Brewing 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

The production of beer is an ancient art which has been practiced and modified over thousands of years to yield the wonderful variety of beers and ales we have available today. At the heart of the brewing process lies a totally natural sequence of events – the anaerobic fermentation of malted barley by yeast.

The raw ingredients required for making beer are consistent across most beer production processes, they are; barley, yeast, hops and water. It is through careful modification of these key ingredients and the associated production recipes that gives rise to the huge variety of beers and ales available for us all to enjoy.

Across the beer and ale varieties, there are similarities common to the production stages necessary to control this natural process as consistently as possible to produce the perfect brew.

These can generally be classified as:

- Fermentation
- Clarification
- Stabilization
- Packaging

Each stage of the process typically requires dedicated technology and equipment and there is a huge range of choice and flexibility in approaches. However, there is no one single, universally accepted option to perform each operation as best practice, and the choice of approach is typically guided by the performance repeatability of the equipment versus the long term running costs involved, or in short, the operational efficiency.

Normal flow filtration techniques are becoming increasingly adopted by head brewers throughout the process as the benefits of this technology are being realized throughout the industry, by the micro-brewery and large consolidated global brewery alike.

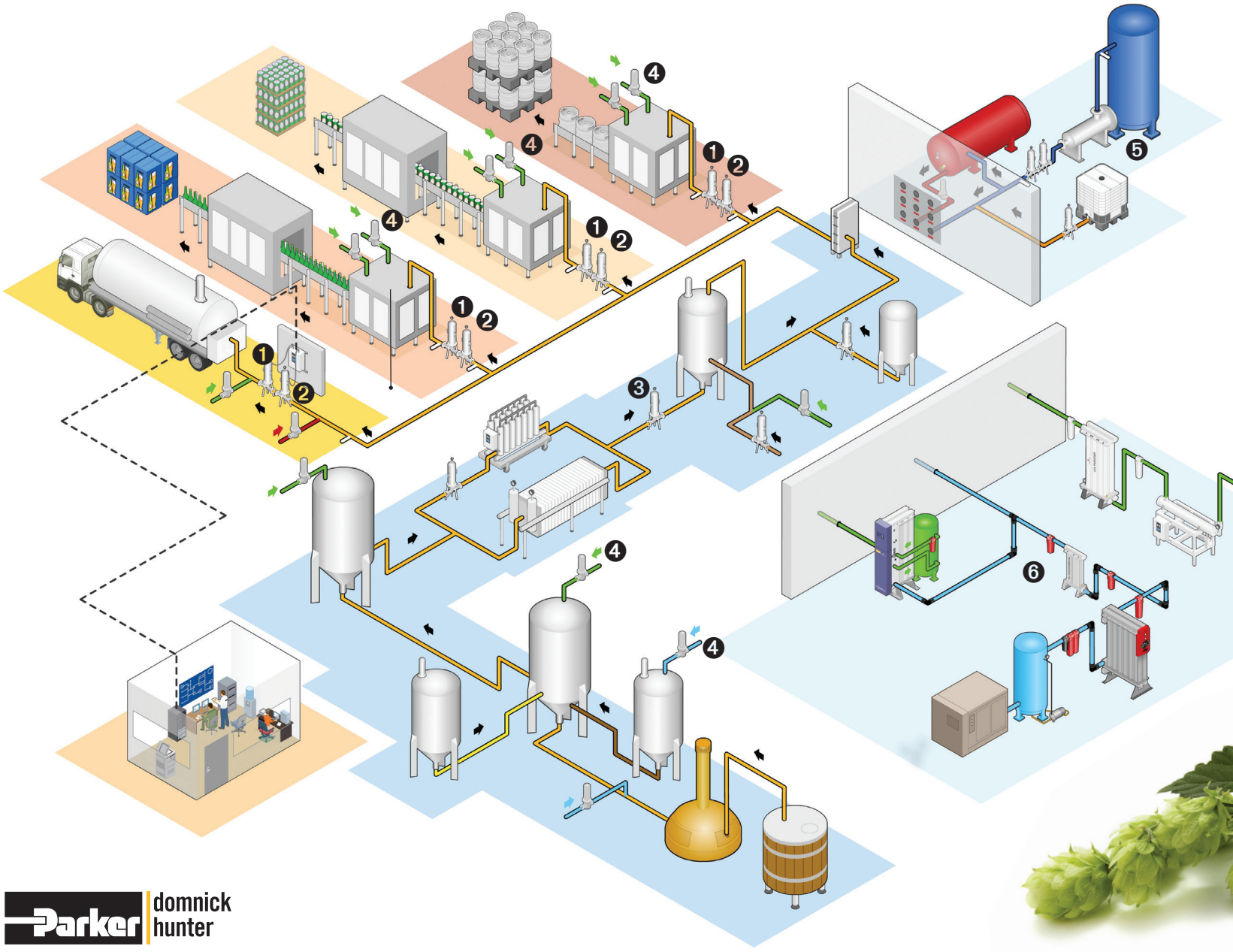
Parker domnick hunter continually offer significant process benefits to brewers across the globe. By combining specialist brewing knowledge with a dedicated product range we deliver:

