Wine Filtration

Training guide for products and applications

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker domnick hunter

ENGINEERING YOUR SUCCESS.

Contents

Introduction

Ensuring total process control for consistent quality

Old and new world producers have partnered with Parker domnick hunter to ensure their process and quality needs are achieved for over 30 years.

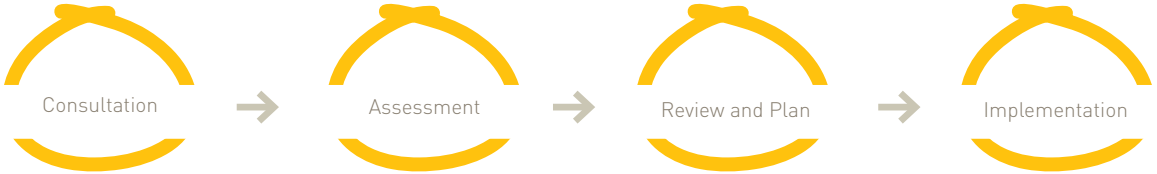
Parker domnick hunter's proven product range, knowledgeable specialists of the wine making process enables Parker domnick hunter to provide value added solutions that guarantee quality, ensure product consistency and protect the unique characteristics of their wine.

Parker domnick hunter aims to provide local application specialists focused on providing added value solutions to wine makers and contract packagers. The local team supported by innovative products, state-of-the-art manufacturing facilities and internationally specialised support teams are all aimed at providing solutions which match Parker domnick hunter's capabilities with the business needs of the producer. By providing added value solutions, Parker domnick hunter give producers greater control of their process, which lead to increased quality of their wines.

This is achieved through a structured pre and after sales programme called Purecare. The Purecare approach by Parker domnick hunter looks at all aspects of the process, aimed at increasing overall process efficiency and product consistency whilst protecting the unique quality of the finished product.

Upfront detailed technical assessments and structured after-sales support packages, Purecare ensures Parker domnick hunter solutions meets agreed performance criteria and that they continue to operate at maximum efficiency.

Parker domnick hunter products and solutions have been specifically developed to provide the required quality at every stage of the wine making process, whilst protecting the unique characteristics of the wine, increasing process efficiency and giving producers greater control throughout their process.



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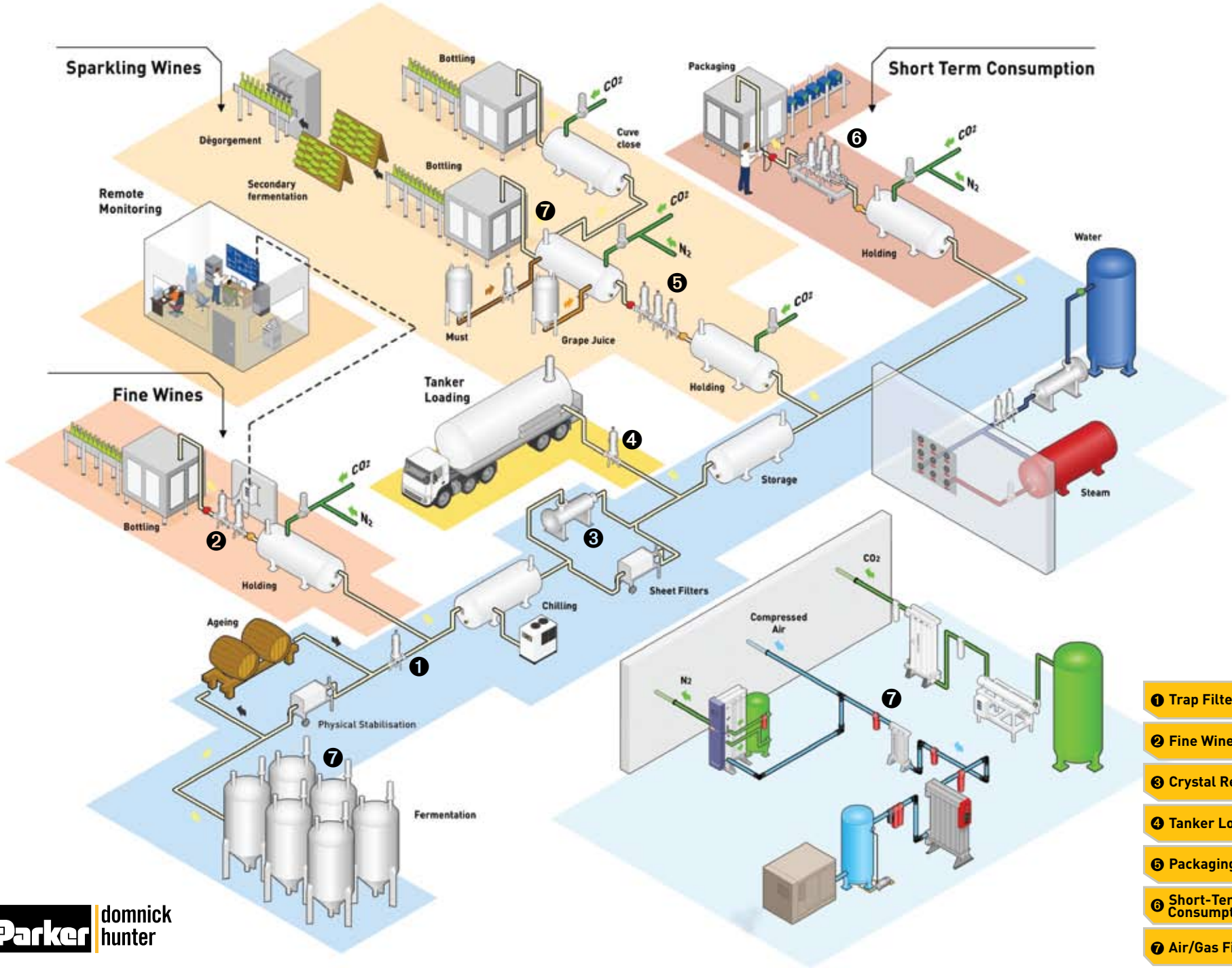

