PALL Food and Beverage

Winning With Water:

Pall Aria™ Auto Rejuvenating Membrane System offers attractive ROI

Filtration. Separation. Solution.SM

WineEng 2011

23 June 2011

Robin Brister
Market Manager
F&B Water - Asia

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PALL Food and Beverage

- **Leader in Filtration, Separation and Purification**
- **Founded in 1946**
- **Global Footprint**
- **Over 10,000 Employees**
- **Annual Sales: US$ 2.4 B**

Technical Information

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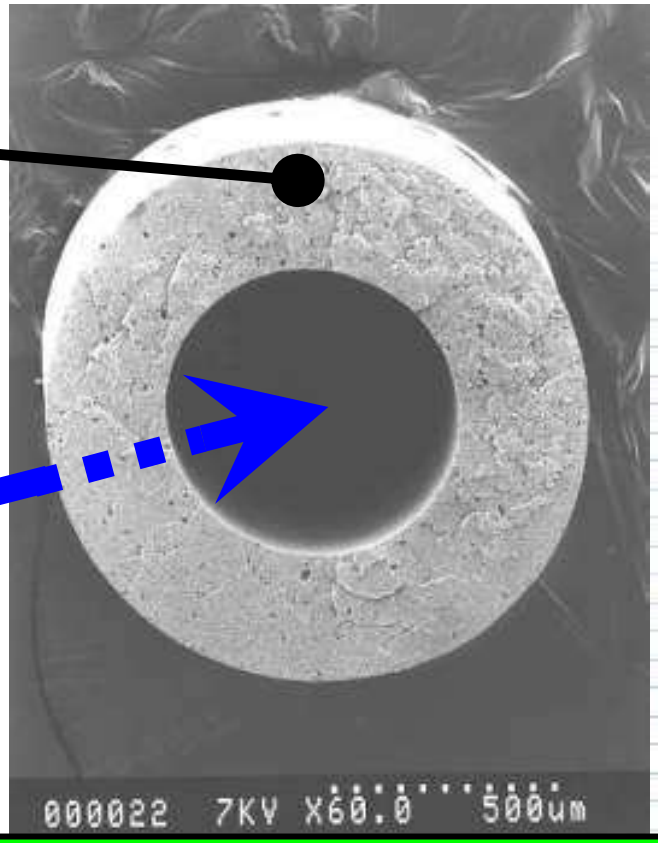
Microza* hollow fibre

*Microza is trademark of Asahi Chemical Company

Homogenous fibre material made of PVDF

Outside-Inside flow



Homogenous material = high mechanical resistance

High crystalline Polyvinylidene fluoride (PVDF) = high chemical resistance

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Module data: UNA 620C

• Module length:	2160 mm
• Module diameter:	165 mm
• Hollow fibre inner diameter:	0.7 mm
• Hollow fibre outer diameter:	1.4 mm
• Membrane surface:	50 m^2
• max. transmembrane pressure:	3.0 bar
• max. operating pressure:	3.0 bar
• max. operating temperature	40 °C
• pH range:	1 – 10
• Membrane material	PVDF
• Module housing material:	ABS
• Manufacturer:	Asahi Kasei, excl. for Pall
• Installation:	Vertical
• Weight, dry (preserved):	Approx. 30 kg
• Cut-Off	0.1 µm nominal

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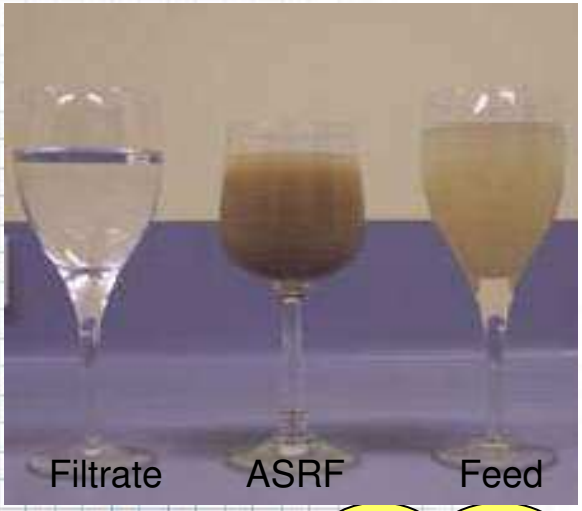
Typical reduction values in clean water

- I. Turbidity: < 0.1 NTU[1] ⟷ Aim of Pall Aria™
- II. TSS: < 0.1 ppm[1] ⟷ Aim of Pall Aria™

- III. *Cryptosporidium* 6 LRR[2]
- IV. *Giardia*: 6 LRR[2]
- V. Total microorganisms: 4 LRR[2,3]
- VI. *E-Coli*: 4 to 5 LRR[2]
- VII. Coli forms: 4 to 5 LRR [2]



[1] below detection limit

[2] LRR = logarithmic reduction rate

[3] Total microorganisms include several spec
Giardia, *Cryptosporidium* oocysts, MS-2
E. Coli, *Bacillus* spores and coliforms.

Specifications are Ideal for winery water!

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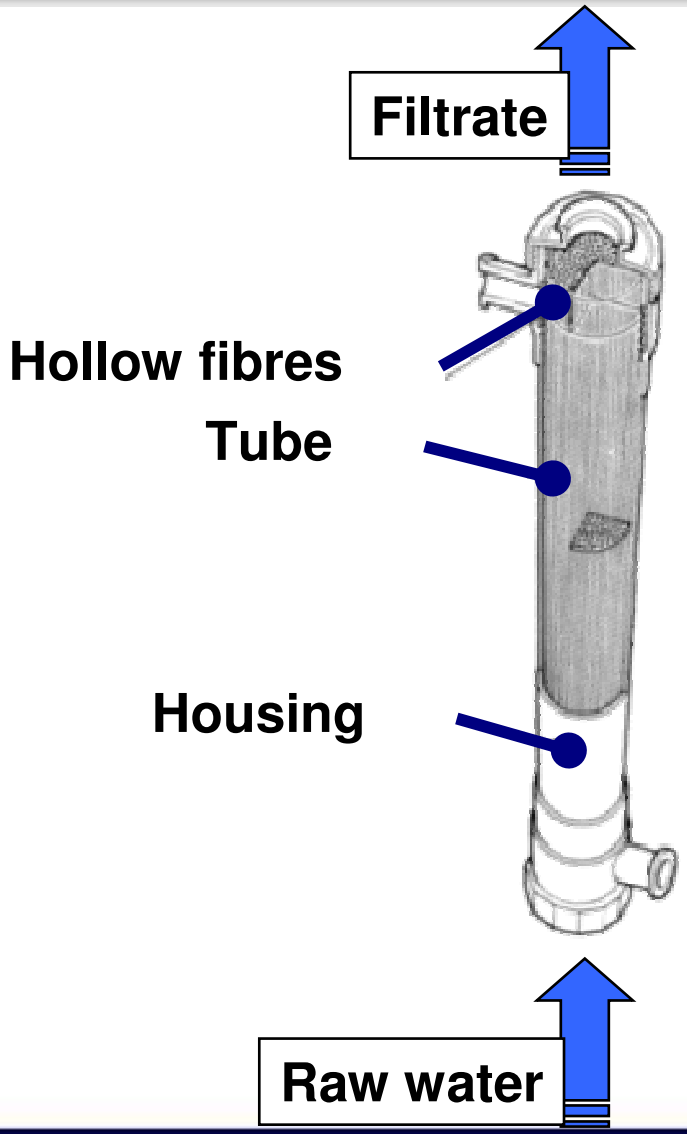
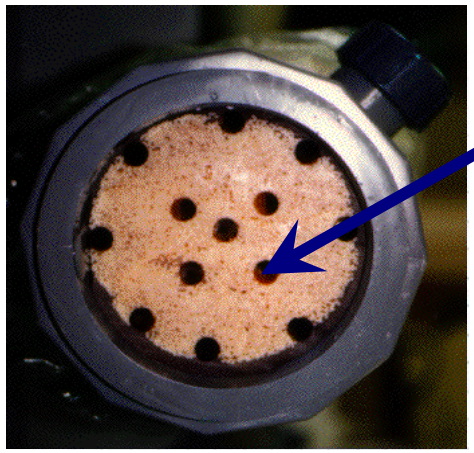
Pall Microza* Module





