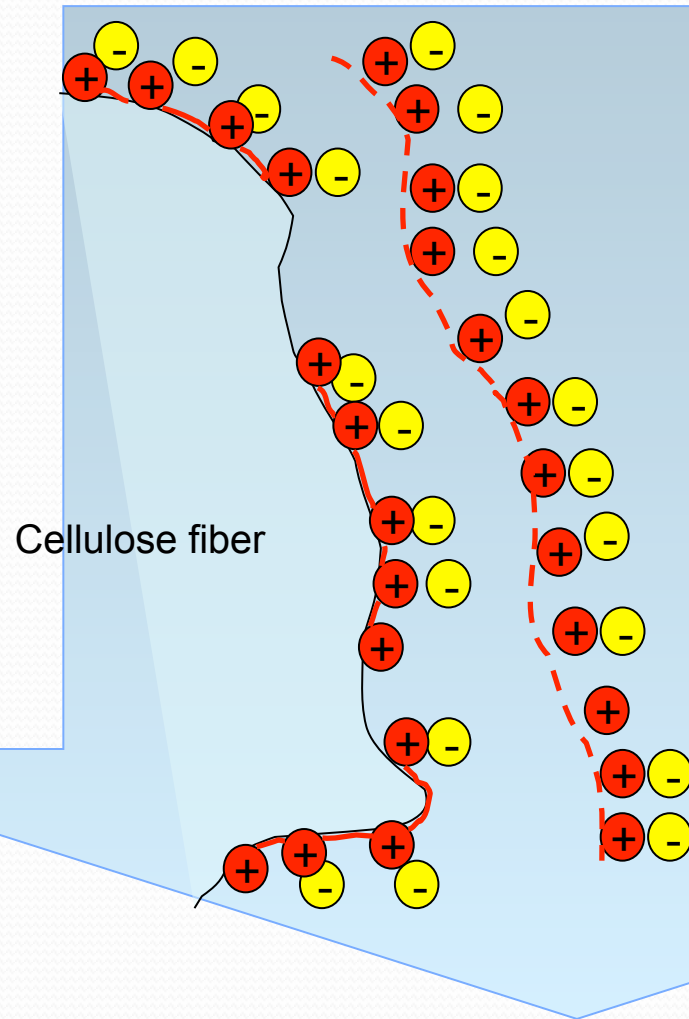
Filtration Mechanisms

Adsorbtive Separation



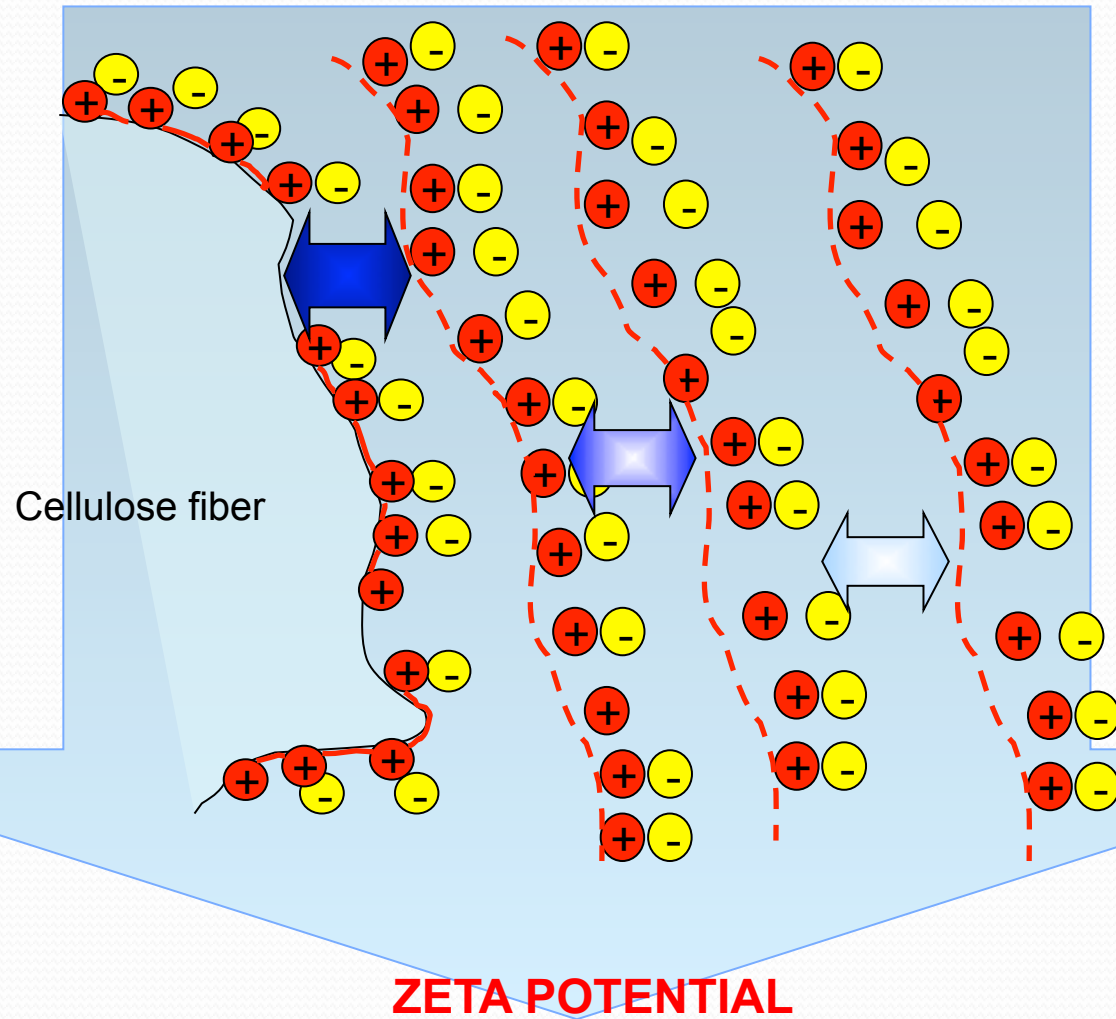
Filtration Mechanisms

Adsorbtive Separation



Filtration Mechanisms

Adsorbtive Separation