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Applications

Clarification

Crystal Removal

- Potassium bitartrate and calcium tartrate crystals are naturally occurring precipitates in wine which form non-hazardous glass like crystals. These crystals are undesirable and need to be removed during production. To remove the crystals the wine is chilled to just above freezing point, facilitating crystallisation and precipitation and the crystals can then be removed by centrifuge and filtration or filtration alone.

Trap Filtration

- Protects the downstream processes from diatomaceous earth (DE) and other additives which may have bypassed other filtration stages resulting in short filter life of the downstream membranes.

Barrel / Cellar Washing

- Dechlorination, yeast removal and micro reduction of water to limit the development of new bacteria during maturation or storage when water is used to pump, rinse or clean tanks. Water coming into contact with corks should be dechlorinated to prevent the formation of chloroanisoles trichloroanisol (TCA), the chemical associated with corked wine.

Polishing / Clarification of Wine

- Removal of insoluble solids such as lees, fragments of grape skin, pulp, seeds and yeast. Due to the high level of suspended solids dead end filtration alone is not suitable for clarification of wine and a number of other processes are used. Clarification generally occurs after primary filtration and can include, Racking, Fining agents, normal flow filtration, Cross flow filtration, DE and Sheet filtration.

Pre-Stabilisation

Standardisation of Wine

- The filterability of any wine can be assessed quickly in a small laboratory based test. Filterability Index (FI) can benchmark wine quality and identify batch to batch variations in product quality. The results can be used to determine wines with high Filterability Index values which require pre-treatment to standardise quality and protect final filter lifetime.

Intermediate Microbial Stabilisation (IMS)

- Intermediate Stabilisation is a process where yeast is removed and levels of microbiological contamination are reduced in order for the wine to be transported or stored. Whilst the alcohol and tannin content of the wine will help in providing stability to the wine, further microbiological treatment is required for long term storage and transport. Potential spoilage could be caused by residual wine yeast or ingress of wild yeasts continuing to react with the sugar within the wine. Sulphur dioxide is commonly used to microbiologically stabilise the wine during storage and transport, however it can cause flavor taints to the wine.

Brettanomyces Removal

- Yeasts from Brettanomyces species are responsible for formation of high quantities of volatile phenols causing unpleasant odour and affecting flavor. These yeasts can originate in the vineyard, growing particularly well in wooden elements and barrels during fermentation or aging.

Prefiltration / Membrane Protection

- Removal of yeast and reduction of microbiological material to protect the life of the final membrane filters.

Final Sterilisation

Terminal Microbial Stabilisation (TMS)

- Full retention of yeast and reduction of microbiological density without effecting the wines unique sensory characteristics of the wine i.e: tannins, colors, flavors, etc.

