

Kuraray Poval™ grades for S-PVC

Technical Data Sheet

Characteristics

Modified or unmodified polyvinyl alcohol (PVOH) grades with varying degrees of polymerization, hydrolysis and co-monomers.

Recommended Uses

Primary and secondary suspending agent for PVC suspension polymerization.

Form Supplied

Colourless to dark yellow, almost colourless, fine granules.

Specifications

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

| Grade name | | Viscosity ¹⁾ [mPa•s] | Degree of hydrolysis [mol%] | Non-volatile ²⁾ content [%] | Ash ³⁾ content [%] | pH |
|----------------|---------------|------------------------------------|--------------------------------|--|-------------------------------------|-----------|
| Kuraray Poval™ | 32-80 | 29.0 - 35.0 | 79.0 - 81.0 | 97.5 ± 2.5 | ≤0.4 | 5.0 - 7.0 |
| | 35-80 | 32.0 - 38.0 | 79.0 - 81.0 | 97.5 ± 2.5 | ≤0.4 | 5.0 - 7.0 |
| | 40-80E | 37.0 - 45.0 | 79.0 - 81.0 | 97.5 ± 2.5 | ≤0.4 | 5.0 - 7.0 |
| | 48-80 | 45.0 - 51.0 | 78.5 - 80.5 | 97.5 ± 2.5 | ≤0.2 | 5.0 - 7.0 |
| | L-8 | 5.0 - 5.8 | 69.5 - 72.5 | 98.5 ± 1.5 | ≤1.1 | 5.0 - 7.0 |
| | L-9 | 5.5 - 6.1 | 69.5 - 72.5 | 98.5 ± 1.5 | ≤1.1 | 5.0 - 7.0 |
| | L-9-78 | 6.0 - 6.7 | 76.5 - 79.0 | 97.5 ± 2.5 | ≤1.2 | 4.5 - 7.0 |
| | L-9P | 6.2 - 7.2 | 71.5 - 73.5 | 98.5 ± 1.5 | ≤0.5 | 5.0 - 7.0 |
| | L-10 | 5.0 - 7.0 | 71.5 - 73.5 | 97.5 ± 2.5 | ≤1.1 | 5.0 - 7.0 |
| | L-11 | 5.5 - 7.5 | 71.5 - 73.5 | 98.5 ± 1.5 | ≤0.4 | 5.0 - 7.0 |
| | L-508W | 6.0 - 7.0 | 71.5 - 73.5 | 97.5 ± 2.5 | ≤0.4 | 5.0 - 7.0 |
| | 44-88 | 40.0 - 48.0 | 87.0 - 89.0 | 97.5 ± 2.5 | ≤0.4 | 5.0 - 7.0 |
| | 49-88 | 45.0 - 52.0 | 87.0 - 89.0 | 97.5 ± 2.5 | ≤0.4 | 5.0 - 7.0 |
| | 55-95 | 50.0 - 60.0 | 95.0 - 96.0 | 97.5 ± 2.5 | ≤0.4 | 5.0 - 7.0 |

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- 1) of a 4% solution at 20 °C DIN 53015 / JIS K 6726
- 2) after 3 hours drying at 105 °C DIN 53189 / JIS K 6726
- 3) calculated as Na₂O

| Grade name | | Viscosity ¹⁾ [mPa•s] | Degree of hydrolysis [mol%] | Non-volatile ²⁾ content [%] | Ash ³⁾ content [%] | pH |
|----------------|----------|------------------------------------|--------------------------------|---|----------------------------------|---------|
| Kuraray Poval™ | LM-10 HD | 4.5-5.7 | 38.0 - 42.0 | 98.5 ±1.5 | ≤0.6 | No spec |
| | LM-20 | 3.0-4.0 | 38.0 - 42.0 | 98.5 ±1.5 | ≤1.0 | No spec |
| | LM-30 | 9.3 - 10.3 ⁴⁾ | 45.0 - 51.0 | 98.5 ±1.5 | ≤0.6 | No spec |
| | LM-40 HT | 3.1-4.3 | 38.0 - 42.0 | 98.5 ±1.5 | ≤1.5 | No spec |

- 1) of a 4% methanol / water (1/1) solution at 20 °C DIN 53015 / JIS K 6726
- 2) after 3 hours drying at 105 °C DIN 53189 / JIS K 6726
- 3) calculated as Na₂O
- 4) of a 10% methanol / water (1/1) solution at 20 °C

Processing

Preparation of Kuraray Poval™ solutions

Kuraray Poval™ L grades are classed as medium hydrolysis polyvinyl alcohols varying in their degree of hydrolysis from 69.5 – 79.0 % OH. As such they are cold water soluble and solutions can be made either in cold water or in hot water.