Hole for water intake

Intake:
Fibres are sealed
Outtake:
Holes are sealed
Filtration:
Vertical upstairs
Filtration direction :
Outside-in

* Microza is a registered trademark of the Asahi Corporation

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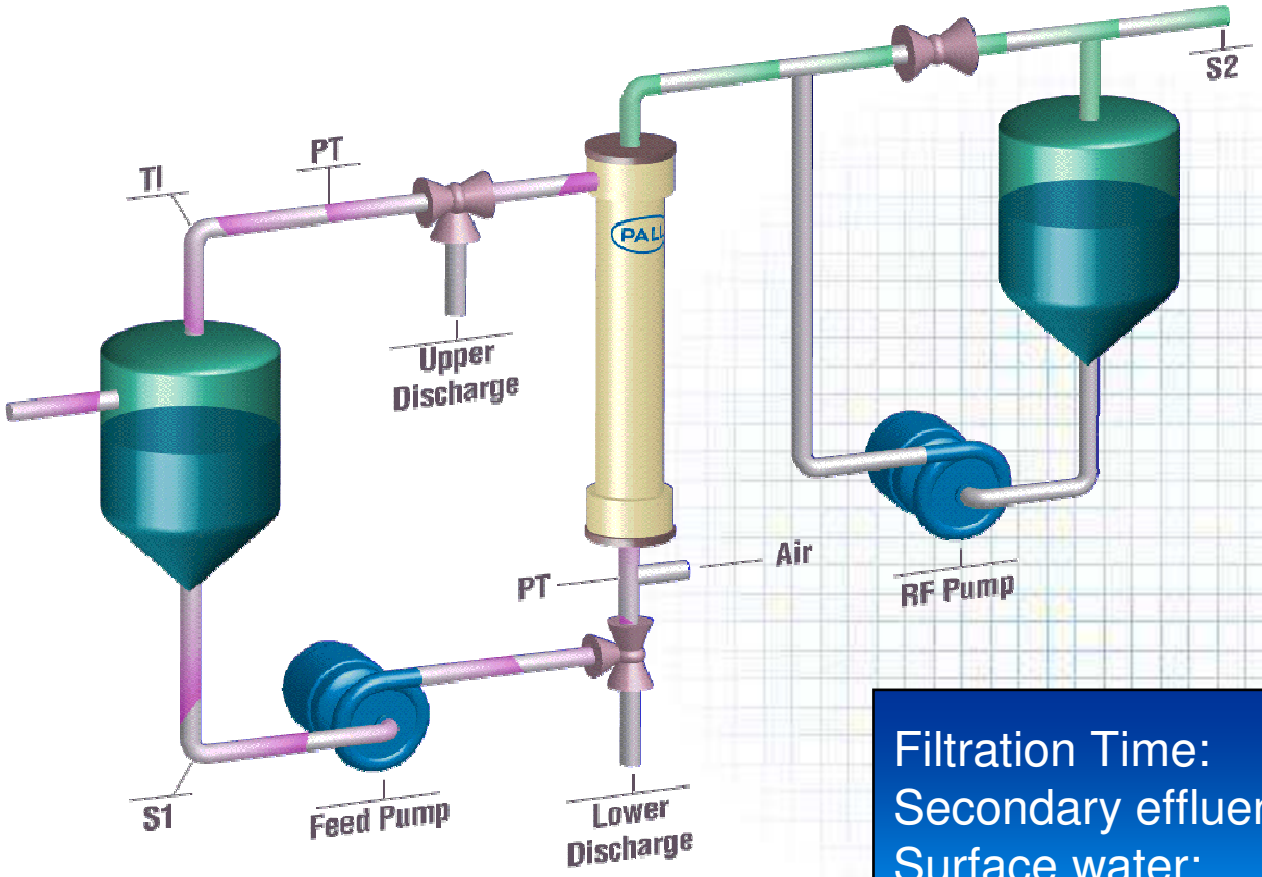
Operating Phase: Filtration



Filtration Time:

Secondary effluent:	15 - 20 min
Surface water:	15 - 30 min
Well water:	30 - 40 min
Mineral water:	40 - 60 min