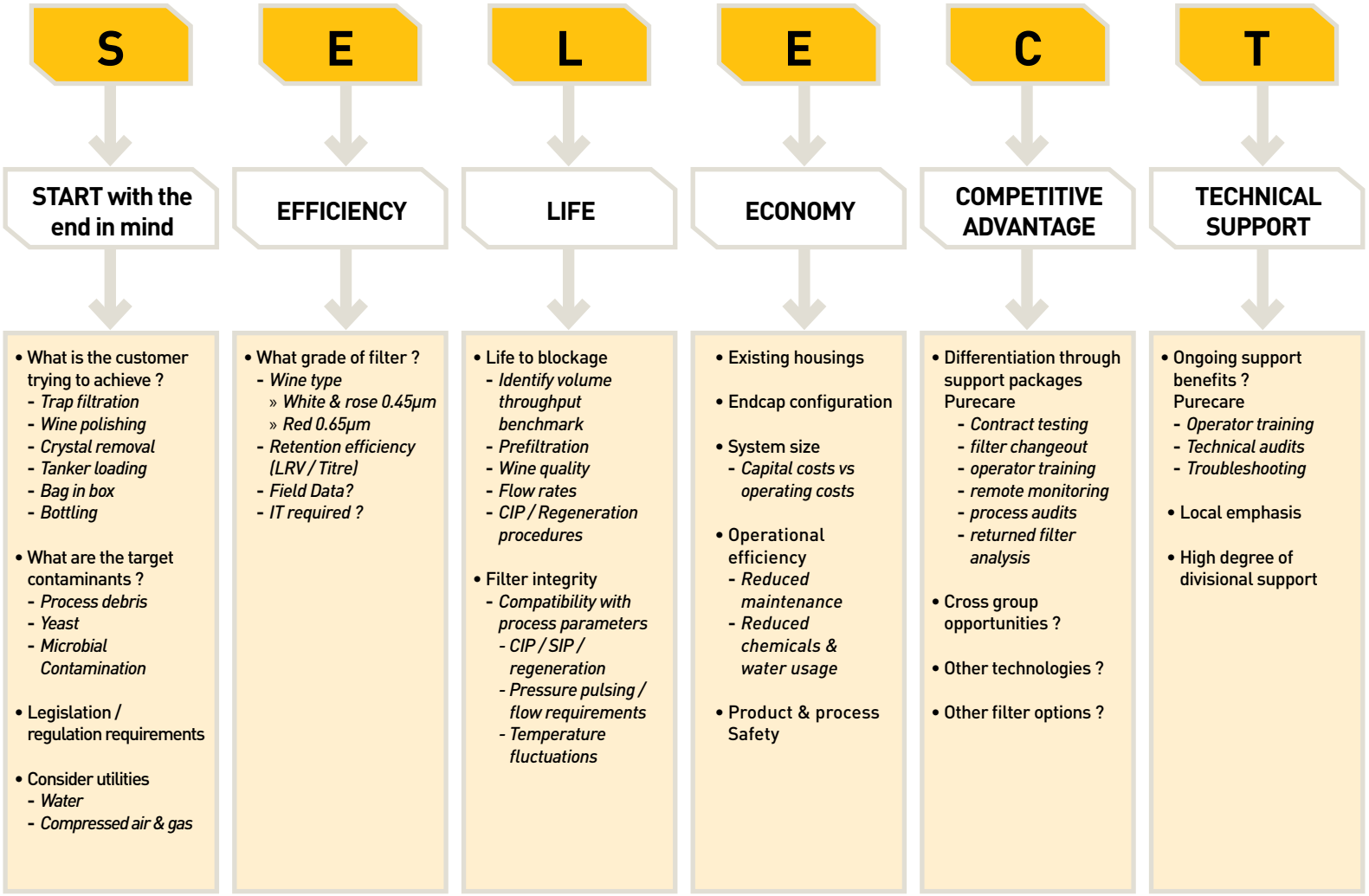
Bottle Rinsing

- To ensure microbiological quality of the water preventing new bacteria from developing and protecting final product quality.

Product selection process wine

There is no one single solution to an oenolgist's filtration requirements. Depending on the region and international location, production methods vary significantly. It is therefore essential that a structured process for identifying efficient process filtration solutions is followed. The Purecare programme outlines the required information prior to establishing a filtration solution and the assessment methods used to identify the suitability of any Parker domnick hunter solution.

The SELECT process builds on the principles used to select the optimum filtration solution for the end user. Starting with the end in mind following the outlined procedure will help to identify a suitable filtration solution.



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Selecting the final filter

Fine Wine 'Polishing'

Clarification 20 µm - 3 µm

- Large Particulate
- Removal of Lee's

PROPLEAT

- *Pleated polypropylene construction*
- *High DHC for removal of large particulate*

PEPLYN MAX

- *Large format product designed to handle large volume flowrates.*
- *The capture of contaminants with inside to outside flow.*

- Clarification of Fine Wines
- Powder Removal
- PVPP Removal / DE
- Crystal Removal

PEPLYN HD

- *High depth polypropylene media for effective powder removal and high particulate loading.*

PEPLYN HA

- *Specifically designed for repeated backflush procedures resulting in increased service life when carefully controlled.*

Tanker Loading / Short-Term Consumption

Pre-Stabilisation 3 µm - 0.6 µm

- Yeast Removal
- Bacteria Reduction
- Colloid Removal
- Standardisation of Wine

PREPOR PP

PREPOR GP

- *Range of prefilters specifically designed to provide pre-stabilisation down to 0.5 µm.*
- *Polypropylene when CIP would cause problems to GP.*

Filling Bag in Box / Bottling

Final Stabilisation 1.2 µm - 0.45 µm

- Spoilage Removal
- Long-term Shelf-Life
- Bacteria Removal
- Full Guaranteed Yeast Retention

BEVPOR PS

- *PES membrane filter used to guarantee yeast removal and microbacterial reduction with wine.*

BEVPOR PH

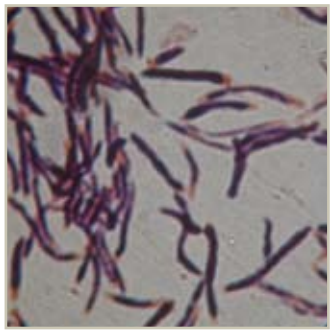
- *Increased area PES membrane filter with integral prefilter layer. For use when increased volume throughput is critical.*

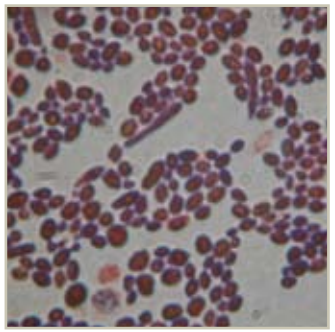
BEVPOR PW

- *PES membrane filter with integral prefilter layer designed for pulse flow applications.*