The Kuraray Poval™ L grade is slowly added to a stirred tank of cold water to avoid lump formation. The product can be passed through a coarse mesh (10 mesh) to catch any extraneous items that may fall into the solution mixer. After all the L-grades is added, the mixture is heated up to 70 -80 °C with agitation. There should be sufficient agitation in the mixer for efficient dissolution but not too intense to cause foam build up at the surface. Mix for 2 hours or until the solution is homogenous. The solution is then cooled to below the cloud point to obtain a clear solution. The solution concentration can then be checked and controlled. Before pumping to the charge vessel or reactor the solution is passed through a 200 micron filter as a final "cleaning process". L-grades exhibit a cloud point and the prepared solutions have to be stored below the products cloud point to avoid separation during storage.

Kuraray Poval™ 80% hydrolysis grades are classed as partially hydrolysed polyvinyl alcohols varying in their degree of hydrolysis from 79.0 – 81.0 % OH. As such they are only hot water soluble and solutions can only be made utilizing hot water.

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The Kuraray Poval™ partially hydrolysed grade is slowly added to a stirred tank of cold water to avoid lump formation. The product can be passed through a coarse mesh (10 mesh) to catch any extraneous items that may fall into the solution mixer. After all the Kuraray Poval™ is added, the mixture is heated up to 80 - 90 °C with agitation. There should be sufficient agitation in the mixer for efficient dissolution but not too intense to cause foam build up at the surface. Mix for 2 hours or until the solution is homogenous. The solution is then cooled to below the cloud point to obtain a clear solution. The solution concentration can then be checked and controlled. Before pumping to the charge vessel or reactor the solution is passed through a 200 micron filter as a final "cleaning process".

Kuraray Poval™ 88% and 95% hydrolysis grades are classed as high hydrolysis polyvinyl alcohols varying in their degree of hydrolysis from 87.0 – 96.0% OH. As such they are only hot water soluble and solutions can only be made utilizing hot water.

The Kuraray Poval™ high hydrolysis grade is slowly added to a stirred tank of cold water to avoid lump formation. The product can be passed through a coarse mesh (10 mesh) to catch any extraneous items that may fall into the solution mixer. After all the Kuraray Poval™ is added, the mixture is heated up to 90 - 95 °C with agitation. There should be sufficient agitation in the mixer for efficient dissolution but not too intense to cause foam build up at the surface. Mix for 2 hours or until the solution is homogenous. The solution is then cooled to below the cloud point to obtain a clear solution. The solution concentration can then be checked and controlled. Before pumping to the charge vessel or reactor the solution is passed through a 200 micron filter as a final "cleaning process".

The Kuraray Poval™ LM grades are solid products and are classed as low hydrolysis polyvinyl alcohols varying in their degree of hydrolysis from 40.0 – 50.0% OH. As such they are not fully water soluble but can be easily dispersed into water. Kuraray Poval™ LM-30 is only soluble in a water / alcohol mixture.

The Kuraray Poval™ LM- grade is slowly added to a stirred tank of cold water to avoid lump formation. The product can be passed through a coarse mesh (10 mesh) to catch any extraneous items that may fall into the dispersion mixer. There should be sufficient agitation in the mixer for efficient dissolution but not too intense to cause foam build up at the surface. Mix for 1-2 hours or until the dispersion is homogenous. The solution concentration can then be checked and controlled. For storage of LM-grade aqueous dispersions, the solid content should be less than 5% and the temperature below 40 °C.

Kuraray Poval™ LM-30 is slowly added to a stirred tank of a mixture of cold water and methanol or ethanol (50:50 mix) passing through a coarse mesh (10 mesh) to catch any extraneous items that may fall into the solution mixer. There should be sufficient agitation in the mixer for efficient dissolution but not too intense to cause foam build up at the surface. Mix for 4 hours or until the solution is homogenous. The solution concentration can then be checked and controlled. Solutions of Kuraray Poval™ LM grade should be charged through the VCM charge line or a dedicated line due to their low solvency in water.

