



Modern filtration solutions for spirits processing



Author:

Amos von Brüning

Area Sales Manager
Fruit Juice & Spirits

Eaton Technologies GmbH,
Langenlonsheim, Germany

AmosBruening@eaton.com

In spirit processing, filtration tasks include the reliable removal of undesirable components from raw materials, products, or service media (water, steam and gas). During the filtration of service media and raw materials, first and foremost, particles and contaminants such as microorganisms are removed. Product filtration may also require colloidal haze-causing substances to be removed while simultaneously preserving valuable ingredients such as aroma and color.

During spirits processing, haze may appear milky, cloudy, as flakes, particles or crystals, which can occur in suspension, as sediment or on the surface as fatty globules. Possible causes include components from raw materials, such as polyphenols, proteins, polysaccharides, oils, or fatty acids from fruits and hardness minerals from blending water, impurities from sugar, and many more. Microbiological load, contamination by materials in contact with tools or packaging, and procedural

errors, for example, during filtration, are also possible.

Conventional filtration systems from the beverage industry are used in the spirits industry. These include

- sheet or stacked disc cartridge filters (see Fig. 1 and 2), which are fitted with depth filter sheets or stacked disc cartridges made up of depth filter sheets
- cartridge filters (see Fig. 3)
- crossflow filters
- pre-coat filters, in which diatomaceous earth, perlite, or cellulose are used as a filter additive
- bag filters (see Fig. 4)
- combined filtration systems

A high degree of initial haze may require multi-stage filtration with the same or different filtration systems used in combination.

When selecting the appropriate filtration system, the nature of the product to be clarified such as the composition and the degree of

initial haze and the requirements of the filtration result, in particular, the required reduction of haze and maintaining quality, play a central role. Also, the number of products to be filtered and their batch size, the required hourly output, and the service life of the filter need to be considered. Other factors affecting the choice of a system are the amount of investment capital available, the intended degree of automation, operating conditions, requirements for materials and an increasing requirement for enclosed systems.

In addition to the selected filtration system, the amount and nature of the initial haze and the quality of the filter medium – in particular its composition and retention rate – greatly influence the filtration result. The filtration parameters (i.e. flow rate, temperature, duration, and differential pressures) and other procedural factors, such as the type of pump, are also key factors.

While cartridge, crossflow and bag filters primarily separate haze particles or contaminants on the surface of the filter medium (surface filtration), depth filter sheets provide an additional crucial filtration mechanism. A separation process in which colloids and molecules that are much smaller than the pores of the filter medium adsorptively bind to that filter medium (depth filtration). As an example, this mechanism allows undesirable, haze-causing fatty acid esters and essential oils from brandies, spirits or liqueurs to be selectively separated when using specially developed depth filter sheets, whereby filter sheets also provide a product-stabilizing property. In addition, by means of adsorption, activated carbon sheets remove undesirable colors, flavors, and aromas from spirits such as vodka.

Cartridge filters are used in the production of spirits, both in product filtration as a police filter before bottling, as well as for particle or sterile filtration of product water and service media (water, steam, or gas). Crossflow filters are primarily used for reverse osmosis water treatment, specifically water softening. Bag filters are characterized by the potential high-volume flows and are therefore used as a police filter prior to storage, shipping or unloading and are also used due to their retention rating of greater than 1 mm to remove contaminants from hazy products.

Thus, modern filtration systems offer appropriate solutions to the in-demand filtration tasks.



BECO COMPACT™ PLATE: Plate and frame filters are still the most commonly used filtration systems, employed by small distilleries and industrial companies alike.



BECO INTEGRA® DISC: Stacked disc cartridge filters combine the advantages of the depth filter sheet with those of an enclosed system and are impressive due to their small footprint and easy handling.



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North America
44 Apple Street
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(North America only)
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Europe/Africa/Middle East
Auf der Heide 2
53947 Nettersheim, Germany
Tel: +49 2486 809-0

Friedensstraße 41
68804 Altludersheim, Germany
Tel: +49 6205 2094-0

An den Nahewiesen 24
55450 Langenlonsheim, Germany
Tel: +49 6704 204-0

China
No. 3, Lane 280,
Linhong Road
Changning District, 200335
Shanghai, P.R. China
Tel: +86 21 5200-0099

Singapore
4 Loyang Lane #04-01/02
Singapore 508914
Tel: +65 6825-1668

Brazil
Rua Clark, 2061 - Macuco
13279-400 - Valinhos, Brazil
Tel: +55 11 3616-8400

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