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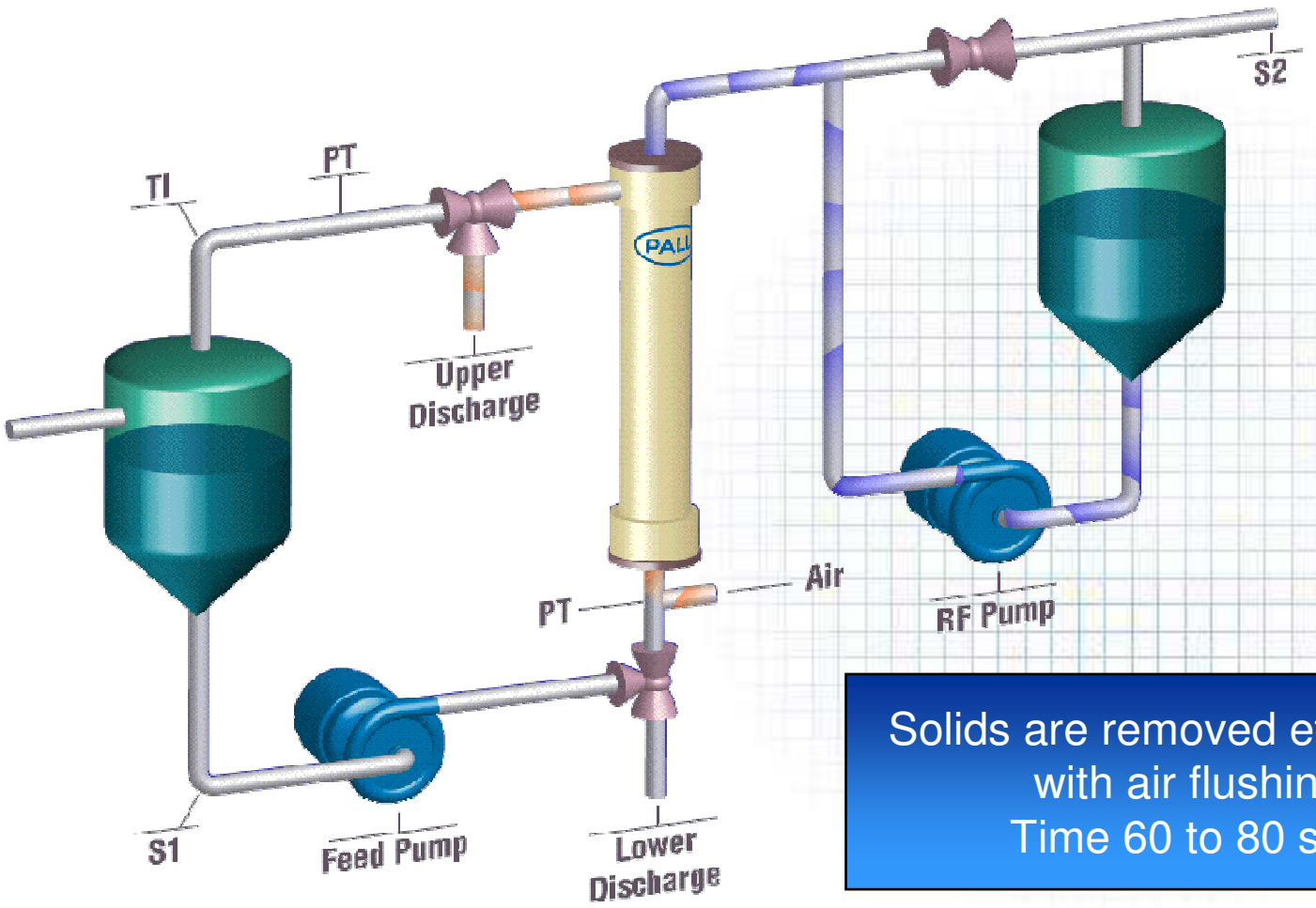
Operating Phase: Regeneration with Airscrub (AS) and Backwash (reverse flush RF)



Solids are removed effectively with air flushing.
Time 60 to 80 sec.

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Operation sequences of a Pall Aria™ FB

30 - 60 min

2 - 3 min

30 - 60 min

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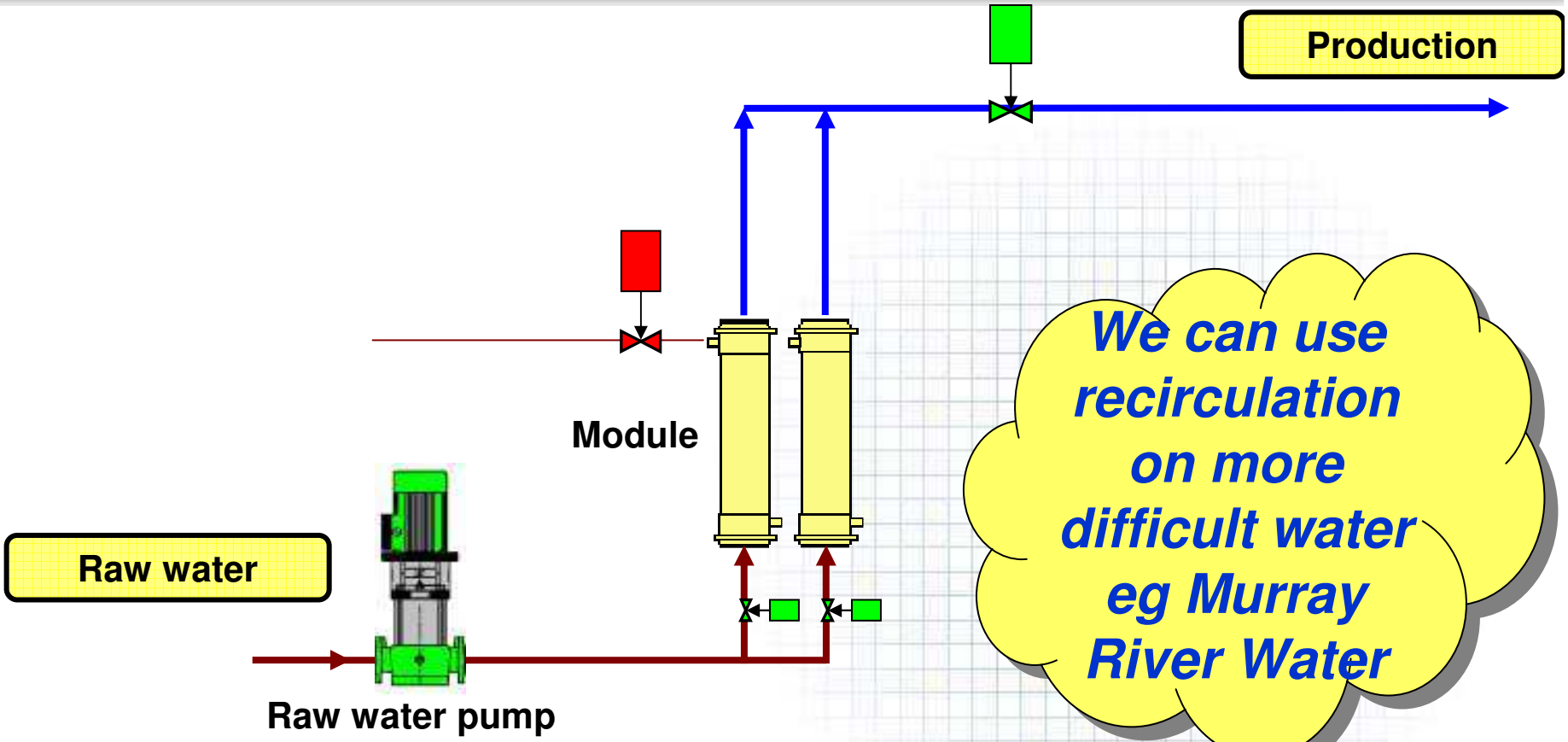
Operation sequence: filtration Pall Aria™ FB