Filtration

Particles to be removed

Inorganic salts

Bacteria

Colloidal substances

Yeasts

Fatty esters

Mould spores

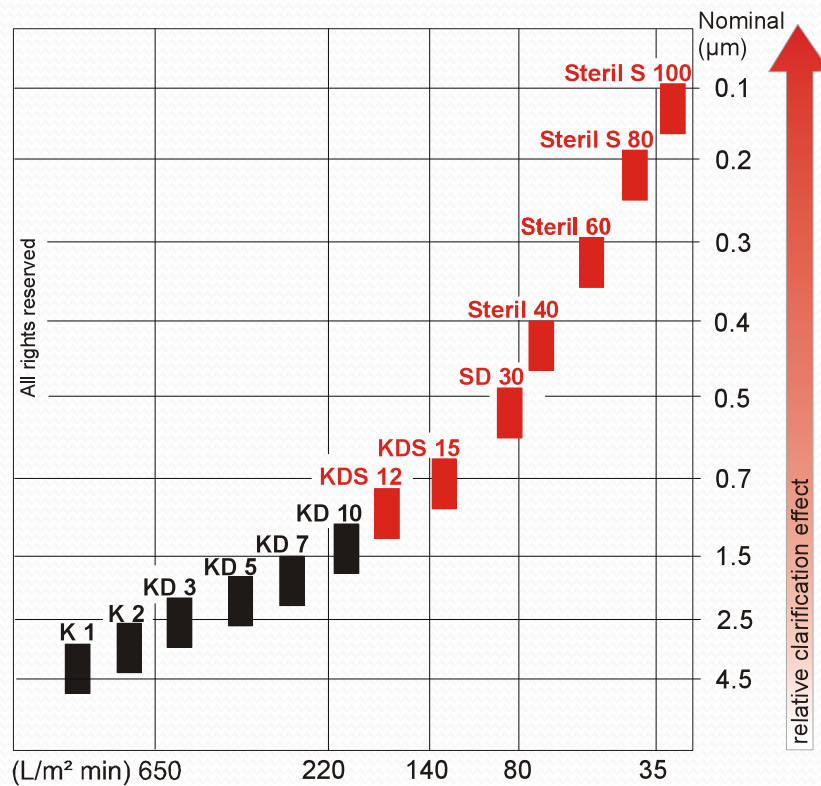
Proteins

Colorants

More reasons to use Filter sheets:

