Wine Filtration

Selection 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 of wine have partnered with Parker domnick hunter for over 30 years to ensure their process and quality needs are achieved.

A proven product range combined with knowledgeable specialists of the wine making process enables Parker domnick hunter to provide value added solutions that guarantee quality.

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 program 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.

Using upfront detailed technical assessments and structured after-sales support packages, Purecare ensures Parker domnick hunter solutions meet 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 wine, increasing process efficiency and giving producers and bottlers greater control throughout their process.

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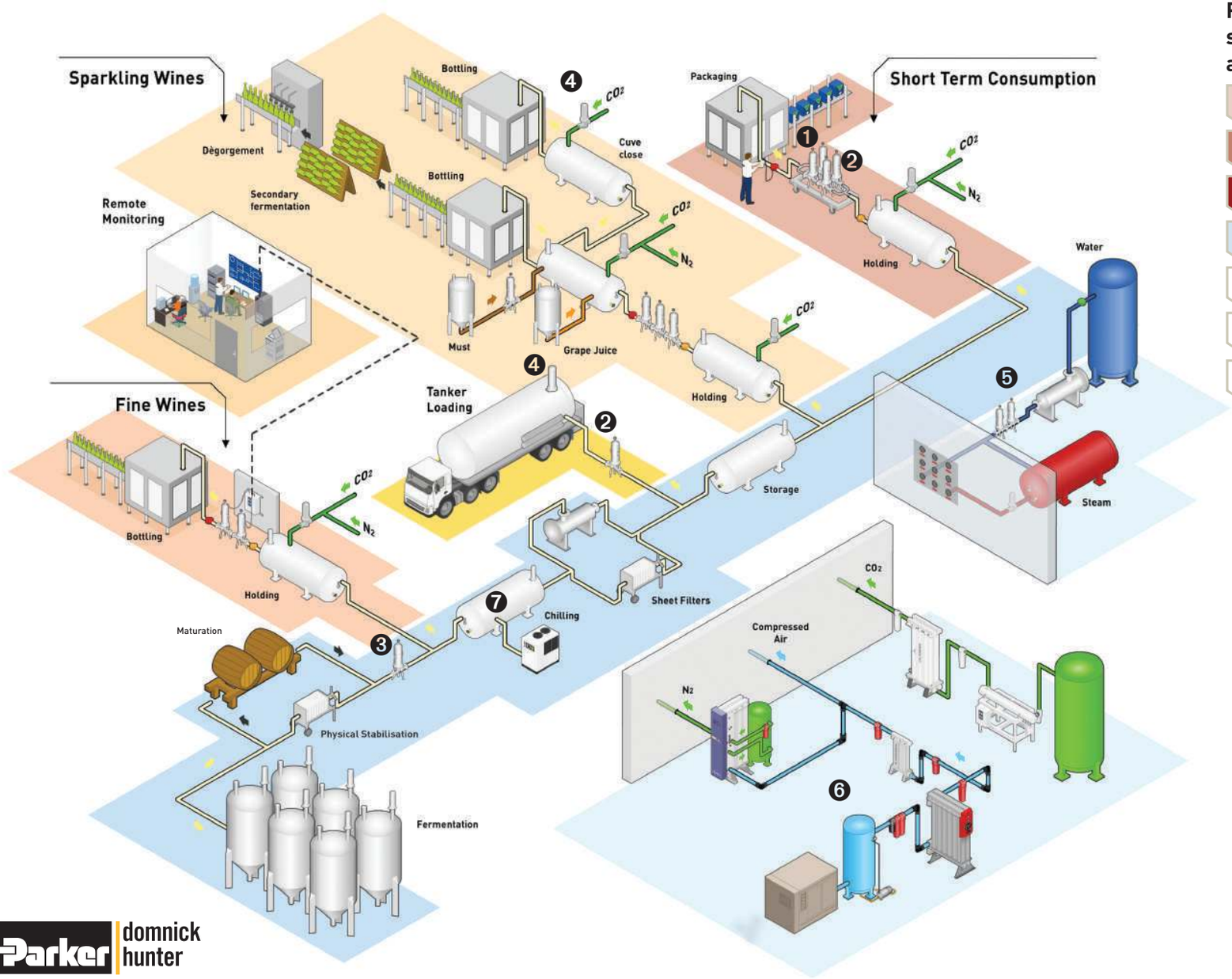
Typical processes