Dead-End Filtration = Low energy consumption + small footprint

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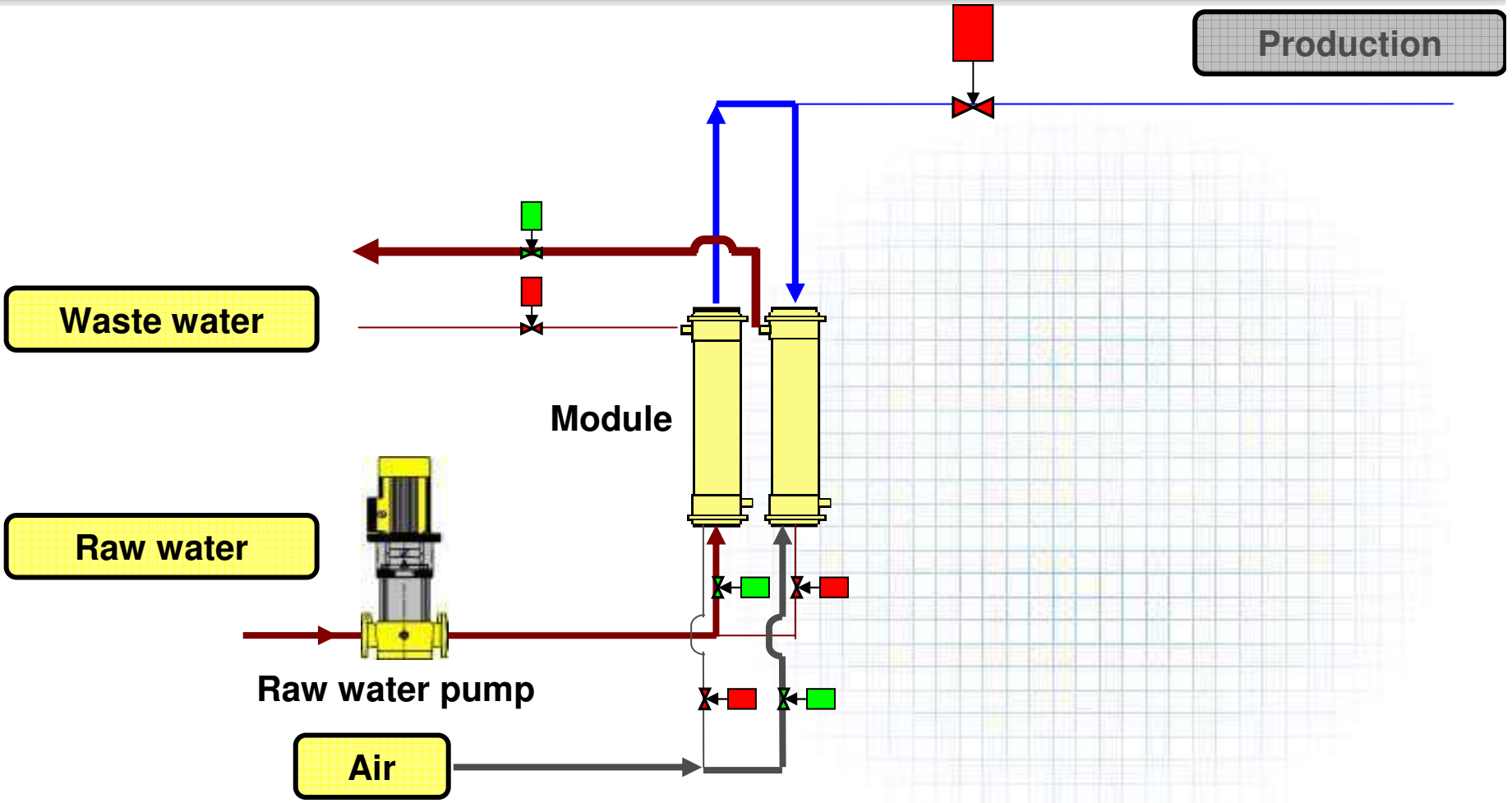
Operation sequence: back wash Pall Aria™ FB



Low energy consumption + small footprint + minimum water losses by Dead-End Filtration with high effective, water saving backwash technology

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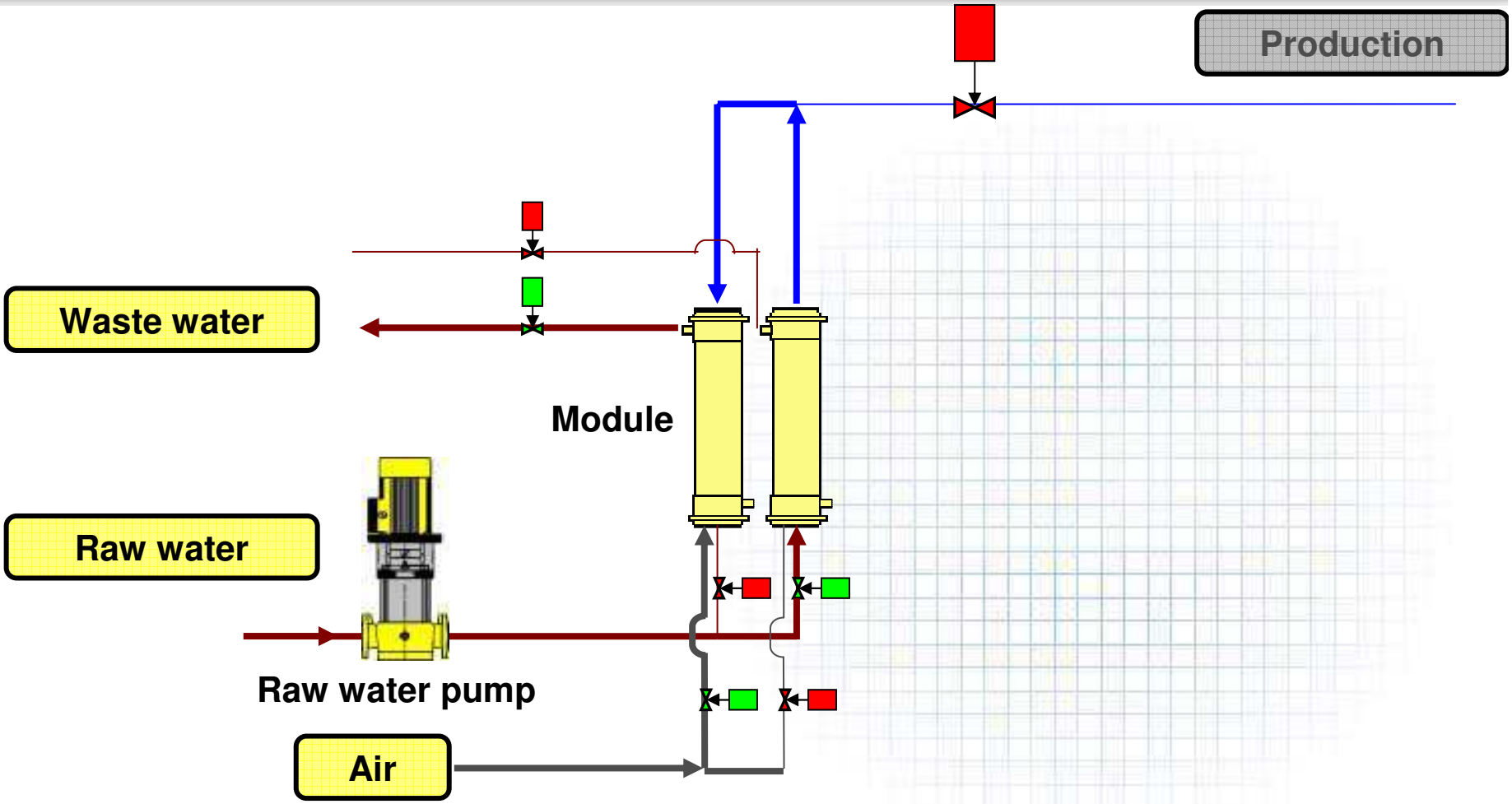
Operation sequence: back wash Pall Aria™ FB



