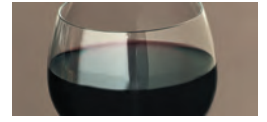




CARLVIN
TOTAL FILTRATION FOR THE VINTNER INDUSTRY
PURITY THROUGH QUALITY™





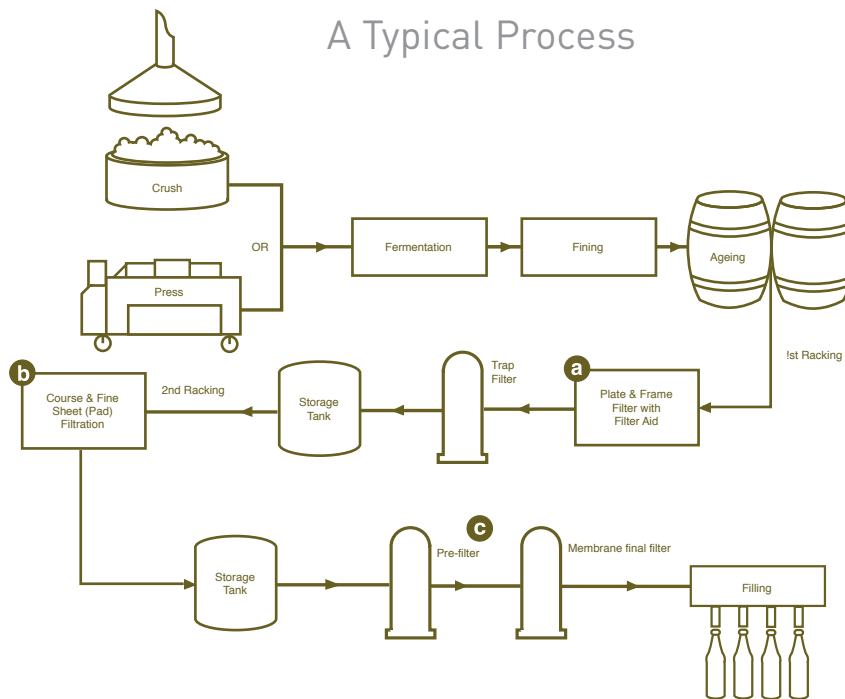
INTRODUCTION

Through an extensive R & D programme, Carlson Filtration is widely regarded as a leader in the field of wine filtration and has developed a range of filtration products ideally suited to the demands of the wine producer. These are available in both filter sheet form and in lenticular format.

Filtration plays a vital role in the production of wine. A number of important characteristics, essential to enhance the quality of wine are facilitated through carefully controlled filtration. These include both chemical and biological stability, a bright appearance and freedom from any deposits. These qualities are achieved in different ways:



A Typical Process



i. Chemical Stability

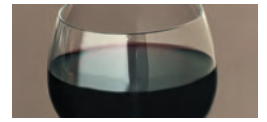
To achieve good chemical stability, it is essential to eliminate excess quantities of heavy metals such as iron and copper and complexes such as tartrates and sometimes, albumens. Heavy metals and albumens are removed using a suitable fining agent followed by filtration. Tartrates are typically removed by chilling followed by filtration.

ii. Biological Stability

Biological stability is achieved by removing bacteria and all traces of yeast. This is accomplished by different filtration stages.

iii. Brightness

Wines of high brightness and free from deposits and hazes are produced using the carefully controlled filtration methods employed to achieve stability as outlined above.



Stages of filtration in the wine making process

During the wine making, racking and bottling process, filtration is used at a number of different stages