Parker domnick hunter specialized wine applications

1. Final stabilization
2. Pre-stabilization
3. Clarification
4. Sterilization of gas
5. Water utilities
6. Gas utilities
7. Chilling

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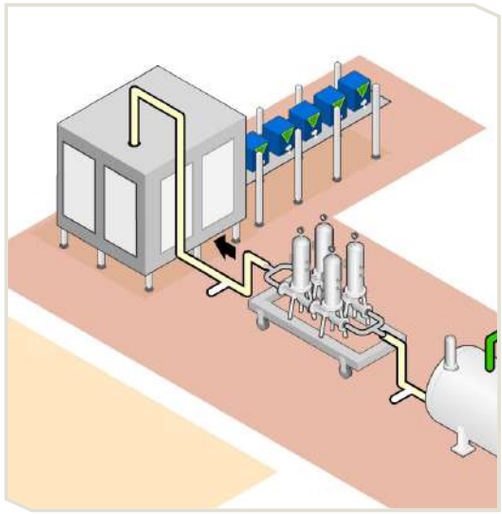
Application 1. Final stabilization

Understanding the application



A number of factors influence the character and appeal of wine during its journey from the fermentation tank to the bottle, but in order to produce stable wine which protects and develops flavour once packaged, the presence of spoilage organisms has to be reduced or eliminated completely.

Typical spoilage organisms in bottled wine are species capable of growing in low pH and anaerobic conditions for example lactic acid bacteria and fermenting yeasts such as *Brettanomyces bruxellensis*. Spoilage organisms can ruin wine by causing off flavours and haze or cloudiness, with contamination from strongly fermenting yeasts causing bottle explosions.

Depending upon the type of the wine and the processes used during its production, the threat of microbial spoilage will vary. For example, relatively young wine with low tannin levels and high residual sugar may be subject to spoilage from low numbers of yeast / bacteria. Mature wines with high alcohol, tannin and low nutrients may be slightly more resistant, however, threats from microbial contamination still exist.

For red wines, membrane filtration down to 0.65µm is typically adequate to eliminate spoilage organisms, however, for white wines, 0.45µm is typically used. Filtration with a tighter membrane than is necessary will cause the filter to block quicker, resulting in an uneconomical process so care must be taken to use the correct grade for the conditions.

BEVPOR wine filters utilize an inert PES membrane which has been designed to protect the flavour and character of wine by providing validated retention to typical spoilage organisms, without impacting upon taste or colour profiles.

Final stabilization

Final filtration

Key filter requirements
- Validated microbial retention
- Integrity testable
- Must not effect wine flavour / characteristics
- Easily cleaned for repeated use
- Strong and robust against pressure pulsing
- High flowing

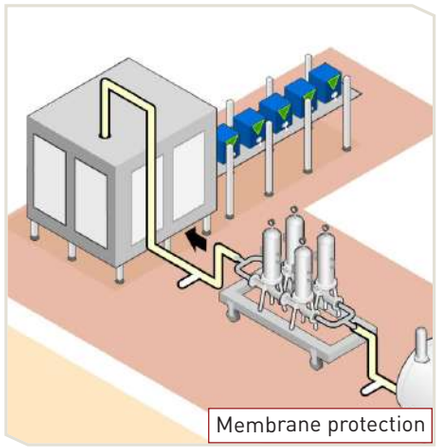
BEVPOR PS	BEVPOR PW	BEVPOR PH
• *0.6m² filtration area*	• *0.6m² filtration area* • *Prefilter layer*	• *High filtration area 0.8m²* • *Prefilter layer* • *Optimum solution*

