©Kuraray Poval for emulsion polymerization

**Characteristics**
Special partially-hydrolysed alcohol (PVA) grades with varying degrees of polymerisation and high degree of blockiness.

**Recommended uses**
Especially recommended for emulsion polymerization.

**Delivery Form**
Fine granules, if not specified otherwise.

**Data**
The data are determined by quality control for each lot prior to release.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Kuraray Poval® grade</th>
<th>Viscosity (^1) JIS K 6276 [mPa s]</th>
<th>Degree of hydrolysis (saponification) [mol-%]</th>
<th>Ash content (^2) max. [%/w %]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poval</td>
<td>PVA-217E</td>
<td>20.26</td>
<td>87 – 89</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>PVA-217EE</td>
<td>20.26</td>
<td>87 – 89</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>PVA-220E</td>
<td>27.35</td>
<td>78 – 82</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>PVA-224E</td>
<td>40.50</td>
<td>80 – 83</td>
<td>0.4</td>
</tr>
</tbody>
</table>

\(^1\) of a 4 % aqueous solution at 20°C, determined by Brookfield synchronised-motor rotary-type viscometer
\(^2\) calculated as Na₂O
**Additional data, valid for all Kuraray Poval grades**

Volatile content max. 5 % (based on measurement in packaging).

Methanol content less than 3%.

pH of a 4 % solution in distilled water: 4.5 – 7.

The viscosity of the 4 % aqueous solution at 20°C is a relative measure for the molar mass of the PVA grade; the mentioned degree of hydrolysis denotes the degree of hydrolysis of the polyvinyl acetate from which the PVA grades is derived.

**Properties and uses**

Polyvinyl alcohol (PVA) are water-soluble polymers manufactured by alcoholysis of polyvinyl acetate.

The properties of the various grades are mainly governed by the molecular weight and the remaining content of acetyl groups.

**PVA as protective colloid**

Kuraray Poval E and EE grades are especially eligible as protective colloids in emulsion polymerization. Because of their ability to anchor to the surface of the polymer particles that from, they help to stabilise the polymer emulsion during and after polymerization. Those PVA types influence not only particle size distribution but also the application properties such as viscosity, stability to stirring, the freeze/thaw stability, pigment compatibility, electrolyte stability and open time of the emulsion.

**Processing**

**Preparation of PVA solutions**

In the adhesives sector PVA is processed as an aqueous solution, as it is in most other fields of application. The solution should be prepared in common-resistant vessels.

As a first step PVA is sprinkled into cold water during stirring and heated to 90 – 95 °C in a water bath or by the use of live steam.

The solution should be stirred during cooling in order to prevent skin formation.

The speed of dissolution increases with increasing temperature. The dissolving process is made more difficult when there is a transition to higher concentrations.

Polyvinyl alcohol solutions may produce foam when stirred or during transport in pipelines, but this can be largely prevented by using a suitable stirrer design such as a low-speed anchor stirrer or by avoiding steep downward gradients in the pipelines.

Suitable defoamers are n-octanol, tributyl phosphate, Foamaster® 2231 and the Agitan® grades 301, 395 and 731, which are used in qualities of up to approx. 0.001 – 0.010 % relative to the solution. Defoamed PVA grades are also available on request.

Polyvinyl alcohol solutions which have been stored for lengthy periods may increase in viscosity. This is especially true of fully hydrolysed grades in high concentrations and at low temperatures. The original viscosity can be restored by heating and stirring.

**Preservation**

PVA in the form of an aqueous solution can be attacked by microorganisms under certain conditions. In the acidic pH range the main organisms reproduced are the fission fungi; while bacteria grow most readily in a neutral to weakly alkaline medium.

The solution can be preserved from any micro-organism attack by adding a preservative. Products which have proved especially suitable for the purpose are for example the Mergal grades® K9N and K14. The dosage depends on the concentration of the solution, the storage temperature and the nature and intensity of the infection. Quantities of about 0.01 – 0.2 % by weight preservative, relative to the PVA solution, are generally sufficient. Compatibility and efficiency must be tested. Information on the quantity to be used is available from the suppliers.

It is advisable for the PVA solution to be prepared and stored in clean containers. Considering the resistance that may be shown by some micro-organisms to the preservatives employed, the dissolving vessel in particular, together with the filling equipment (pipes, valves, tubing etc.), needs to be kept clean. Any skins or incrustations should be removed. In the event of complications the possibility of changing to a different preservative must be considered.

Certain applications for PVA in solution (cosmetic preparations, finger paints etc.) require the preservatives employed to be of approved types and physiologically inert. In such instances it is essential for the relevant legal regulations regarding physiological effects to be taken into account.
Storage

PVA can be stored for an unlimited period of time under appropriate conditions that is in its original packs in closed, dry rooms, at room temperature.

Industrial Safety and Environmental Protection

Not classified as a dangerous substance or preparation according to the current criteria of chemical legislation, or of the EU Directives 67/548/EC.

A safety data sheet is available on request.

Special remarks

Status as governed by foodstuffs legislation

Refer to the Poval Brochure Regulatory information.

1) Cognis Deutschland GmbH, Düsseldorf, Germany
2) Münzing Chemie GmbH, Heilbronn, Germany
3) Troy Chemie GmbH., Seelze, Germany