a. Racking

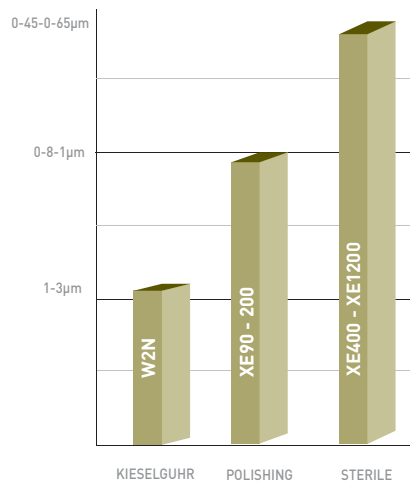
The first stage at which filtration plays an important role is at the time of first racking. This filtration step is usually carried out, after aging, using filter aid powder (kieselguhr). The filter equipment used to support the filter aid powder is a plate and frame filter press, candle filter or pressure leaf filter. This filtration stage removes the bulk of coarse particulate. The filter aid powder is dosed continuously during filtration, typical addition rates for this application are between 40 and 120 grammes per hectolitre, depending on the condition of the wine. When using a plate and frame filter press for this stage, support sheets are required for the filter aid powder, Carlson's "W2N" grade washable support sheets are designed specifically for this application. The sheets are normally pre-coated with 1 or 2 layers of clean powder giving a typical total pre-coat of between 800 to 1200 grammes per square metre.



Specially designed for this type of application, 'W2N' range sheets offer a number of benefits to the wine producer.



- Manufactured from natural fibres incorporating carefully chosen food grade wet strength resins within the cellulose matrix providing high wet strength and durability
- Even control of pore size distribution of the sheet to ensure even build up of filter cake on the sheet. This ensures that the filter capacity is maximised and that there is minimum risk of bleed through of even the finest of fines, whilst minimising the pressure drop of the filter.
- Very tolerant of pressure transients during the filtration cycle because the formulation used in their manufacture, coupled with the manufacturing process, produces an extremely durable yet flexible sheet.





b. Fine Filtration

The main purpose of filtration at this stage is to remove any fine particulate and haze as well as any fining materials carried over, which has in itself removed heavy metals and albumens. At this stage, a sheet filter or lenticular cartridge system, dressed with XE90H, XE150H, XE200H or XE280H is used. Typical flow rates for this stage, subject to wine quality and operating conditions, are in the range of 500-800 litres per square metre per hour. Because of the carefully controlled pore size distribution, Carlson sheets in this range present the wine producer with major benefits:

- Excellent flow rates can be achieved, whilst incurring minimum pressure drop. This allows increased cycle times, which in turn reduces costs.
- High levels of clarity and minimal risk of fine haze forming materials passing through the sheet.

c. Bottling

Wines requiring a higher level of bacteria removal, which include some red wines, white and sweet non-fortified wines, usually undergo a further filtration step immediately prior to bottling. A sheet filter or lenticular cartridge system, equipped with XE400H, XE675H or XE1200H sterilising sheets are used. Again, Carlson has developed these sheets with carefully controlled pore sizes to ensure excellent sterilisation characteristics. A typical flow rate here is 350 to 400 litres per square metre per hour.



Specialist applications

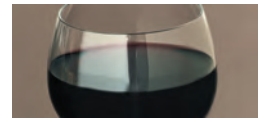
There are a number of specialist applications related to wine production including:

- Brandy - this is normally filtered in one stage, particularly to remove metal hazes using XE90H sheets
- Champagne - also uses single stage filtration under high pressure using XE200H sheets
- Liqueurs - are normally prepared by macerating various herbs in the base spirit and these are removed by straining. Filtration usually follows this step to remove fine colloidal turbidities using sheets from the BK series followed by XE150H or XE200H at the final bottling stage.
- Sherry - this is usually filtered in one stage using medium clarifying sheets such as XE90H
- Fortified wines and wine based aperitifs are usually filtered using sheets from the BK series
- Both malt and wine vinegars are filtered at the bottling stage. Pre-filtering is carried out, typically using XE90H clarifying sheets at 200-550 litres per hour per square metre, depending upon the quality of the raw vinegar. Final filtration is primarily carried out to sterilise and polish the vinegar using XE400H sheets at 300-350 litres per hour per square metre.



* See separate Lenticular (CARLENT) brochure for details.





Alternative Filtration

As an alternative to either sheet filter media or the lenticular filtration system, process cartridges can be used for some filtration requirements

Cartridges and cartridge housings

Carlson offers a wide range of cartridges from coarse wound, thermal bonded and pleated through polishing to PES membranes, along with a full range of housings.