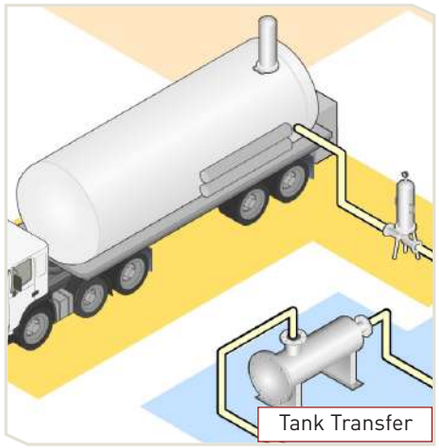
Flow guide
5-10l/min/10"cartridge
3-6hl/h/10"cartridge

See page 15 for rating guide

Application 2. Pre-stablization

Understanding the application


Membrane protection


Tank Transfer

Membrane Protection
In order to return long service life and efficient use of the final filtration system, the suspended particle and microbial loading of the wine should be reduced with adequate prefiltration. Final membrane filtration is normally the most expensive filter stage in the line and therefore, should only be used to remove microbes.

Fine Wine Polish
Mature or fortified wine is already physically, chemically and microbiologically stable and only requires a final polish to improve clarity and to remove any yeast and bacteria which may be present.

Standardization: Tank Transfer and Cellar Management
In order to protect wine quality during storage or transportation, yeast and other microbial loadings should be reduced.

The PREPOR range of filters have been developed to excel in the prevoius applications, with the new PREPOR NG filter designed to offer the optimum choice for increased microbial security, fine particle retention and the strength necessary to withstand repeated cleaning and backwash regeneration.

Membrane protection fine wine polish standardization

Pre-stabiliztion

Key filter requirements
- Removal of undesirable colloids
- Microbial reduction
- Stable construction for reliable retention
- Strength to withstand CIP
- High flowing

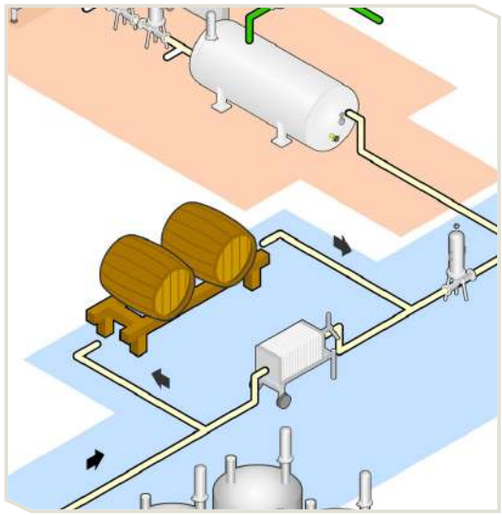
PREPOR PP	PREPOR NG (NEW)
• *Yeast reduction*	• *More retentive, advanced depth construction* • *Yeast removal* • *Bacterial reduction* • *CIP regenerable* • *Optimum choice for retention / lifetime*

Size guide
10 l/min/10¨cartridge
6hl/h/10¨cartridge

See page 15 for rating guide

Application 3. Clarification

Understanding the application



Trap filtration
The trap filter system is designed to capture any solid particulate such as filter aids which may remain in the wine following primary clarification. The objective of this stage is to provide a consistent level of particulate filtration to help reduce filterability index and provide clear wine to intermediate storage.

Crystal Removal
Potassium bitartrate and calcium tartrate crystals are naturally occurring precipitates in wine which form non-hazardous, glass-like crystals as the alcohol concentration increases during must fermentation. These crystals are undesirable as they are sometimes large enough to be visible to the naked eye (>40µm) and need to be removed during production. To remove the crystals, the wine is chilled to just above freezing point, facilitating crystallization and precipitation, and the crystals can then be removed by filtration.

Parker domnick hunter has designed the PEPLYN TF as the optimum solution for maximum efficiency in crystal removal and trap filtration applications. The filters have been specially designed to capture particles on the surface of the media so that they can be easily removed through backwash, therefore allowing easy regeneration and long service lifetimes. The high area filter media will return high wine flow, whilst providing an absolute retention to solid particulate.

PEPLYN HD filters provide an optional solution to trap filtration and crystal removal applications where backwash regeneration is not feasible.