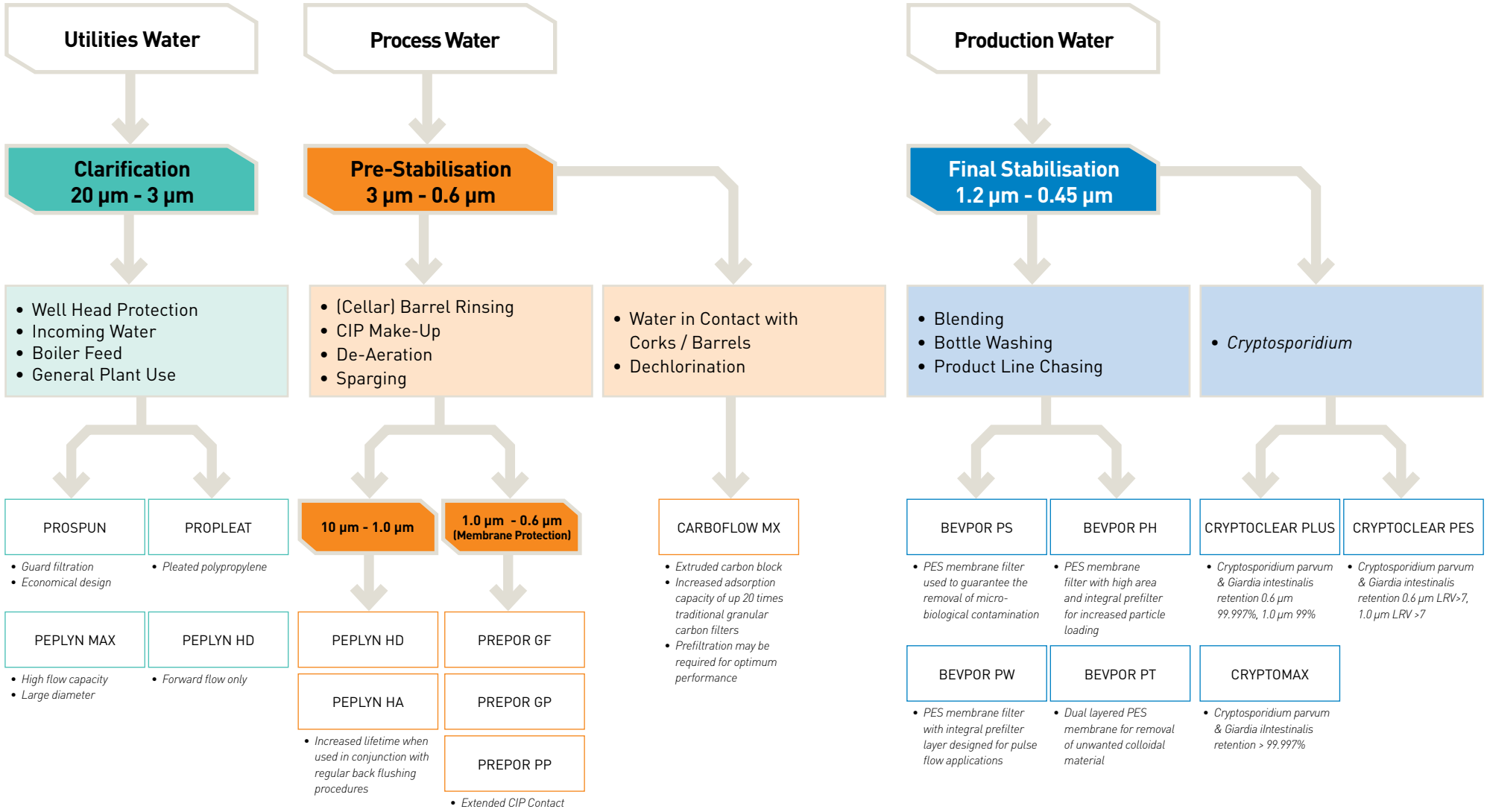
BEVPOR PT

- *Dual layered PES membrane for removal of unwanted colloidal material.*





Typical water applications



Compressed air / gas applications

Boiler House

Compressed Air Pretreatment

AO
- *Compressed gas filter*
- *Particle removal to 1 micron*
- *Remaining oil content 0.5ppm*

AA
- *Compressed gas filter*
- *Particle removal to 0.01 micron*
- *Remaining oil content 0.01ppm*

AX
- *Ultra high efficiency gas filter*
- *Particle removal to <0.01 micron*
- *Remaining oil content 0.001ppm*

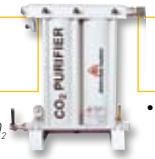
ACS
- *Oil vapour and odour removal*
- *Air quality to ISO 8573.1; Class 1 oil*

Production or Process Air / Gas

Compressed Air / Gas in Contact with Flushed Product

- Product Carbonation / Filling

PCO2
- *Protection*
- *Added sterility of CO_2 quality*
- *Protection against impurities resulting in flavour defects*
- *Easy maintenance*



HIGH FLOW BIO-X / TETPOR AIR

- Nitrogen Blanketing / Flushing

MAXIGAS
- *Generates N2 in-house irradicating need to buy in.*
- *On demand, convenient and secure supply*
- *High purity supply 5% to 10 ppm² (99.999%)*
- *Modular design allows expansion*
- *Cost effective supply*

HIGH FLOW BIO-X / TETPOR AIR

Product Contact

Packaging & Production Process

- Purging
- Charging
- Top Pressure

HIGH FLOW BIO-X
- *Hydrophobic glass microfibre*
- *Aerosol integrity test VALAIRDATA II*

TETPOR AIR
- *Hydrophobic membrane filter*
- *Liquid & aerosol integrity testing*