Low energy consumption + small footprint + minimum water losses by Dead-End Filtration with high effective, water saving backwash technology

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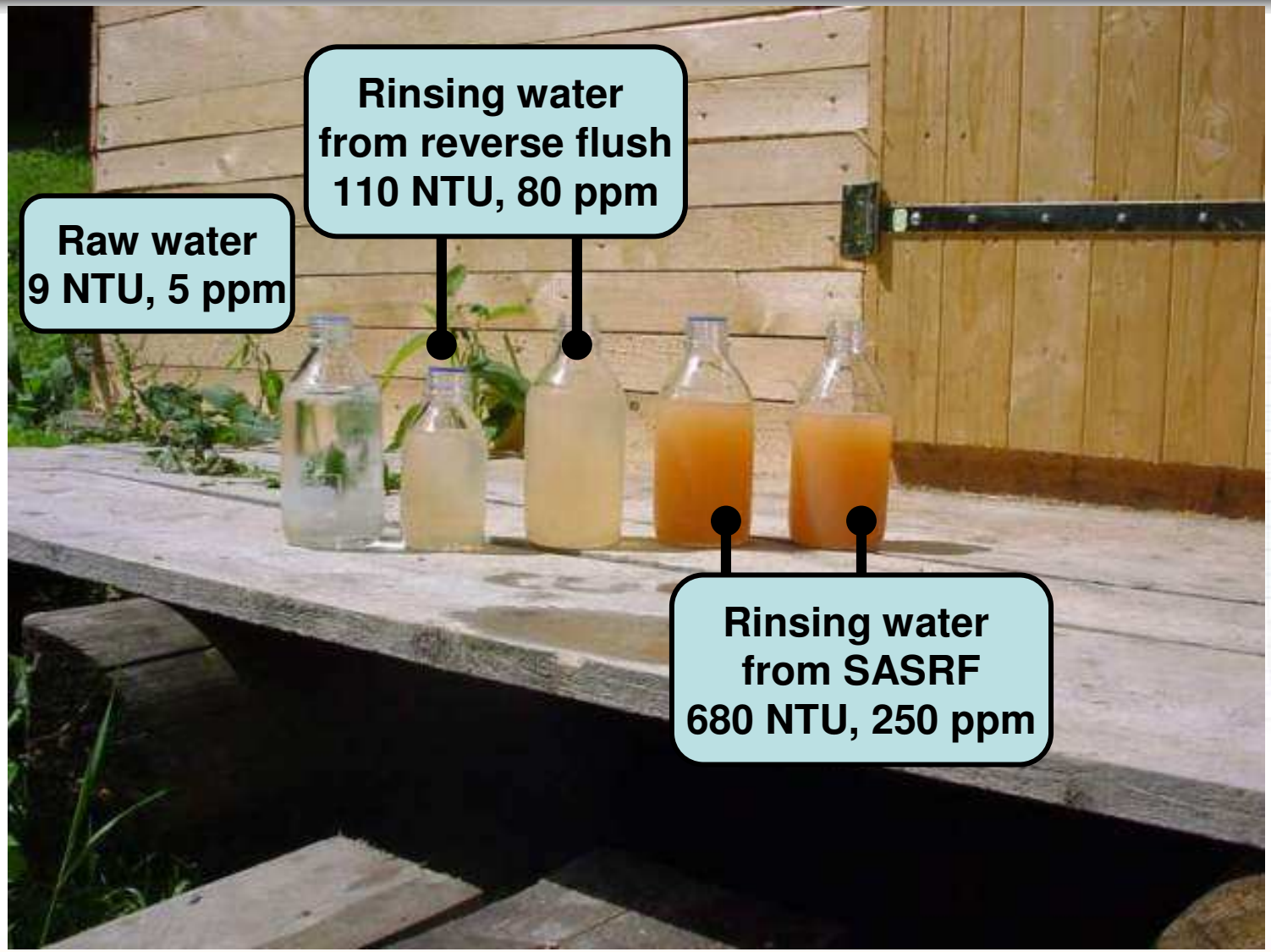
Backwash versus SASRF



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Standardised Systems

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Aria BM4

Pall Aria™ FB 4 – a new development in water filtration for FB industry

Stainless steel
Hygienic design
FB 2 – up to 10 m³/h
FB 4 – up to 20 m³/h
FB 6 – up to 30 m³/h
FB 8 – up to 40 m³/h
FB 10 – up to 50 m³/h
FB 12 – up to 60 m³/h

New!

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Pall Aria™ FB - Benefits

- Based on proven system concept of the Pall Aria™ range
- Reduced risk of microbiological contamination due to hygienic design, material and components choice
- Meets the demands of FB-standards for stainless steel
- Competitive pricing due to standardization and use of Oenoflow parts
- Meets Food Contact Regulations
- More flexible reaction to customer requests by offering a Basic version with options

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Pall Aria™ FB

- Tanks, valves and piping of stainless steel AISI 304 (1.4301)
- No RF tank, modules get backwashed with the filtrate of opposite modules
- Automatic flux regulation
- One control / program in which all possible options are included
- Hygienic sampling valve
- Butterfly valves with pneumatic drive
- Ebara-pumps (like Oenoflow®)
- Automation concept:
  - normal operation + ASRF: automatic
  - EFM/MCU*: automatic

*MCU – Membrane cleaning unit

New!