Trap filtration crystal removal

Clarification

Key filter requirements
- Ability to capture all DE powder - absolute rated
- Highly robust for chemical / physical regeneration
- High flowing

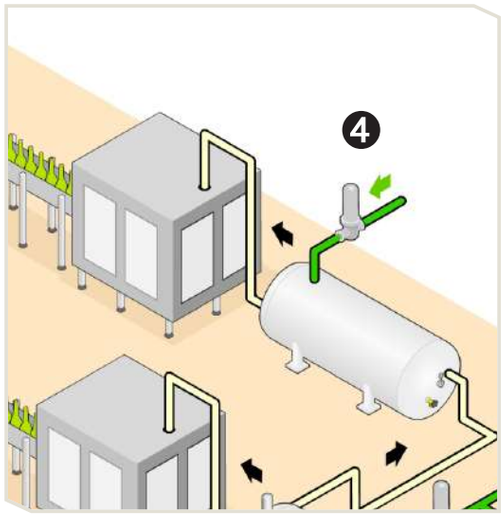
PEPLYN HD	PEPLYN TF
• *High depth* • *Ability to withstand blockage under variable particle loading*	• *High surface area* • *Specifically designed for backwash regeneration* • *Optimum solution for clarification*

Size guide
10-15 l/min/10"cartridge
6-9hl/h/10"cartridge

See page 15 for rating guide

Application 4. Sterilization of gases

Understanding the application



Compressed gases which come into direct contact with; ingredients, the finished product, packaging materials, storage vessels or the manufacturing machinery, are termed critical and require sterile filtration to safeguard against a potential contamination of the wine.

For aseptic filling operations, maintenance of machine sterility and the associated packaging such as bottles and caps becomes critically important. The filling machine will typically require at least one sterile gas filter to remove microorganisms from the nitrogen, CO_2 or compressed air used in the filling operation.

Bottling and tank vent filtration

Gas sterilization

Key filter requirements

- Fully validated microbial retention
- Integrity testable
- Hydrophobic to prevent blinding with moisture
- High flowing to reduce operational costs and increase energy efficiency

HIGH FLOW BIO-X	HIGH FLOW TETPOR II
• *Fully retentive to aerosol bacteria* • *Superior flow rates* • *PTFE impregnated depth media*	• *Hydrophobic PTFE membrane for added security* • *Fully integrity testable*

For sizing consult your Parker domnick hunter representative or sizing calculator

Application 5. Water utilities

Understanding the application

Service water

Point of entry clarification

PEPLYN PLUS	PARMAX / MAXGUARD
• *Absolute retention for a range of micron grades* • *Pleated polypropylene*	• *Large diameter* • *Bulk water treatment*

Process water

Cork and barrel washing

CARBOFLOW MX
• *De-chlorination*

RO membrane

PEPLYN PLUS	PARMAX / MAXGUARD
• *Absolute retention for a range of micron grades* • *Pleated polypropylene*	• *Large diameter* • *Bulk water treatment*

CIP makeup

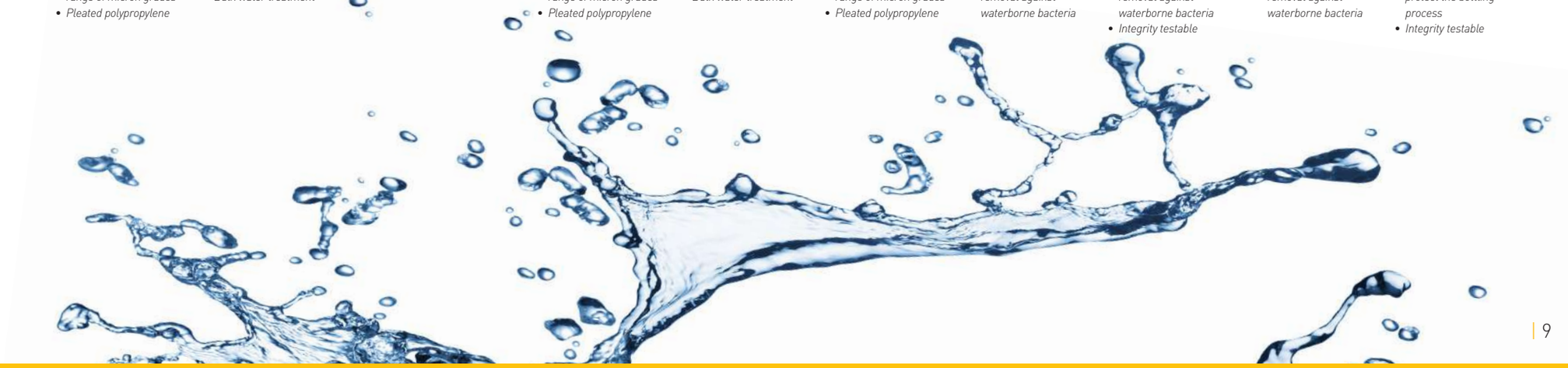
PEPLYN PLUS
• *Absolute retention for a range of micron grades* • *Pleated polypropylene*