- World class manufacturing and quality systems
- Consistent filter performance developed for specific brewing applications
- Commitment to reduce waste and energy consumption throughout the brewing process
- Process efficiency improvements through dedicated technical support

This document will focus on beer stabilization operations after fermentation and is intended to guide the optimum choice of filter product for a given application within the brewery, so that the benefits of Parker domnick hunter's capability can be maximized by the end user and the perfect beer is produced and enjoyed time after time.

Parker domnick hunter

Typical processes



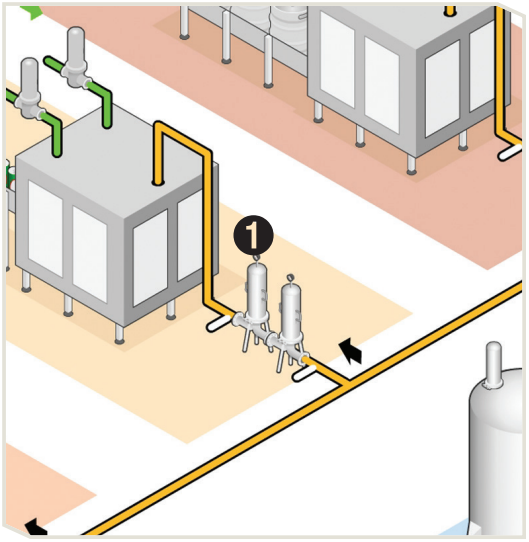
Parker domnick hunter specialized brewing applications

1. Cold stabilization
2. Pre-stabilization
3. Trap filtration
4. Sterilization of gas
5. Water utilities
6. Gas utilities

Parker domnick hunter

Application 1. Cold stabilization

Understanding the application



Cold stabilization refers to the filtration of beer to remove any spoilage microorganisms before it is packaged.

There are a number of spoilage organisms which must be removed from the beer to prevent spoilage and they are typically yeast, acetic acid bacteria and lactic acid bacteria.

The level of filtration will depend upon the expected shelf-life of the beer and the susceptibility to spoilage. Typically, for most large breweries, 12 months shelf-life and zero yeast or bacteria are the accepted norms once packaged into bottles or cans.

Until recently, the more commonly accepted method of achieving microbial stabilization was through pasteurization, either tunnel (~60°C for ~10 minutes) or flash (~70°C for seconds). Both forms of pasteurization compromize the process.