- ▶ **Aroma and colour protective filtration of white and red wine**
- ▶ **High contaminant removal capacity of colloidal substances**
- ▶ **Maximum biological security**
- ▶ **Protection of membrane cartridges**
- ▶ **Reliable removal of yeast and bacteria**

Depth Filter sheets- Typical micron range and purpose



Conditions: $\Delta p = 100 \text{ kPa (1 bar)}$, medium: water at $20 \text{ }^\circ\text{C}$

relative throughput ←

Sterile Filtration
Removal of Yeast and Bacteria

Sterile Filtration
Removal of Yeast

Fine Filtration

Pre Filtration

Maximum Differential Pressure and... *speed kills!*

Step of Filtration	Maximum Differential Pressure
1 st filtration and fine filtration	3 bar
Sterile filtration	1,5 bar

20cm X 20cm sheet filter



40cm X 40cm sheet filter





Recommendations for packing of filter

- ▶ Prior to packing, check filter sheets for any damage
- ▶ Downstream side of filter sheet (BECO mark) must always face the filtrate plate
- ▶ Remove any loose fibres
- ▶ Tighten filter slightly and rinse from the outside
- ▶ Increase pressure of filter to max. 4 bars to test for any leakage
- ▶ Rinse filter with cold water until neutral taste is obtained

Technical Information

Sterilization with Steam

- ▶ In reverse direction of product flow (longer sterilization time)
- ▶ Requirement: Particle free steam
- ▶ Temperature of Sterilization: Max. 105 °C (0,5 bar)
- ▶ Time of Sterilization: At least 20 min. after steam escape from all filter outlets
- ▶ Counter Pressure: Approx. 0,5 bar (adjust via outlet valve)
- ▶ To avoid damage by steam pressure shocks, open all condensation valves

Technical Information

Regeneration

- ▶ Replace product by water or CO₂
- ▶ Forward flush with cold water, for approx. 5 min.
- ▶ Reverse flush with hot water

Temperature: 75 - 80 °C

Time: approx. 20 min.

Counter Pressure: 0,1 - 1 bar (adjust at outlet valve)

Flowrate: at least flowrate of product, better double flowrate

If possible - diagonal flushing

- ▶ Do not flush via buffer tank (germs will be set free - danger of infection)



1-800-240-5366

**The evolution of filter
sheets ..**

Time to go **green!!**

**Presenting the world's
only DE free and all
natural filter
sheet ...**

Pure. Nothing else.



be pure

BEGEROW

BECOPAD

Components

- ▶ Only certified celluloses
- ▶ No synthetic fibres
- ▶ Targeted application of a special cellulose based on the **special bepure processing method**



- ▶ **No inorganic components**



**White depth filter sheet
with outstanding purity**

BECOPAD

Results

- ▶ Unlimited availability of raw materials ✓
- ▶ Regenerative raw materials ✓
- ▶ Improved purity ✓
- ▶ 100% Bio-degradable ✓