Blending must and sugar

NEW BEVPOR WG	BEVPOR PS
• *Validated microbial removal against waterborne bacteria*	• *Validated microbial removal against waterborne bacteria* • *Integrity testable*

Bottle washing

NEW BEVPOR WG	BEVPOR MS
• *Validated microbial removal against waterborne bacteria*	• *Sterile filtration to protect the bottling process* • *Integrity testable*



Application 6. Gas utilities

Compressed air pretreatment / generation

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

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

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

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

Production or process air / gas

- Product carbonation / filling

PCO_2
- *Protection*
- *Added sterility of CO_2 quality*
- *Protection against impurities resulting in flavour defects*
- *Easy maintenance*

- Nitrogen blanketing / flushing

MAXIGAS
- *Generates N_2 in-house irradicating need to buy in*
- *On demand, convenient and secure supply*
- *High purity supply*
- *Modular design allows expansion*
- *Cost-effective supply*

- Purging
- Venting top pressure

HIGH FLOW BIO-X
- *Hydrophobic glass microfibre*
- *Aerosol integrity test VALAIRDATA 3*

HIGH FLOW TETPOR II
- *Hydrophobic membrane filter*
- *Liquid and aerosol integrity testing*

Steam

No product contact

SINTERED 25 µm
- *21 - 82 Kg / hr*

PLEATED 5 µm
- *150 - 280 Kg / hr*

Product contact

- Culinary 3A standard 609-03

SINTERED 1 µm
- *21 - 82 Kg / hr*

PLEATED 1 µm
- *150 - 280 Kg / hr*

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

Culinary 3A Standard 609-03
- 95% retention of >2 micron particles in the liquid phase
- Manufactured from 316 series stainless steel
- Any additives to the boiler feed should conform to CFR Title 21, Chapter 1, Part 173, Section 173.310

Application 7. Chilling

Creating the right environment

Process cooling is regularly used in the processing of wine:

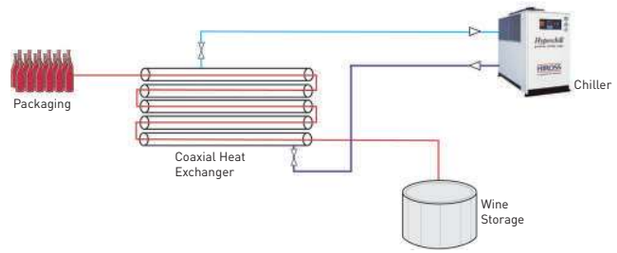
- To regulate temperature during fermentation.
- During accelerated precipitation of tartrate crystals.
- To stabilize the wine during storage.

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 customized solutions to meet individual needs, this provides a dedicated approach to the requirements of winery applications.

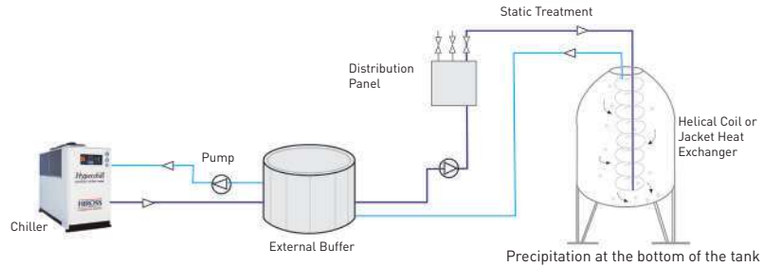
The technology is characterized by a high refrigeration yield for low electrical consumption. Combined with a small footprint this leads to a compact, space-saving and energy efficient solution.