Disadvantages of pasteurization:

- Does not remove heat resistant spores
- May oxidize the beer and heavily compromizes flavour
- Highly energy intensive
- Requires a big water demand

Benefits of cold stabilization:

- Removes all microorganisms
- Retention ability of filters can be verified by testing prior to use
- Minimal effect on beer flavour / characteristics
- Much reduced water or energy requirements
- Delivers a longer shelf-life

More frequently, brewers are turning to cold stabilization as a way of ensuring long shelf-life of packaged product. This movement has primarily been driven by the high energy and water consumption demanded by pasteurization operations coupled with advances in membrane technology which has returned longer filter life.

Parker domnick hunter have produced the range of BEVPOR filters to provide validated microbial retention, whilst being capable of frequent cleaning in place (CIP) for repeated use.

Cold stabilization

Final filtration

Key filter requirements

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

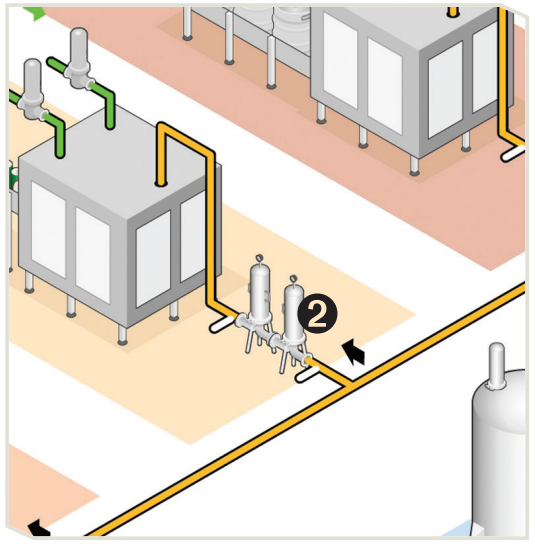
BEVPOR PS	BEVPOR PW	BEVPOR PH
• *0.6m² filtration area*	• *0.6m² filtration area* • *Prefilter layer*	• *High filtration area 0.8m²* • *Prefilter layer* • *Optimum solution*

Size guide
1.5 - 3.0 l/min/10¨cartridge

See page 14 for rating guide

Application 2. Pre-stablization

Understanding the application



Pre-stabilization refers to the fine filtration of bright beer, beer which has already been clarified, to reduce the level of microorganisms and turbidity prior to further downstream processing / storage.

In large breweries, the ability to hold beer in a stable condition prior to packaging is of benefit to filling operations. Filtering the beer prior to storage to reduce the microbial loading will protect the quality of the brew during storage, allow flexibility in filling operations and improving the efficiency of the downstream systems.

Parker domnick hunter have produced the range of PREPOR filters to excel in pre-stabilization filtration applications. The cartridges will reduce the microbial loading of the beer whilst retaining colloids which can subsequently cause haziness in the finished package and protect membrane systems downstream.

Intermediate storage / Membrane protection

Pre-stabiliztion

Key filter requirements

- Retention to colloidal species
- Microbial reduction
- Stable construction for reliable retention
- Strength to withstand CIP
- High flowing

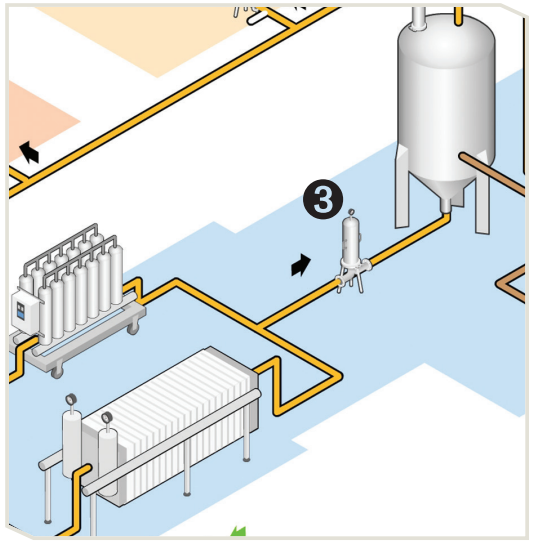
PREPOR PP	PREPOR NG (NEW)
• *Yeast removal* • *Haze reduction* • *CIP regeneration*	• *More retentive, advanced depth construction* • *Yeast removal* • *Bacterial reduction* • *Haze reduction* • *CIP regenerable*