BECOPAD

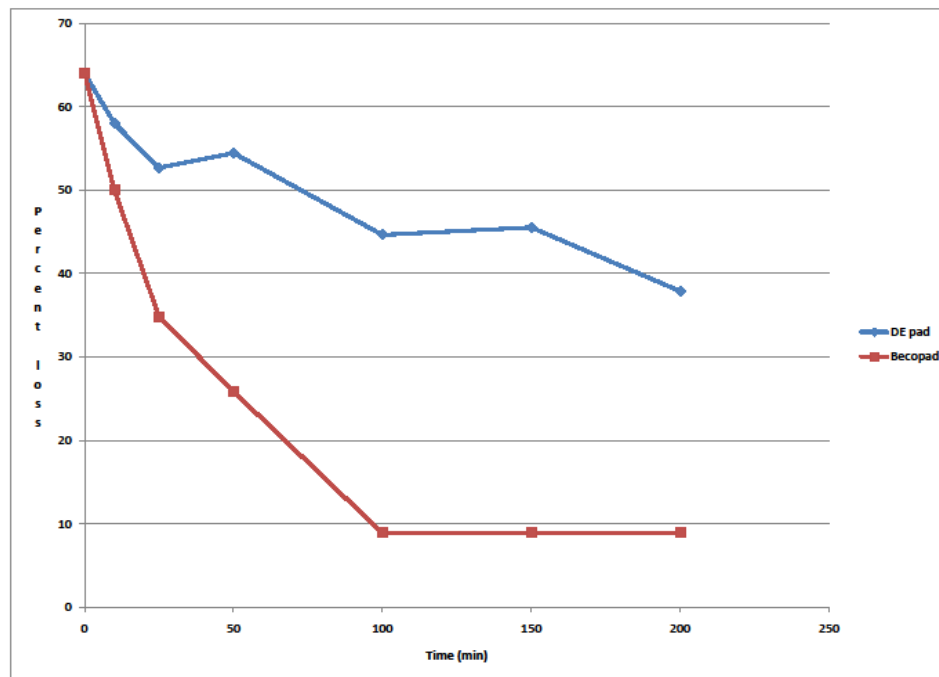
- ▶ **Why a DE free Filter Sheet is important to the Winemaker:**
 - ▶ Product quality
 - High microbiological safety (even at higher differential pressures)
 - Value-preserving filtration
 - Drip losses reduced to a minimum
 - mold growth reduced by 99%
 - Hygiene
 - ▶ Process optimization
 - Significantly improved handling during packing and unpacking
 - Reduction of rinsing volume (50% less water needed)
 - Reduction of backwashing volume (30% less water needed)
 - **100% biodegradable and compostable – a Green product**

BECOPAD

Results

- ▶ Economic efficiency
 - ▶ Enhanced economic efficiency through
 - ▶ Reduction of energy costs (electricity/water) ✓
 - ▶ Reduction of personnel costs
 - faster loading/unloading of filter
 - longer filtration runs → less changing of filters ✓
 - ▶ Longer filter service life ✓
 - ▶ Reduction of disposal costs
BECOPAD is compostable (DIN EN 13432 and ISO 14855)
→ “greenomic” filtration ✓

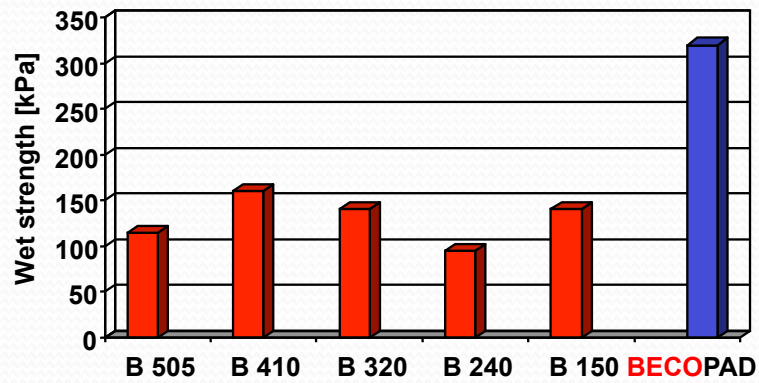
Flavor savings: DE filter sheet vs 100% Cellulose



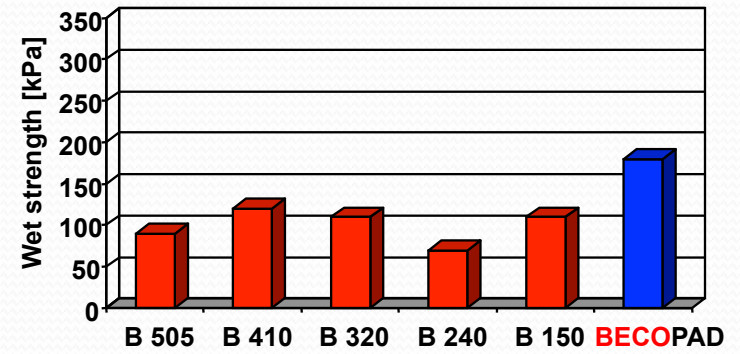
BECOPAD

Results

Wet bursting strength



Wet bursting strength after steaming for 3 hours at 121 °C



BECOPAD

Hygienic risks (mold) eliminated



→ B 240

→ **BECOPAD**





GREENOMIC The advantage of a DE free Filter Sheet





GREENOMIC in wine filtration



Thank you for
Your
ATTENTION!