# Divergan® RS

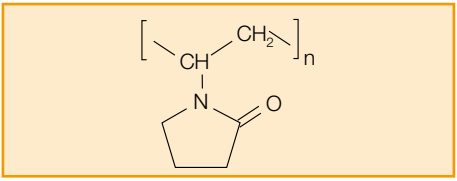
Human Nutrition

BASF
The Chemical Company

**Chemical name**
Cross-linked poly-1-(2-oxo-1-pyrrolidinyl) ethylene

**EU name**
Crosspovidon (PVPP insoluble)

| | |
|---|---|
| **CAS No.** | 9003-39-8 |
| **PVPP E No.** | 1202 |



$(C_6H_9NO)_n$ Molar mass cannot be determined as it is insoluble in all common solvents

**Product number**
10007297 kosher

**Description**
White, hygroscopic powder with a faint characteristic odour. Divergan® RS is crosslinked 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.

**Function**
Haze in beer is caused mainly by polyphenol-protein complexes. Divergan® RS 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.

**Standard packaging**
Divergan® RS is available in 25 kg containers. Sample quantities are available in 500 g containers.
Please see appendix I for further information.

**Storage**
Divergan® RS should be kept in closed containers in a dry place to maintain its effectiveness.
It can be stored for 3 years in the original unopened containers without loss of activity.

**Application**
Divergan® RS is intended for reuse and it therefore requires special filtration and regeneration equipment consisting of a metering device and a filter unit installed downstream of the kieselguhr filters (see Fig. 1).
Compared with the Divergan® F and EF grades which are designed for single use, Divergan® RS is coarser-grained (average particle size 80–100 µm) and mechanically stronger. These properties ensure that it can be used again and again without causing blockages or other problems.

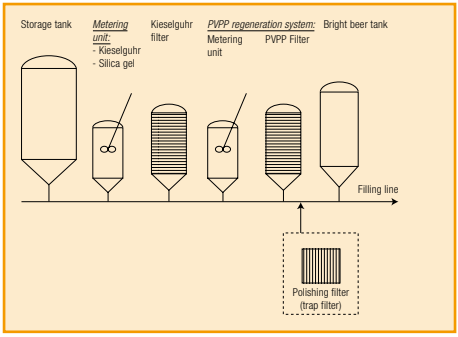



*Fig. 1: Diagram of a filtration line with regenerable PVPP. The PVPP is in a separate filtration/ stabilisation unit.*

*1. Preparation*

Divergan® RS is suspended in water in a concentration of typically 10% in the supply tank of the metering unit, where it must be continuously stirred.

If larger quantities of fresh Divergan® RS are introduced into the system, e. g. a complete filling or even a replenishment of major losses, they should be subjected to the regeneration process once before use. This provides an ideal conditioning for the material.

*2. Continuous metering*

After the beer stream has been filtered through Kieselguhr and clarified, the Divergan® RS suspension is continuously fed in by means of a metering pump.

The PVPP loaded with polyphenols is filtered off after a contact time of at least 3 minutes. The contact time is dictated by the design of the filter.

*3. Regeneration*

When the filtration/stabilization process is complete, the filter is either blown out or the beer is displaced with water.

The PVPP filter cake is then regenerated by intensive washing with hot caustic soda (1–2% at 60–85°C).

The different filter manufacturers recommend either a one alkali or a two alkali process. The alkali treatment converts the adsorbed polyphenols into water-soluble anions that can be washed out of the filter cake as a dark-coloured solution. Often, the PVPP also gradually turns brown with use, but this does not detract from its effectiveness.

After it has been regenerated, the filter cake is washed with hot water (50–70 °C) to remove the remaining polyphenols and alkali.

It is then neutralised with a dilute mineral acid e. g. 0.5% nitric acid or 1% phosphoric acid.

The filter is then blown out with $CO_2$ and the filter cake is removed while still moist. Horizontal filters can be spun to remove the filter cake. The PVPP is then returned to the metering vessel and any losses are made up.

It is essential to follow the recommendations of the filter manufacturer throughout the filtration/stabilisation process to avoid damage to the equipment.

*4. Losses*

A small loss of PVPP of the order of 0.5–1% must be expected with each regeneration cycle. To determine the loss, it is recommended to regularly check and adjust the solids content of the PVPP suspension, preferably after each regeneration. Only gravimetric methods should be used for this purpose.

**Note**



July 2005