Size guide
3.0 - 7.0 l/min/10¨cartridge
2hl/h/10¨cartridge

See page 14 for rating guide

Application 3. Trap filtration

Understanding the application



After fermentation the brew, or "green beer", will contain a high degree of solids and suspended material such as; wort (malted barley residue), yeast cells, fats and proteins. This typically forms sediment at the bottom of the fermentation vessel and is sometimes referred to as *lees*. In its present state the beer will appear hazy and will deteriorate if left untreated. In order to produce clear, visually appealing beer with a certain shelf-life once packaged, the brew will require clarification and stabilization.

The first stage of this process will be to separate the solid lees from the liquid brew. There are various techniques available to do this, including centrifugation, physical stabilization by adding agents such as PVPP and isinglass, cross-flow filtration or powder filtration using diatomaceous earth (DE) or keiselguhr. All of these processes are not absolute and some solid particles will still persist in the beer requiring filtration.

The trap filter system is designed to capture any solid particulate which has been left behind by the initial separation stage following fermentation. The objective of this filtration stage is to provide a consistent level of particulate filtration so that a certain quality of bright beer is delivered to intermediate storage. A consistent quality of beer provided at this stage in the process will help ensure maximum efficiency of the downstream operations used for microbial stabilization.

PEPLYN TF filters have been specifically designed to capture DE particles which will be periodically shed from powder filtration stages. The high area filter media will return high beer flow, whilst providing an absolute cut off to solid particulate. The construction of the HA filter has been optimized for repeated backwashing, so that filter regeneration and continual operation can be achieved.

PEPLYN HD is the product of choice where backwash is not required. The construction of the HD filter again returns absolute cut off to retain solid particulate and has been designed to resist blockage under variable particle loading conditions that are expected in this application.

Trap filtration

Clarification

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

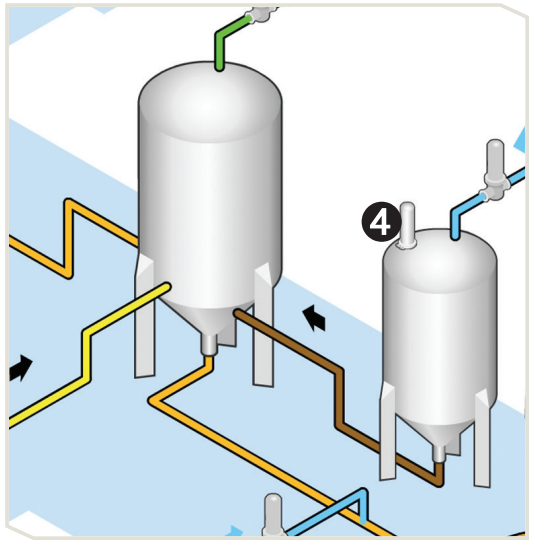
PEPLYN HD	PEPLYN TF
• *High depth* • *Ability to withstand and blockage under variable particle loading*	• *High surface area* • *Specifically designed for backwash regeneration* • *Optimum solution for clarification*

Size guide
10-15 l/min/10˝cartridge

See page 14 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 brew.