Typical cartridges used in the wine industry are polypropylene wound or thermal bonded for coarse pre-filtration. Spun, thermal bonded and pleated for fine particulate removal through to pleated or thermal bonded guard filters prior to final membranes. Pleated polypropylene and pleated glass cartridges offer high throughput, low differential pressure and high dirt holding capacity. In addition pleated glass offers a natural positive charge that assists the retention of small particulate. Final membranes used in the wine industry, in either 0.45um or 0.65um, are critical to ensure absolute security. The Carlson range of high quality PES wine grade membranes offer this security with long service life and integrity testing.



All cartridges are available with a combination of end fittings; code 7, code 3, code 8, double open end and in standard lengths of 10", 20", 30" and 40". A full range of gasket and o-ring materials are also available.

Trap Filtration

Carlson Filtration has a range of wound, depth filter cartridges. They have high flow rate and dirt holding capacity, and long life. They allow ease of installation combined with a full range of micron ratings from 1 to 100 um. Materials of manufacture give chemical compatibility with a range of media materials available on support cores of polypropylene, stainless steel or tin plated steel.

All polypropylene particulate cartridges

These high flow all polypropylene filters exhibit high dirt holding capacity and are ideal for the filtration of liquids. They are available in micron ratings from 0.5 to 100 um and 10", 20", 30" and 40" lengths. The robust construction is achieved using multiple layer media of a monofilament, non woven, heat bonded construction. The core, outer cage and end caps are hot melt bonded to give a rigid cartridge unaffected by variations in operating conditions.

PES membrane cartridges

Carlson polyethersulfone membranes are encased and supported by all polypropylene materials. Pore sizes range from 0.2 to 0.65 micron and lengths from 10" to 40". Our beverage grade PES membrane cartridges are specifically designed for the removal of wine spoilage organisms and are excellent for the final sterile guard prior to packaging.

Housings

Carlson can also supply a wide range of single and multi-stack all stainless steel filter housings capable of accommodating cartridges sized 10" to 40" and with a variety of end cap fittings.





Filtration Equipment/Methods of filtration

Lenticular filter cartridges and housings - Carlent

The lenticular module concept offers a compact, self contained, liquid filtration solution utilising proven filter media technology.

Carlson lenticular filters are essentially composed of Carlson depth filter media, supported on a polypropylene skeleton and supplied in modular form normally comprising 16 cells of either 12" (300mm) or 16" (400mm) diameter. They offer all the advantages of traditional sheet filtration, but in a totally enclosed, sterile, environment, thus eliminating product loss and external contamination. They are designed to fit industry standard housings incorporating 1, 2, 3 or 4 modules.

Carlson Filtration also offers a range of lenticular filter housings. These are available in 12" and 16" diameter, single or multi module versions to suit small scale laboratory or pilot plant production to large scale continuous production.

*For further information on this product please see our Carlent brochure.

Filter equipment and spares

New filter equipment

Carlson offers a comprehensive range of new filtration equipment, from a plate and frame press to the most sophisticated membrane filters. The range includes plate and frame and sheet filters from 20x20cm to 60x60cm of varying lengths. Manual models and fully automatic closing systems are available.

Reconditioned filter equipment

Carlson also offers reconditioned sheet and plate and frame filter presses. We have developed a wide ranging network of contacts in the filter press user community as well as among dealers in used factory equipment. On arrival back at Carlson's factory all filters are rebuilt to exacting standards to achieve an "as good as new" quality. All reconditioned units come with a six month warranty, a full pressure test before delivery and full Carlson site back up where required.

Filter spares

Another important element of Carlson's support service is to supply spare parts for their filter range. These are categorised into:

- consumable spares which include eyelet seals, in a host of materials including Nitrile, Silicon, Natural Rubber, EPDM, Butyl and Viton
- Servicing spares including pump spares, sight glasses, valve diaphragms and pressure gauges etc. Service kits for hydraulic filter press closing systems are also available.

Please Note:

We provide information and advice to the best of our knowledge. Please understand, however, that this information cannot be binding in every case on account of the variety of applications, work methods and operating conditions. We cannot assume liability for improper use.

Dealer stamp

Carlson Production Facility



Purity through quality™ since 1923

ISO 9001: 2008
Investors in People
DMF No 14255



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