Steam

No Product Contact

SINTERED 25 µm
- *21 - 82 Kg / hr*

PLEATED 5µm
- *150 - 280 Kg / hr*

Product Contact

- Culinary 3A Standard 609-03

SINTERED 1µm
- *21 - 82 Kg / hr*

PLEATED 1µm
- *150 - 280 Kg / hr*

PLEATED JUMBO 1µm
- *750 - 3750 Kg / hr*

Culinary 3A Standard 609-03
- 95% retention of >2 micron particles in the liquid phase
- Manufactured from 300 series stainless steel
- Any additives to the boiler feed should conform to CFR Title 21, Chapter 1, Part 173, Section 173.310

Filter housings

Air / Gas Housings

Direct Product Contact

HSA

- *Sanitary Air / Gas Housing*
- *Internal Finish - As welded*
- *External Finish - 0.8 µm Ra*

Indirect Product Contact

HBA

- *Beverage Air / Gas*
- *Internal Finish - As Welded*
- *External Finish - 0.8 µm Ra*

Tank Vents

HSV

- *Vent Housing*
- *Internal Finish - 0.8 µm Ra*
- *External Finish - As welded*

HBA

- *Beverage Air / Gas*
- *Internal Finish - As Welded*
- *External Finish - 0.8 µm Ra*

Liquid Housings

Single Filter Housings

HSL

- *Sanitary Liquid Housing*
- *Internal Finish - 0.4 µm Ra*
- *External Finish - 0.25 µm Ra*

HIL

- *Liquid Housing*
- *Internal Finish - As Welded*
- *External Finish - 0.8 µm Ra*

Multi-Round Filter Housings

VSH

- *Sanitary Multi-Round Housing Range 3 - 30 Round*
- *Internal Finish - <0.8 µm Ra*
- *External Finish - Mechanically Polished*

Steam Housings

780-1300 Kg/hr

VIS

- *Jumbo HIGH FLOW Steam Vessels*
- *Internal Finish - 0.8 µm Ra - 100% Pickled & Passivated*
- *External Finish - Grit Blast 5 µm Ra*

62-280 Kg/hr

HBA-HP

- *Industrial Air / Gas*
- *Internal Finish - 0.4 µm Ra*
- *External Finish - 0.25 µm Ra*

Adding value

Increasing Process Control

Utilities Testing

- Assessing Incoming & System Water Quality
- CIP, Make-Up & Procedures
- Season Variation of Water Quality

SDI

- *Silt Density Index identifies quality of water with regards to filtration*

PSA

- *Particle size distribution with sample*
- *Breakdown of the number of particles by size*

Increasing Process Efficiency

Site Audit

- Assessing Incoming Wine Quality
- Effective Product Selection
- Evaluate System Size
- Identify Filtration Efficiency
- Continuous Improvement

Micro Assessment

- *Establish finish product quality post filtration*

FI Testing

- *Establish wine quality*
- *Identify optimum system*

Capsule Trials

- *Identify optimum system based on customer criteria*

Guaranteeing Final Product Quality

Filter Integrity Testing

- Sterile Air / Gas Filters

Aerosol Test

VALAIRDATA II

- Liquid Final Stabilisation Filters

Diffusional Flow / Pressure Decay

BEVCHECK

BEVCHECK PLUS

On-Going Support Services

Troubleshooting

- Returned Filter Analysis
- Monitor & Evaluation

Analysis

Integrity Testing (IT)

Physical Inspection

- *Returned report & recommendations*

Remote Monitoring

Chilling

Creating the right environment

Process cooling is regularly used in the processing of wine:

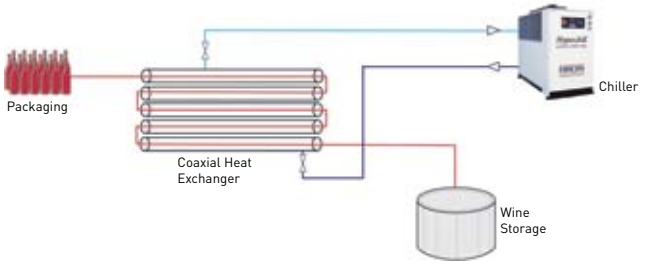
- To regulate temperature during fermentation.
- During accelerated precipitation of tartrate crystals.
- To stabilise the wine during storage.

Parker domnick hunter Hiross has more than 30 years experience in the manufacture of industrial cooling systems. In recent years a wide range of chillers for the production of chilled water has been introduced. Coupled with a sales and engineering team capable of providing customised solutions to meet individual needs, this provides a dedicated approach to the requirements of winery applications.

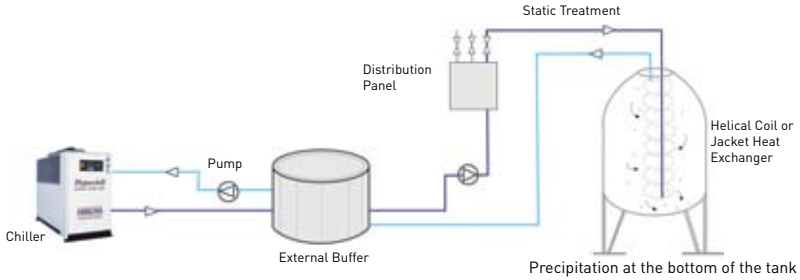
The technology is characterised by a high refrigeration yield for low electrical consumption. Combined with a small footprint this leads to a compact, space-saving and energy efficient solution.

Chillers are available for internal and external installation and are equipped with microprocessor intelligence providing precise control and automatic function.