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

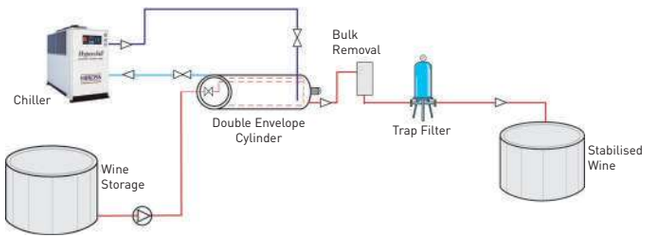
In-Line Chilling



Tank Chilling



Tartrate Precipitation



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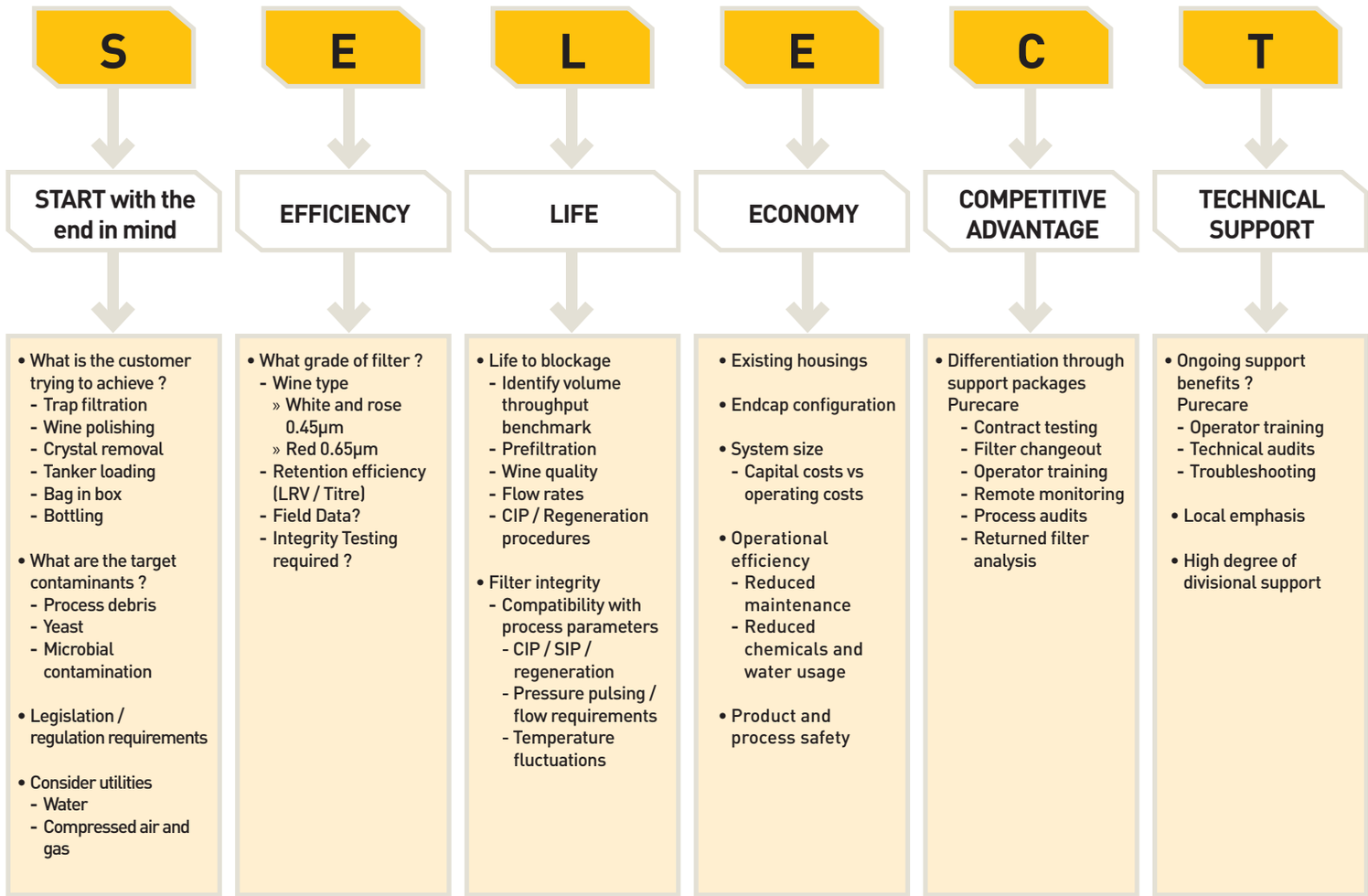
Product selection process wine