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Pall Aria™ FB - Options

- MCU - Membrane Cleaning Unit
- Data logging package E&H Ecograph T
  - Filtrate volume
  - Pressure upstream of modules
  - Pressure downstream of modules
  - Raw water temperature
  - Frequency of feed pump and (option wise) filtrate pump

- Filtrate transfer pump for filtrate outlet pressures of up to 3 bar

- Dosing section for continuous dosage in the feed water
- Dosing section for the dosage of oxidation chemicals in RF
- Dosing section for continuous dosage of disinfectant into the filtrate line

- Pumps with 3A certificate
- Piping and tank material AISI 316l (1.4561) or AISI 304 (1.4301)

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Capabilities

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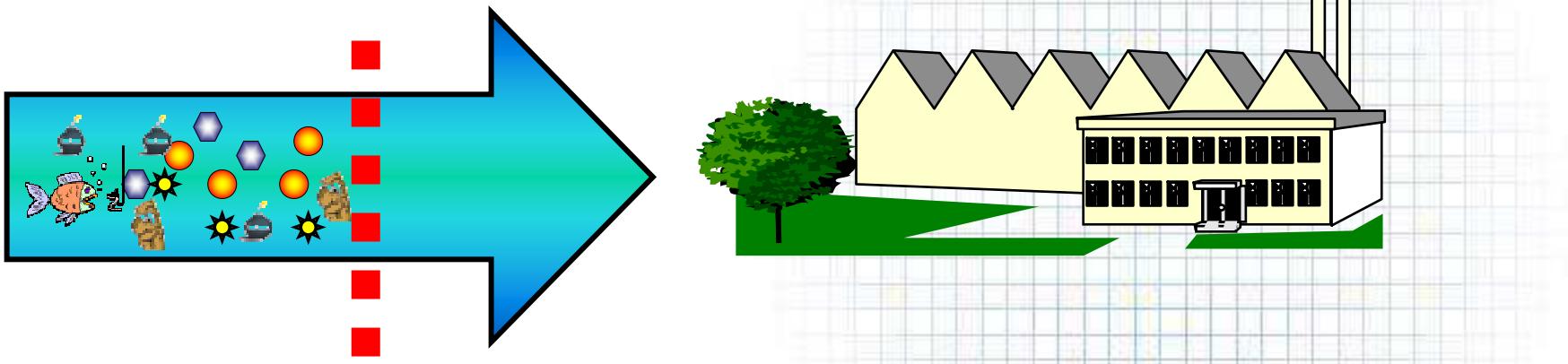
Where to place the Pall Aria™…

- All contaminants which are removed *before* entering the winery …



… Will save money at POU, *i.e.* filter cartridges!

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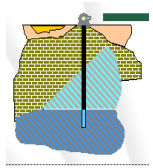
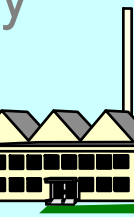
Surface water



Ground water

Tap water

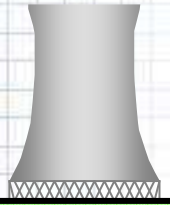
Winery



Sand filter Backwash

Boiler Feed

Rinsing water



Cooling Tower

CIP Water

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Removal Capabilities

For the elimination of:	In Winery Feed Water we use Pall Aria™ MF:	
Iron	+ +	After Aeration. Approx. 20 min reaction time at pH 7 **More effective replacement of Sand Filter**
Manganese	+ +	After Chlorine dioxide dosing. If necessary (high Fe levels) pre-aeration is used. **Replacement of MMF & Manganese adsorbtion (Greensand)**
Arsenic	+ +	After oxidation with air (or, if necessary, ClO_2) Dosage of $FeCl_3$ (if low Fe content in the water).
Turbidity	+ +	Filtrate downstream of Pall Aria™ is < 0.1 NTU
E. coli	+ +	6 log LLR with Pall Aria™
Total Bacteria	+ +	Microbiologically safe water with Pall Aria™ + Final Filtration

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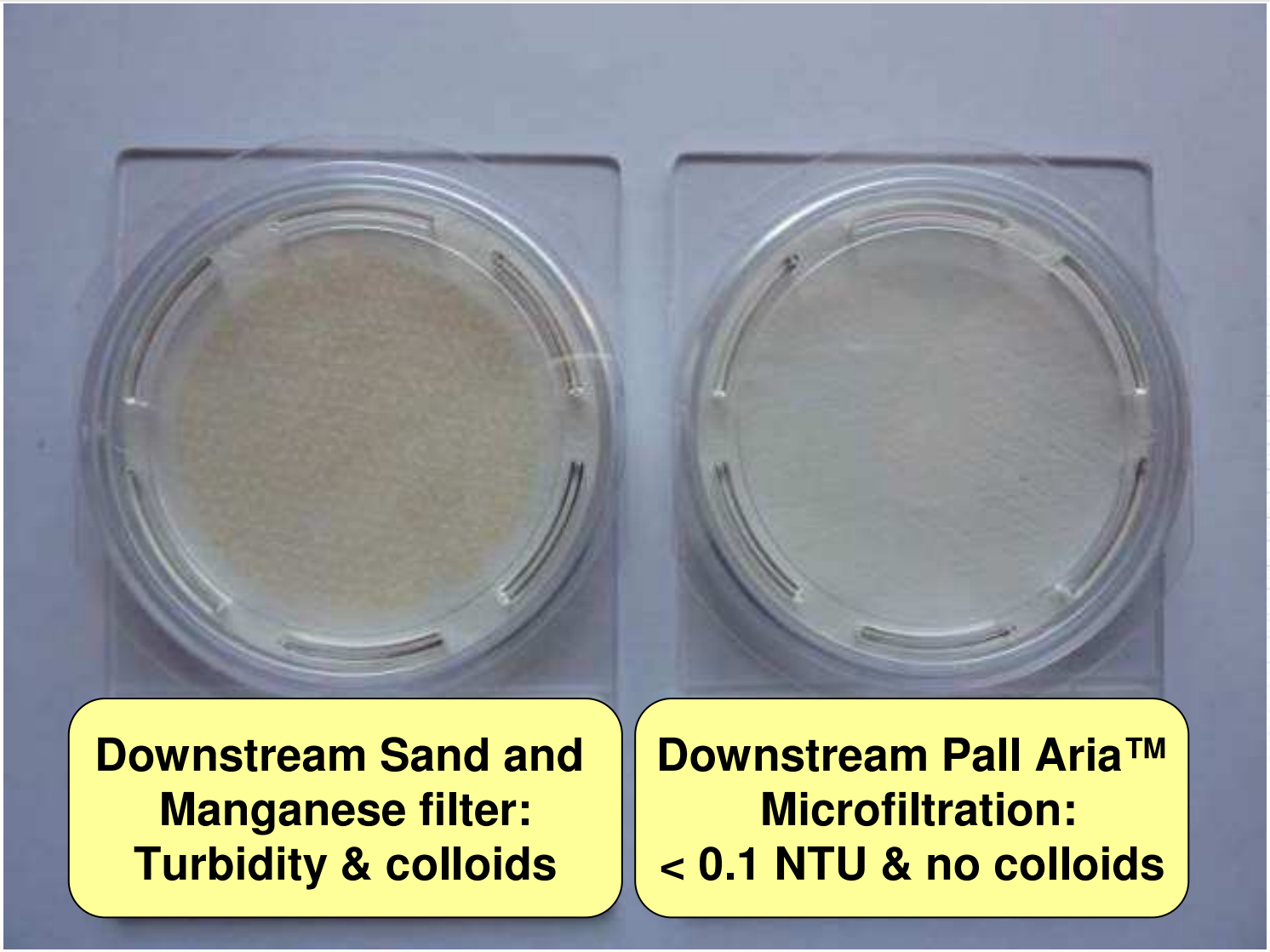
Water Samples