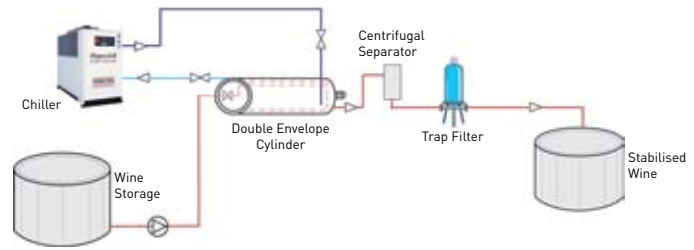
In-Line Chilling



Tank Chilling



Tartrate Precipitation



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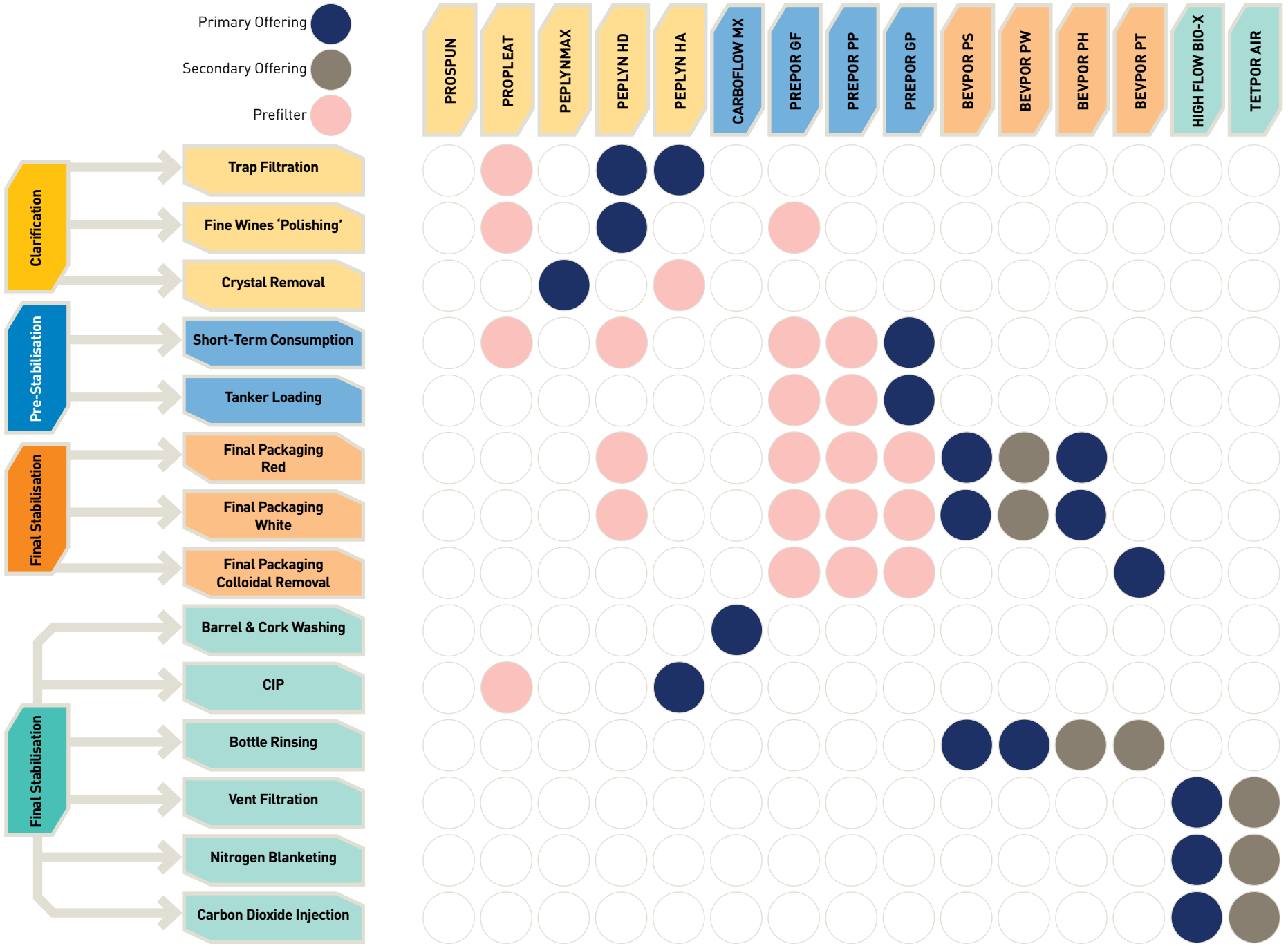

Primary Offering
Secondary Offering
Prefilter
PROSPUN
PROPLEAT
PEPLYNMAX
PEPLYN HD
PEPLYN HA
CARBOFLOW MX
PREPOR GF
PREPOR PP
PREPOR GP
BEVPOR PS
BEVPOR PW
BEVPOR PH
BEVPOR PT
HIGH FLOW BIO-X
TETPOR AIR
Clarification
Trap Filtration
Fine Wines 'Polishing'
Crystal Removal
Pre-Stabilisation
Short-Term Consumption
Tanker Loading
Final Stabilisation
Final Packaging Red
Final Packaging White
Final Packaging Colloidal Removal
Final Stabilisation
Barrel & Cork Washing
CIP
Bottle Rinsing
Vent Filtration
Nitrogen Blanketing
Carbon Dioxide Injection

Liquid filtration - Clarification

PROSPUN

0.5 - 75 µm micron

Polypropylene

- High dirt holding capacity
- Consistent absolute retention under a wide range of operating conditions
- Ideal for primary stage filtration

PROSPUN is the most economical solution for delivering general liquid clarification and particle retention. It can be used as a guard filter to protect the process against high variable levels of particulate.