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

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

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

RO membrane protection		CIP makeup	Bottle washing / dilution liquor	
PEPLYN PLUS	PARMAX / MAXGUARD	PEPLYN PLUS	BEVPOR WG (NEW)	BEVPOR MS
• *Absolute retention for a range of micron grades* • *Pleated polypropylene*	• *Large diameter* • *Bulk water treatment*	• *Absolute retention for a range of micron grades* • *Pleated polypropylene*	• *Validated microbial removal against waterborne bacteria*	• *Validated microbial removal against waterborne bacteria* • *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
- Nitrogen blanketing / flushing
- Sterilization
- Purging
- Venting Top Pressure

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

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*

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

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

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 and passivated*
- *External finish - Grit blast 5 µm Ra*

62-280 Kg/hr

HBA-HP

- *Industrial air / gas*
- *Choices of finish available*

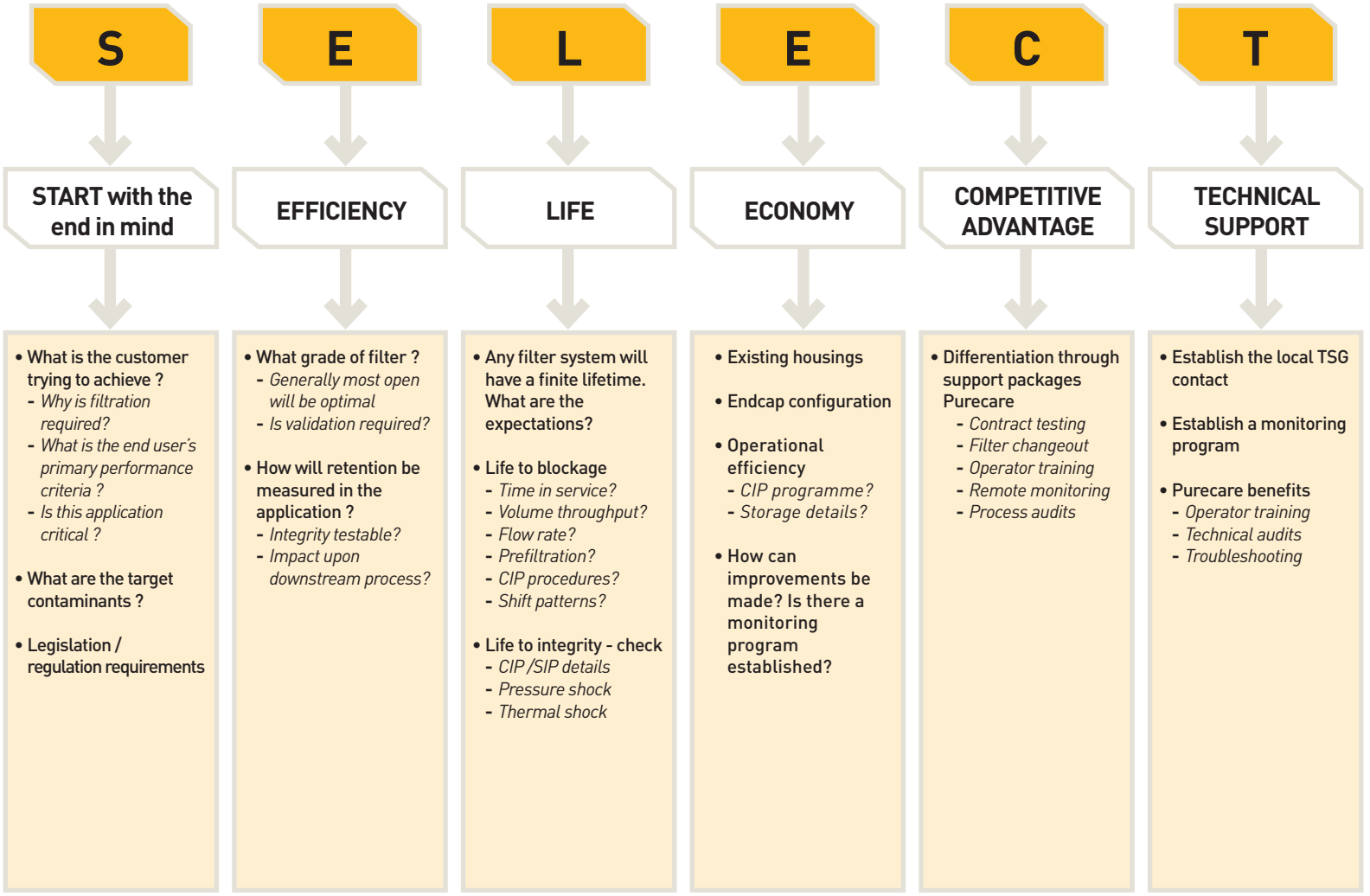
Product selection process

There is no one single solution to any filtration application, it is a balance of factors which dictates performance and cost-effectiveness.

We can provide a guide to select and size products, however, the optimum system specification should be defined through careful assessment of the application and then end users' requirements.

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 this outlined procedure will help you to identify a suitable filtration solution.



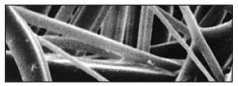
Parker domnick hunter

Selection matrix

		PARMAX / MAXGUARD	PROPLEAT	PEPLYN PLUS	CARBOFLOW MX	PEPLYN HD	PEPLYN TF	PREPOR PP	PREPOR NG	BEVPOR PS	BEVPOR PW	BEVPOR PH	BEVPOR WG	BEVPOR MS	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 / Dilution liquor			P									2	1		
Clarification	Trap filtration					2	1									
Pre-stabilization	BBT protection							2	1							
	Membrane protection							2	1							
Cold Stabilization	Final filtration								P	3	2	1				
Gas Sterilization	Tank venting														2	1
	Nitrogen blanketing														2	1

Trap filtration

PEPLYN HD



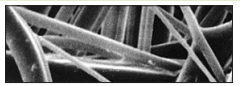
