Technical Information

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Divergan® F

Single-use PVPP for stabilising beer

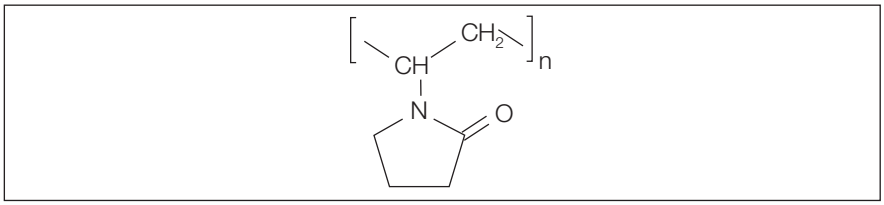
BASF
The Chemical Company

Human Nutrition

Chemical name

Poly-1-(2-oxo-1-pyrrolidinyl)ethylene

Structural formula



Molecular formula

$(C_6H_9NO)_n$

Molar mass

Cannot be determined as it is insoluble in all common solvents.

PRD-No.

30034969

Description

White, hygroscopic powder with a faint characteristic odour. Divergan F is cross-linked polyvinyl pyrrolidone (PVPP) that has been manufactured by a patented polymerisation process (DP 2437629). It is insoluble in water and all the usual organic solvents.

Specification

See separate document: “Standard Specification” (not for regulatory purposes) available via BASF’s WorldAccount: https://worldaccount.basf.com (registered access).

Function

Haze in beer is caused mainly by polyphenol-protein complexes. Divergan F selectively adsorbs the polyphenols that cause turbidity. Removing the excess responsible for this problem considerably improves the colloidal stability of beer.

There is evidence that this also improves the stability of the taste, as the flavonoid polyphenols, in particular, are prone to polymerise to products of higher molecular weight that have a bitter taste.

Application

Divergan F is added to the beer as an aqueous suspension prior to filtration. To be fully effective, it must be in contact with the beer for at least 3 minutes before it is completely removed again by filtration together with the adsorbed polyphenols.

Divergan F can also be used at an earlier stage in the production of beer, e. g. during wort treatment or in the storage tank.

However, best results are obtained if the beer has already been largely clarified, e. g. by centrifugation, as the active surface cannot then be blocked by suspended material.

A low oxygen content is required for good stabilisation results.

Preparation

For Divergan F to develop its full activity, it must be suspended in degassed water before use. It is ready for use after about 1 hour, when it is fully hydrated. The hydration process can be accelerated by using warm water (about 50 °C).

If the suspension is to be continuously metered, it must be constantly stirred. For best results, a blanket of CO_2 should be maintained over the suspension to keep out oxygen.

Continuous metering

The preferred method of introducing Divergan F is to meter it continuously into the beer stream with a metering pump.

If no separate metering unit is available, the Divergan F can be added together with the filtration agent, usually kieselguhr. Provision must be made for a contact time of at least 3 minutes. In calculating the contact time, the sludge capacity of the filter must also be taken into account.

In some breweries, silica gel is added together with the PVPP to the same supply tank. This gives a highly efficient combination of filtration and stabilisation effects that also saves on capital investment, as no further equipment is required (Fig. 1).

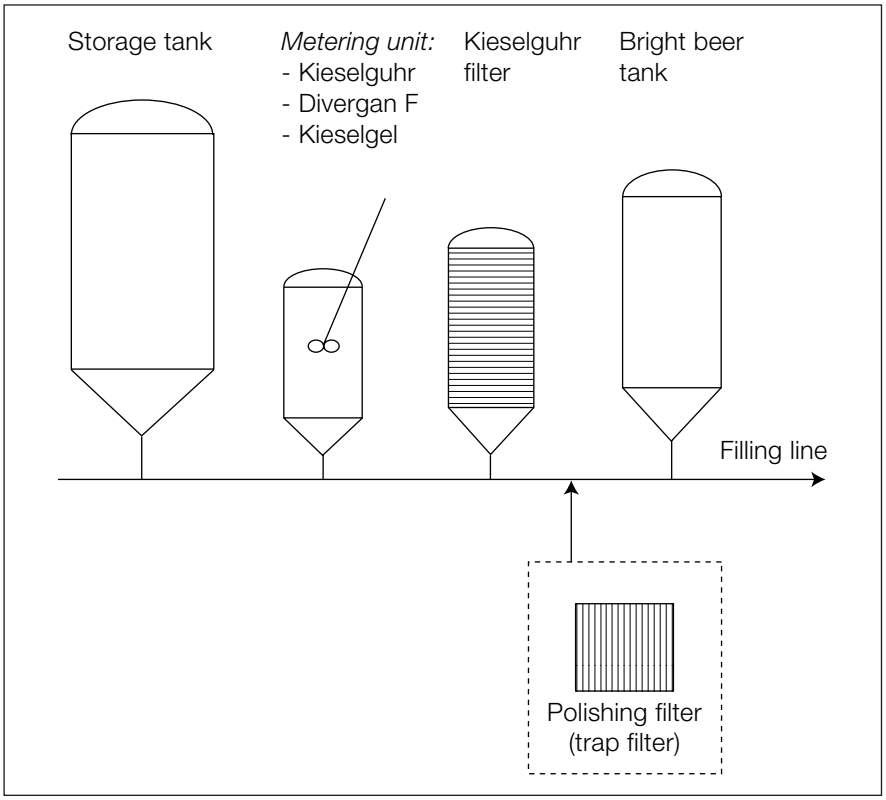


Fig. 1: Divergan F is often metered into the beer continuously together with the kieselguhr.

Addition to the storage tank

The Divergan F suspension can also be metered into the storage tank. If it is added to the full tank, proper mixing must be ensured, while if it is metered in when the tank is being filled, the turbulent conditions provide adequate mixing.

Quantity

The optimum rate of addition depends on many factors. A major factor is the stability to be achieved – shelf lives of more than 12 months are possible. Other factors include the raw materials used, the cellar equipment, the degree of clarification prior to filtration, and the type and quantity of other stabilising auxiliaries used.

	Divergan F alone	Divergan F when combined with silica gel
Beer brewed from 100% malt	20 – 40 g/hl	10 – 30 g/hl
Beer brewed with adjuncts (ratio approx. 30%)	10 – 30 g/hl	10 – 20 g/hl

Table 1: Addition rates for Divergan F

Approvals and safety

Divergan F is sold throughout the world and meets all the current laws and regulations.

PVPP was approved for use as a fining agent for beer in Germany as long ago as 1973 (Bundesministerium für Jugend, Familie und Gesundheit (BMJFG), 19 June 1973, Ref. No. L II 8-49 780-8118/73).

The requirements for breweries that do not fall within the scope of the German beer law can be found in the Food Chemicals Codex, the regulations of the European Union, the Japanese registration authorities, and the Code of Federal Regulations of the Food and Drug Administration. These monographs also cover the use of PVPP in other areas of the beverage industry.

Divergan F is not harmful to health if it is properly handled and used for the purpose intended.

The usual precautions against dust should be taken.

Transport and storage present no hazard to humans or the environment.

Storage

Divergan F should be kept in closed containers in a dry place to maintain its effectiveness.

It can be stored for 3 years in the orginal unopened containers without loss of activity.

Packaging

Divergan F is available in 20 kg containers. Sample quantities are available in 500 g containers.

Note

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