PROPLEAT

3 - 20 µm micron absolute

Polypropylene

- Continuous length rigid sleeve and core provide high strength during normal and reverse flow operations
- Retention ratings to suit a wide range of clarification applications

PROPLEAT cartridges have been developed to bridge the gap between meltblown depth filters and absolute rated pleated media filters. Their continuous length and all-polypropylene construction results in a robust yet economical design that maximises the effective filtration area and provides wide chemical compatibility, coupled with low extractable levels.

PEPLYNMAX

5 - 20 micron absolute

Polypropylene

- Large diameter yields much higher flow rates compared to traditional filters
- Absolute retention ratings for critical filtration

PEPLYNMAX has been developed for pre-clarification and clarification of bottled water from source, using a depth polypropylene media with optimised pleat geometry. PEPLYNMAX with its wide format diameter offers high flow rates and an inside to outside flow configuration that offers high particulate holding capacities and better retention of contaminants.

PEPLYN HD

3 - 35 micron absolute

Polypropylene

- Graded density and increased depth resulting in high dirt holding capacity
- Ideally suited to high volume, forward flow processes

PEPLYN HD has been developed using graded pore density depth polypropylene media for clarification of bottled water from source. The PEPLYN HD has outstanding particulate holding capacity through its multi-layer depth construction providing optimised filtration for bottled water sources with high particulate loading and size distribution.

PEPLYN HA

3 - 100 micron absolute

Polypropylene

- Graded density results in high dirt holding capacity
- Optimised pleat configuration maximises backwash efficiency

The PEPLYN HA has been developed using graded density polypropylene depth media for the clarification of bottle water. PEPLYN HA is designed to capture particles on the surface of the media where the rigid, open pleat structure ensures that the backwash cleaning provides effective removal of trapped particulate.

Liquid filtration - Pre-Stabilisation

CARBOFLOW MX

Bituminous Coal

- Ideal for chlorine and chloroform reduction
- FDA approved materials

CARBOFLOW MX cartridges are offered in both high efficiency and general grades. They consist of bituminous coal sourced carbon, extruded together with an FDA listed thermo-plastic binder, to produce an extremely porous yet rigid structure.

PREPOR PP

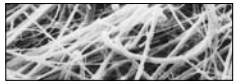
?? micron absolute

Polypropylene

- Fine clarification to provide bright finished product
- Prefiltration duty to extend the lifetime of downstream microporous filters

PREPOR PP filter cartridges will significantly reduce numbers of yeast and spoilage organisms from beverage products, to provide extremely cost effective microbial stabilisation. The cartridges will also 'condition' liquids and can be used to improve the filterability of products prior to terminal stabilisation by thermal or filtrative methods.

PREPOR GF



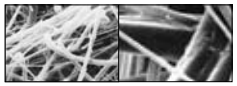
2 - 10 micron absolute

Glass Microfibre

- High voids volume media provides high dirt holding capacity
- Higher flow than polypropylene media results in low pressure drop even in viscous liquids

PREPOR GF liquid filter cartridges are utilised for the clarification, stabilisation and bioburden reduction of aqueous solutions, media and biologicals. These filters have a high dirt holding capacity and exhibit exceptional flow performance compared to polypropylene filters. The hydrophilic nature of PREPOR GF filter cartridges also makes them more suitable for gravity fed systems.

PREPOR GP



0.6 - 1.5 micron absolute

Glass Microfibre / Polypropylene

- Composite media provides high strength and dirt holding capacity
- High efficiency removal of spoilage organisms and yeasts

PREPOR GP with its pleated combination of glass microfibre and high efficiency polypropylene media is ideally suited for fine clarification and pre-microbial filtration in bottled water applications.

Liquid filtration - Final Stabilisation

BEVPOR PS

0.2 - 1.2 micron stabilising — Polyethersulphone

- Can be sanitised and regenerated for extended life
- Low adsorption of protein colours and flavours

BEVPOR PS utilises an advanced polyethersulphone membrane configured to provide high flow and cost effective performance. The membrane has an asymmetric pore structure which provides graded filtration throughout its depth, resulting in increased capacity to hold contaminants. Componentry has been selected to maximise mechanical strength & chemical compatibility enabling the filter to withstand repeated chemical cleaning and sterilisation.

BEVPOR PW

0.2 - 1.2 micron — Polyethersulphone

- Optimised for the microbiological stabilisation of water
- Repeatedly integrity testable

BEVPOR PW has been designed with a modified pleat configuration to ensure sustained integrity and performance even under the harshest process conditions. The BEVPOR PW is a robust filter suited for applications where pulsation of water 'hammer' shocks can be generated as a result of the rapid on / off cycles during filling operations.

BEVPOR PH

3 - 35 micron absolute — Polyethersulphone

- Integral prefilter layer maximises service life
- Can be sanitised and regenerated for extended life
- Higher surface area extends service life

The BEVPOR PH combines a prefiltration layer with a final PES asymmetric membrane to provide a graded filtration throughout their depth that enables high flow rates, long life and improved throughputs. The hardware selected in the construction of the BEVPOR PH is able to withstand repeated chemical cleaning and steam sterilisation.