5, 10, 15 micron

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

PEPLYN TF



5,10 15 micron

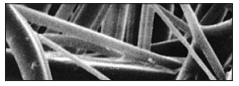
Polypropylene

- 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 beer flow, whilst providing an absolute retention to solid particulate.

Pre-stabilization - membrane protection and BBT protection

PREPOR PP



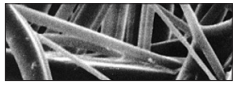
0.6 - 1.0 micron

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.

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.

Cold stabilization

BEVPOR PS

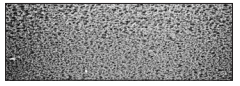
0.45, 0.65 micron

Polyethersulphone

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

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

BEVPOR PW



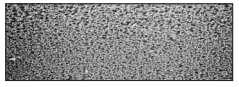
0.45, 0.65 micron

Polyethersulphone

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

BEVPOR PW filters have been validated against typical beer spoilage organisms. Combined with easy integrity testing, the filters ensure the effective microbial stabilization of beer. 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 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 beer spoilage organisms. Combined with easy integrity testing, the filters ensure the effective microbial stabilization of beer. 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 beer stabilization.

Air / Gas filtration

HIGH FLOW BIO-X

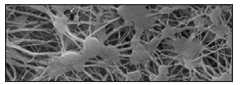
0.01 micron sterilising

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

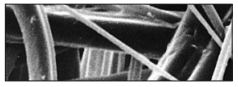
Polypropylene Expanded PTFE

- 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



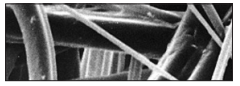
1.0 – 10 micron

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



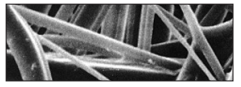
1 – 20 microns

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 waterborne 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

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

HBA

- Flow efficient range of air / gas housing
- Designed to maximize flow and minimize 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

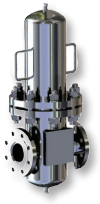
- Industrial single-element liquid housing
- BSPP inlet / outlet standard connections
- Suitable replacement for plastic housings
- Suitable for cartridge types DOE or 222 and 226