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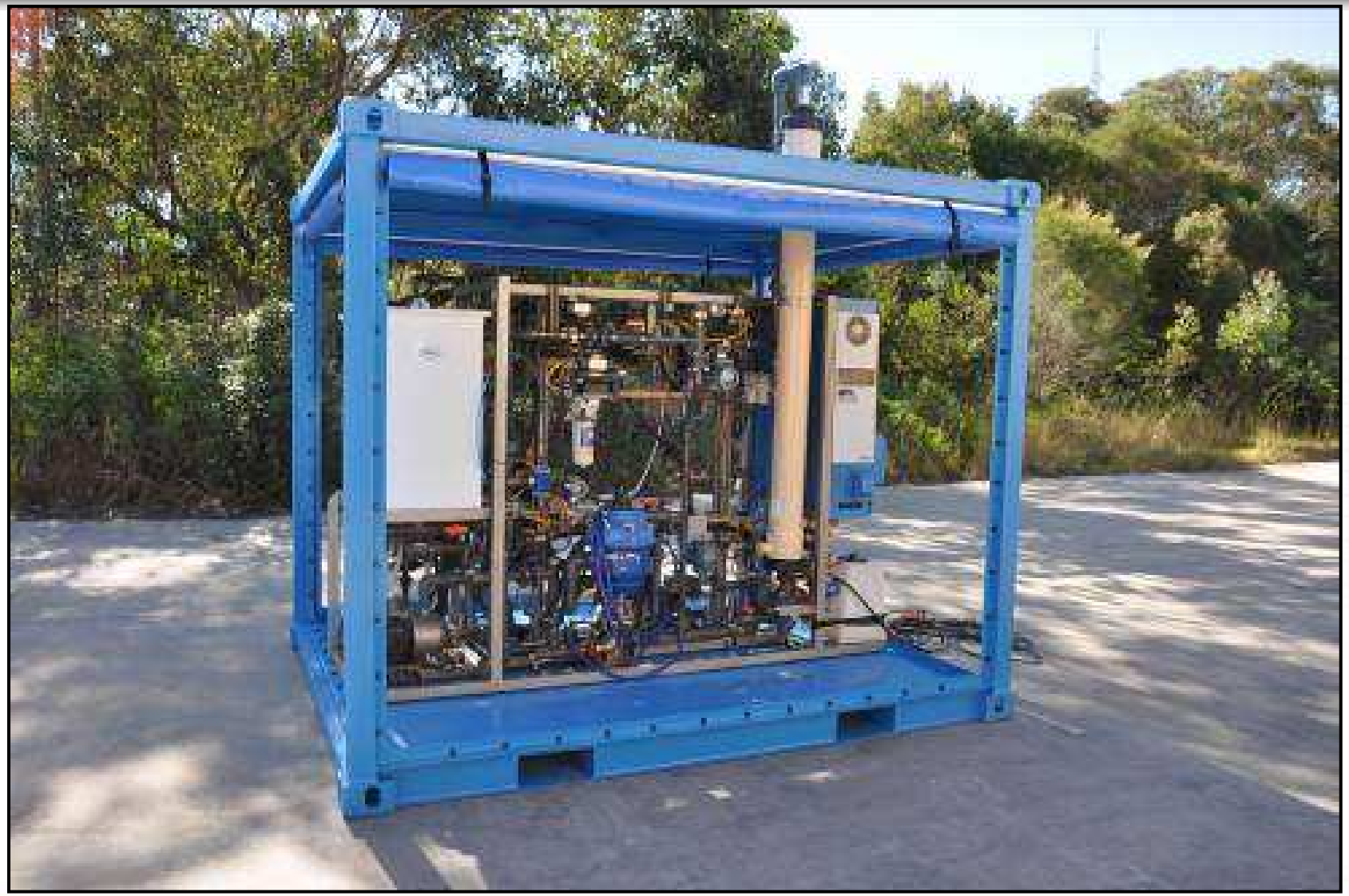
Pilot Units Available



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References

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Pall Aria™: A successful product with 612 references in 48 countries

USA	231
Germany	108
Australia	34
Italy	28
Canada	26
Romania	18
United Kingdom	16
Belgium	14
New Zealand	13
France	12
Spain	11
Macedonia	8
South Africa	8
China	7
Turkey	7
United Arabian Emirates	6

Korea	5
Russia	5
Serbia	5
Hungary	4
Oman	4
Poland	4
Algeria	3
Iraq	3
Lithuania	3
Portugal	3
Jordan	2
Kazakhstan	2
Thailand	2
Ukraine	2
Angola	1
Argentine	1

Bahrain	1
Brazil	1
Cyprus	1
Czech Republic	1
Estonia	1
Ethiopia	1
Indonesia	1
Japan	1
Mexico	1
Republic of Ireland	1
Republic of the Philippines	1
Slovakia	1
Switzerland	1
Tanzania	2
Uzbekistan	1
Yemen	1

Worldwide	**612**
Europe, Middle East, Africa	288
United States	260
Asia/Pacific	64

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Success list for F&B Australia

AFB	Food	W&S	Beer
Mountain H2O Albury	NCMC Booyong NSW	Treasury WE Packaging	Carlton & United Yatala
Copack Beverages	Inghams Brisbane	Treasury WE Karadoc	Lion Nathan Brisbane
	Inghams Mornington	Australian Vintage Loxton	
	Atkinson Hydro NSW	AustralianVintageBuronga	
		Treasury WE Packaging	
		Ral Ral Creek Wines	
		Treasury WE Penfolds	
		Berri Estates	
		Treasury WE Wynns	
		Thachi Wines	
		Casella Wines	