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 program 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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Selection matrix

		PARMAX / MAXGUARD	PROPLEAT	PEPLYN PLUS	CARBOFLOW MX	PEPLYN HD	PEPLYN TF	PEPLYN HA	PREPOR PP	PREPOR NG	BEVPOR PS	BEVPOR PW	BEVPOR PH	BEVPOR MS	BEVPOR WG	HIGH FLOW BIO-X	HIGH FLOW TETPOR II
Water Treatment	Point of entry clarification	1	3	2													
	Dechlorination	P	P		1												
	RO membrane protection	P	2	1													
	Bottle washing			P										1	2		
Clarification	Trap filtration					2	1										
	Crystal removal					2	1										
Pre-stabilization	Membrane protection							P	2	1							
	Fine wine polish / tank transfer								2	1							
Final Stabilization	Final filtration							P		P	3	2	1				
Gas Sterilization	Tank venting															2	1
	Nitrogen blanketing															2	1

Filter housings

Air / gas housings

- Direct product contact
  - **HSA**
    - *High specification sanitary air / gas housing*
    - *Internal finish - 0.4 µm Ra*
    - *External finish - 0.8 µm Ra*
- Indirect product contact
  - **HBA**
    - *Sanitary air / gas*
    - *Choices of finish available*

Tank vents

- **HSV**
  - *Open vent housing*
  - *Choices of finish available*
- **HBA**
  - *Closed tee port air / gas*
  - *Choices of finish available*

Liquid housings

- Single and multi style filter housings C Style
  - **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*
    - *Electropolished option*
  - **VSH**
    - *Sanitary multi-round housing range 3 - 30 round*
    - *Internal finish - <0.8 µm Ra*
    - *External finish - Mechanically polished*
- Single and multi large format filter housings (PARMAX)
  - **HPM**
    - *Single, 3 and 5 round housings*
    - *Horizontal or verticle orientation*
    - *Selection of ISO, BS4504, DIN2633 and ANSI RF150 connection flanges*

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*
    - *Choices of finish available*

Liquid filtration - Trap filtration and crystal removal

PEPLYN HD

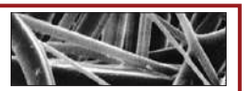
5, 10, 15 micron

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 wine. The PEPLYN HD has outstanding particulate holding capacity through its multi-layer depth construction providing optimized filtration for wine with high particulate loading and size distribution.

PEPLYN TF



5,10 15 micron

Polypropylene

- Graded density results in high dirt holding capacity
- Optimized pleat configuration maximizes backwash efficiency

PEPLYN TF filters have been specially designed to capture particles on the surface of the media so that they can be easily removed through backwash, therefore allowing easy regeneration and long service lifetimes. The high area filter media will return high wine flow, whilst providing an absolute retention to solid particulate.

Pre-stabilization - Tank transfer, fine wines, membrane protection and cellar management

PREPOR NG

0.5 - 1.0

Polypropylene

- Validated yeast removal and bacterial reduction
- Graded density construction for increased retention and throughput
- Strong, pleated polypropylene construction for backwash and chemical CIP

Combining a superior level of microbial retention with a strong and robust construction to withstand frequent CIP and backwash, PREPOR NG filters represent the optimum choice for pre-stabilization applications such as membrane protection and tank transfer operations.

PREPOR PP

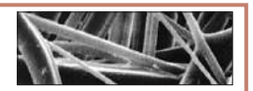
0.6 - 1.0 micron

Polypropylene

- Yeast and bacterial reduction
- Strong, pleated polypropylene construction for backwash and chemical CIP

PREPOR PP filter cartridges will significantly reduce the numbers of yeast and spoilage organisms from beverage products, to provide extremely cost effective microbial stabilization.