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

VIS

- High efficiency steam filter housing
- Compatible with JUMBO element to maximize 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

Parker Worldwide

Europe, Middle East, Africa

AE – United Arab Emirates, Dubai
Tel: +971 4 8127100
parker.me@parker.com

AT – Austria, Wiener Neustadt
Tel: +43 (0)2622 23501-0
parker.austria@parker.com

AT – Eastern Europe, Wiener Neustadt
Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

AZ – Azerbaijan, Baku
Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

BY – Belarus, Minsk
Tel: +375 17 209 9399
parker.belarus@parker.com

CH – Switzerland, Etoy
Tel: +41 (0)21 821 87 00
parker.switzerland@parker.com

CZ – Czech Republic, Klecany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid
Tel: +34 902 330 001
parker.spain@parker.com

FI – Finland, Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens
Tel: +30 210 933 6450
parker.greece@parker.com

HU – Hungary, Budapest
Tel: +36 1 220 4155
parker.hungary@parker.com

IE – Ireland, Dublin
Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IT – Italy, Corsico (MI)
Tel: +39 02 45 19 21
parker.italy@parker.com

KZ – Kazakhstan, Almaty
Tel: +7 7272 505 800
parker.easteurope@parker.com

NL – The Netherlands, Oldenzaal
Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Asker
Tel: +47 66 75 34 00
parker.norway@parker.com

PL – Poland, Warsaw
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

PT – Portugal, Leca da Palmeira
Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest
Tel: +40 21 252 1382
parker.romania@parker.com

RU – Russia, Moscow
Tel: +7 495 645-2156
parker.russia@parker.com

SE – Sweden, Spånga
Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

SK – Slovakia, Banská Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

TR – Turkey, Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

UA – Ukraine, Kiev
Tel +380 44 494 2731
parker.ukraine@parker.com

UK – United Kingdom, Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

ZA – South Africa, Kempton Park
Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

North America

CA – Canada, Milton, Ontario
Tel: +1 905 693 3000

US – USA, Cleveland
Tel: +1 216 896 3000

Asia Pacific

AU – Australia, Castle Hill
Tel: +61 (0)2-9634 7777

CN – China, Shanghai
Tel: +86 21 2899 5000

HK – Hong Kong
Tel: +852 2428 8008

IN – India, Mumbai
Tel: +91 22 6513 7081-85

JP – Japan, Tokyo
Tel: +81 (0)3 6408 3901

KR – South Korea, Seoul
Tel: +82 2 559 0400

MY – Malaysia, Shah Alam
Tel: +60 3 7849 0800

NZ – New Zealand, Mt Wellington
Tel: +64 9 574 1744

SG – Singapore
Tel: +65 6887 6300

TH – Thailand, Bangkok
Tel: +662 717 8140

TW – Taiwan, Taipei
Tel: +886 2 2298 8987

South America

AR – Argentina, Buenos Aires
Tel: +54 3327 44 4129

BR – Brazil, Sao Jose dos Campos
Tel: +55 12 4009 3500

CL – Chile, Santiago
Tel: +56 2 623 1216

MX – Mexico, Apodaca
Tel: +52 81 8156 6000

VE – Venezuela, Caracas
Tel: +58 212 238 5422

GL_BR_07_09/13 Rev. 1C

Parker domnick hunter

Parker Hannifin Manufacturing Ltd
domnick hunter
Process Filtration - Europe
Durham Road
Birtley, Co. Durham
DH3 2SF, England
phone +44 (0)191 4105121
fax +44 (0)191 4105312
email: dhprocess@parker.com
www.parker.com/processfiltration

Parker Hannifin Corporation
domnick hunter
Process Filtration - North America
2340 Eastman Avenue
Oxnard, California, USA 93030
toll free: +1 877 784 2234
phone: +1 805 604 3400
fax: +1 805 604 3401
email: dhpsales.na@parker.com
www.parker.com/processfiltration