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Return on Investment

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ROIC – how to use

	Pall Aria™ LT 4	Cartridge filter*
Please fill in only the white fields!		
Filtrate Volume	20,0 m³/h	20,0 m³/h
Raw water volume	20,4 m³/h	20,0 m³/h
Filtrate recovery	98%	100%
Operation time	4.500 h/a	4.500 h/a
Filtrate Production	90.000 m³/a	90.000 m³/a
Raw water volume	91.837 m³/a	90.000 m³/a
Product loss	1.837 m³/a	-
Pressure decay over all filtration steps	1,2 bar	2,5 bar
Energy consumption	0,08 kWh/m³	0,09 kWh/m³
Energy consumption	7.200 kWh/a	7.950 kWh/a
Energy costs	0,08 €/kWh	0,08 €/kWh
Number of modules	4	
Membrane lifetime	10 a	
Cost per module	3.500 €	
Depreciation time	10 a	10 a
Interest	3%	3%
Costs for raw water	-	-
Costs for waste water	-	-

Investment	**53.430 €**	**5.000 €**

Cost per year		
Depreciation costs	6.300 €/a	600 €/a
Energy cost	576 €/a	636 €/a
Product loss	--	--
Waste water discharge	--	--
Membrane exchange	1.400 €/a	
Cartridge costs**	2.000 €/a	15.000 €/a
Lump sum	10.276 €/a	16.236 €/a

* Two or three stages, Aria™ replaces the prefiltration
** With Aria™: One set of final cartridges per year

Pall Aria™: 90% reduction in final filtration costs

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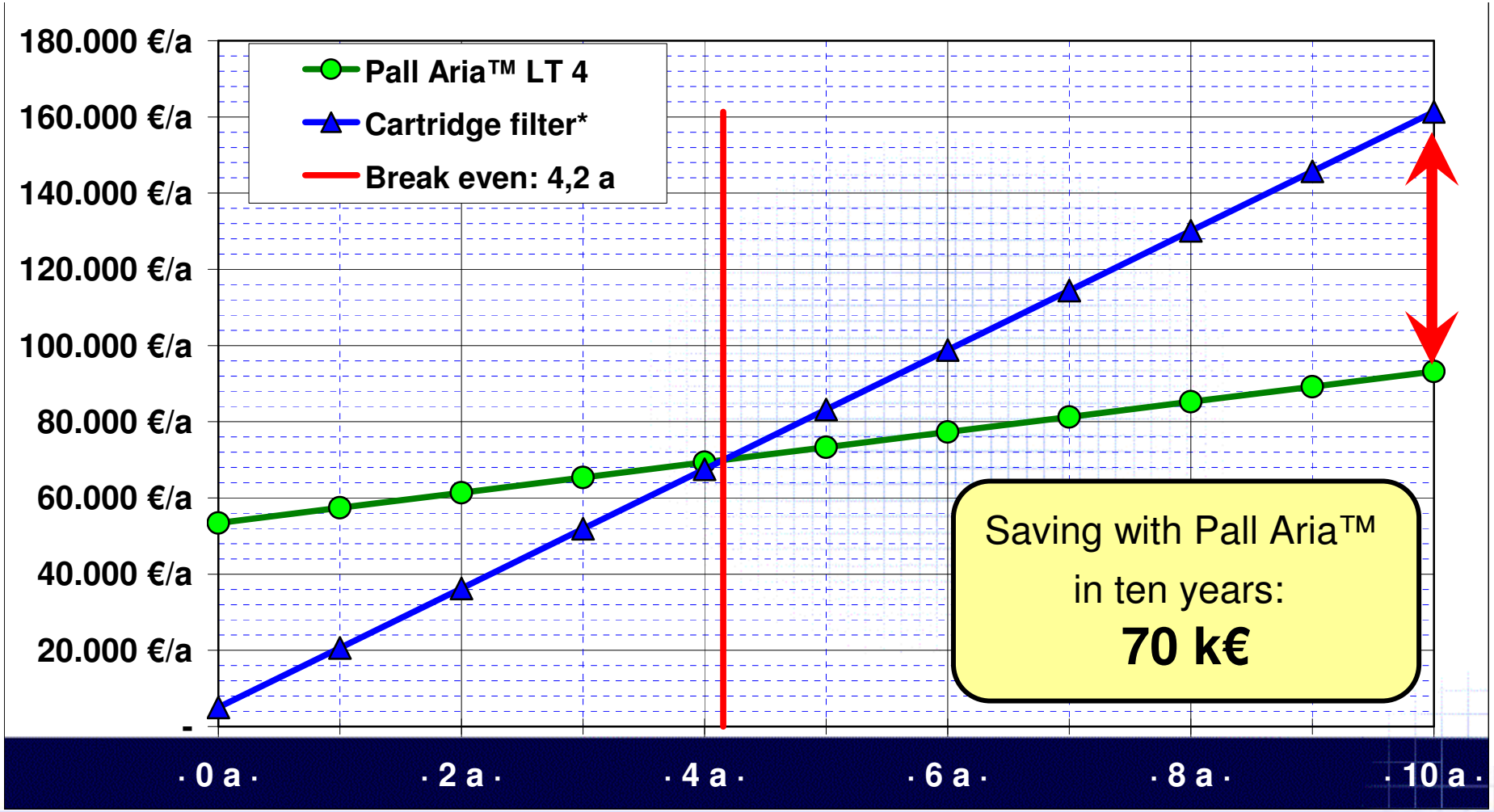
After four years+ we have the return on investment!



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Features and Benefits

Pure water at low cost!
Pall Aria™ FB – a new development in water filtration for FB industry

Maximized value by minimized invest

Fulfils legal requirement as modules are approved to EU 10/2011

High microbiological safety by hygienic design

Consistent quality of water irrespective raw water quality by operational Flexibility

Low energy consumption + small footprint + minimum water losses by Dead-End Filtration with high effective, water saving backwash technology

Low chemical consumption because of efficient mechanical cleaning

Easy integration in existing installations because of compact system footprint

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Any questions?

Ask the Bricklayers!

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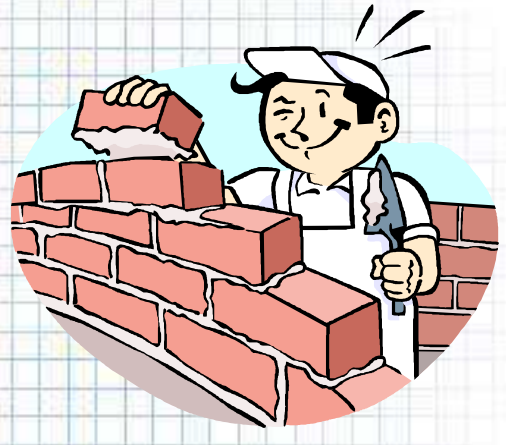

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