PEPLYN HA



1.0 – 20 micron

Polypropylene

- Absolute particle retention at a range of micron grades
- Strong, pleated polypropylene construction designed for chemical CIP

PEPLYN PLUS filters are utilized for the clarification and pre-stabilization of a wide range of liquids for the food and beverage industry.

Liquid filtration - Final stabilization

BEVPOR PS

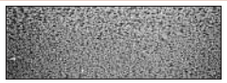
0.45, 0.65 and 1.2 micron

Polyethersulphone

- Validated microbial retention for effective stabilization
- 0.6m^2 filtration area

BEVPOR PS filters have been validated against typical wine spoilage organisms. Combined with easy integrity testing, the filters ensure the effective microbial stabilization of wine. The advanced polyethersulphone membrane has been configured to provide high flow and cost effective performance throughout the range of grades.

BEVPOR PW



0.45, 0.65 and 1.2 micron

Polyethersulphone

- Validated microbial retention for effective stabilization
- 0.6m^2 filtration area
- Integral prefilter layer

BEVPOR PW filters have been validated against typical wine spoilage organisms. Combined with easy integrity testing, the filters ensure the effective microbial stabilization of wine. The advanced polyethersulphone membrane in conjunction with the integral prefilter layer provides extended service life to blockage and improved filtration economics.

BEVPOR PH

0.45, 0.65 and 1.2 micron

Polyethersulphone

- Validated microbial retention for effective stabilization
- High filtration area – 0.8m^2
- Integral prefilter layer

BEVPOR PH filters have been validated against typical wine spoilage organisms. Combined with easy integrity testing, the filters ensure the effective microbial stabilization of wine. The advanced, high area polyethersulphone membrane in conjunction with the integral prefilter layer will provide maximum service life to blockage and the optimum solution for wine stabilization.

Air / Gas filtration

HIGH FLOW BIO-X

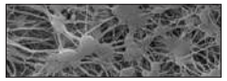
0.01 micron sterilising

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.

HIGH FLOW TETPOR II



0.01 - 0.2 micron

Polypropylene Expanded PTFE

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

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

Water treatment

PROPLEAT

1.0 – 10 micron

Polypropylene

- Economical solution to particle removal

PROPLEAT filters have been developed to bridge the gap between meltblown depth filters and absolute pleated media filters. The all polypropylene construction exhibit 99% efficiency at their given retention rating, providing consistent and economical clarification in a diverse range of applications.

PARMAX

1 – 20 microns

Polypropylene

- Large diameter filtration for high flow rates and high capacity
- Absolute retention ratings for critical filtration

PARMAX filters offer the optimum solution to bulk water treatment where costs of equipment space are at a high premium. The use of PARMAX large diameter cartridge and housing offers a smaller footprint which is advantageous. The cartridges are available in absolute micron ratings from 1 to 20 microns.

PEPLYN PLUS

0.6 – 25 micron

Polypropylene

- Absolute particle retention at a range of micron grades
- Strong, pleated polypropylene construction designed for chemical CIP

PEPLYN PLUS filters are utilized for the clarification and pre-stabilization of a wide range of liquids for the food and beverage industry.

BEVPOR WG

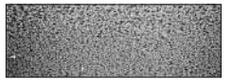
0.2 micron

Polyethersulphone

- Validated microbial removal against water borne bacteria

BEVPOR WG filters utilize a pleated PES membrane to remove bacterial contamination from water, ensuring the water supply entering the facility is of a safe standard to reduce the risk of biofilm formation / product spoilage.

BEVPOR MS



0.2 micron

Polyethersulphone

- Validated microbial removal against water borne bacteria
- Integrity testable

BEVPOR MS filters utilize a pleated PES membrane to remove bacterial contamination from water, ensuring the water supply entering the facility is of a safe standard to reduce the risk of biofilm formation / product spoilage. Added security is ensured through ease of repeat integrity testing.

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 and 226

VSH

- Multi-element sanitary liquid housing
- Designed specifically for the food and 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 3

- 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

PCO_2

- 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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