BEVPOR PT

0.2 - 0.65 micron — Polyethersulphone

- Prefilter layer means colloids extending service life
- Low adsorption of protein, colours and flavours

The BEVPOR PT has been developed using a PES membrane and an integral prefilter layer to provide high flow rates, long life and improved throughputs. Combination of the asymmetric pore prefilter and final membrane layers, provide a graded filtration throughout their depth, resulting in increased capacity to hold colloidal matter and other contaminants.

CRYPTOCLEAR PES

1.0 micron — Polypropylene

- Specifically developed for the removal of *Cryptosporidium parvum* oocysts
- High throughputs and flow rates
- Can be repeatedly steam sterilised or chemically sanitised

CRYPTOCLEAR PES utilises the unique properties of a microbially retentive polyethersulphone membrane that provides absolute retention of *Cryptosporidium parvum* oocysts to meet the specific needs of the food, beverage and portable water industries.

CRYPTOCLEAR PLUS

1.0 micron — Polypropylene

- Specifically designed for the reduction of *Cryptosporidium parvum* oocysts
- Graded density pleated media optimised dirt capacity and oocyst retention
- Independently tested with viable *Cryptosporidium parvum* oocysts

CRYPTOCLEAR PLUS pleated filter cartridges have been designed specifically for the removal of *Cryptosporidium parvum* and *Giadia intestinalis* from water in the food, beverage and healthcare industries.

Air / Gas filtration

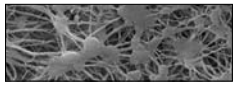
HIGH FLOW BIO-X

0.1 micron sterilising — PTFE Impregnated Glass Fibre

- 94% voids volume PTFE impregnated glass fibre
- Exceptional flow rates with low pressure drops
- Integrity testable by aerosol challenge

HIGH FLOW BIO-X combines proven depth filter technology and a pleated construction to provide retention down to 0.01 micron in gas. Flow rates typically 2-3 times that of membrane filters make HIGH FLOW BIO-X the filter that can dramatically reduce cartridge usage and installation size within the fermentation, food and beverage industries.

TETPOR AIR



0.2 micron — Polypropylene Expanded PTFE

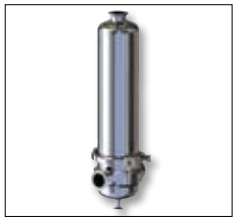
- Assured biosecurity with absolute rated filtration
- High flow rates with low pressure drops
- High voids volume PTFE membrane

TETPOR AIR sterilisation filter cartridges offer exceptional filtration performance whilst providing the highest levels of biosecurity throughout the process industry. Operating at ambient temperature conditions, TETPOR AIR filter cartridges provide a cost effective filtration solution.

Housings

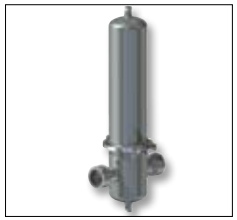
HSA

- Flow efficient sanitary range of air / gas housing
- Designed specifically for the food and beverage industry
- Sanitary tri-clamp, vent and drain connections as standard
- Sanitary tri-clamp body closure as standard



HBA

- Flow efficient range of air / gas housing
- Designed to maximise flow and minimise pressure drop
- Designed specifically for the food and beverage industry



HSV

- Industrial vent housing
- Direct connection to tank boss allows housing to be self supported
- Corrosion resistant 316L stainless steel
- Easy assembly and maintenance

HSL

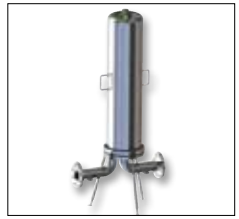
- Single-element sanitary liquid housing
- Designed specifically for the food and beverage industry
- Sanitary vent, tri-clamp connections as standard
- Sanitary tri-clamp body closure as standard

HIL

- Industrial single-element liquid housing
- BSPP inlet / outlet standard connections
- Suitable replacement for plastic housings
- Suitable for cartridge types DOE or 222

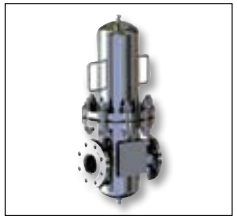
VSH

- Multi-element sanitary liquid housing
- Designed specifically for the food & beverage industry
- High quality crevice free construction
- Available for 3 to 30 round filters



VIS

- High efficiency steam filter housing
- Compatible with JUMBO element to maximise steam capacity



HBAHP

- Air / gas and steam housing
- For pressures up to 15 barg (232.06 psig) @ 205 °C (401 °F)
- Double bolted clamp for extra security
- Available with many connection types

Integrity testing equipment

VALAIRDATA II

- Aerosol challenge testing
- Integrity testing of gas filters

BEVCHECK

- Pressure decay and diffusional flow testing
- Hand held portability with rechargeable battery option
- Flexible - suitable for use with compressed air or nitrogen

BEVCHECK PLUS

- Pressure decay and diffusional flow testing
- Convenient built-in printer provides printed test report
- Flexible - suitable for use with compressed air or nitrogen

Compressed air pre-treatment

OIL-X

- The most energy efficient filters available
- High quality ISO8573.1:2001 compressed air
- Running costs that start low and stay low

PCO2

- Ensures compliance with quality guidelines published by the International Society for Beverage Technologies (ISBT)
- Protects drinks manufacturing processes from vapour impurities

MAXIGAS

- Low life-cycle ownership cost and elimination of costs associated with a cylinder supply
- On-demand functionality limits waste
- Energy efficient; operates from a small compressor

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