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Solid content recommendation

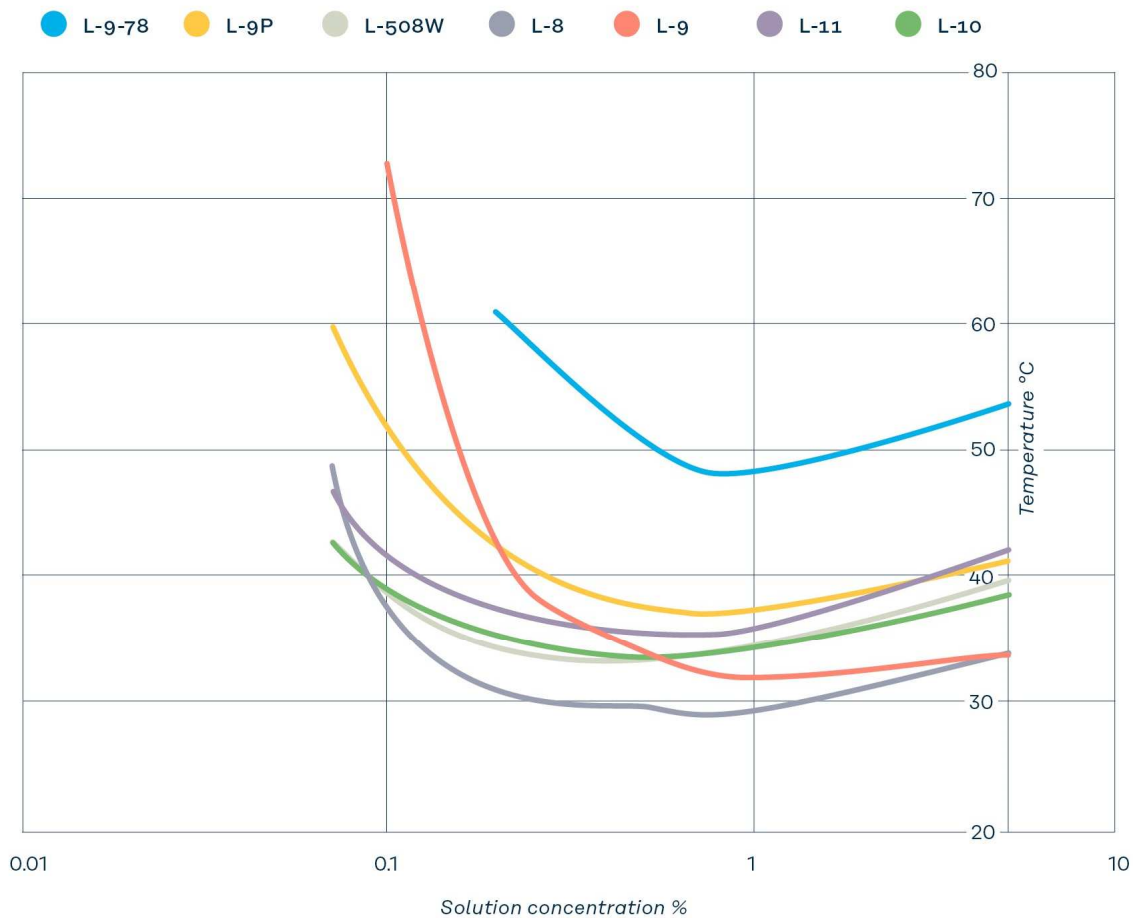
| Grade name | | Degree of hydrolysis [mol%] | Recommended concentration (%) |
|----------------|----------|-----------------------------|-------------------------------|
| Kuraray Poval™ | 32-80 | 79.0 - 81.0 | 4 - 5 |
| | 35-80 | 79.0 - 81.0 | 4 - 5 |
| | 40-80E | 79.0 - 81.0 | 4 - 5 |
| | 48-80 | 78.5 - 80.5 | 4 - 5 |
| | 55-95 | 95.0 - 96.0 | 4 - 5 |
| | L-508W | 71.5 - 73.5 | 4 - 6 |
| | L-8 | 69.5 - 72.5 | 4 - 6 |
| | L-9 | 69.5 - 72.5 | 4 - 6 |
| | L-9 78 | 76.5 - 79.0 | 4 - 6 |
| | L-9P | 71.5 - 72.5 | 4 - 6 |
| | L-10 | 71.5 - 73.5 | 4 - 6 |
| | L-11 | 71.5 - 73.5 | 4 - 6 |
| | LM-10 HD | 38.0 - 42.0 | 2 - 4 |
| | LM-20 | 38.0 - 42.0 | 3 - 7 |
| | LM-30 | 45.0 - 51.0 | 2 - 4 |
| | LM-40 HT | 38.0 - 42.0 | 2 - 5 |

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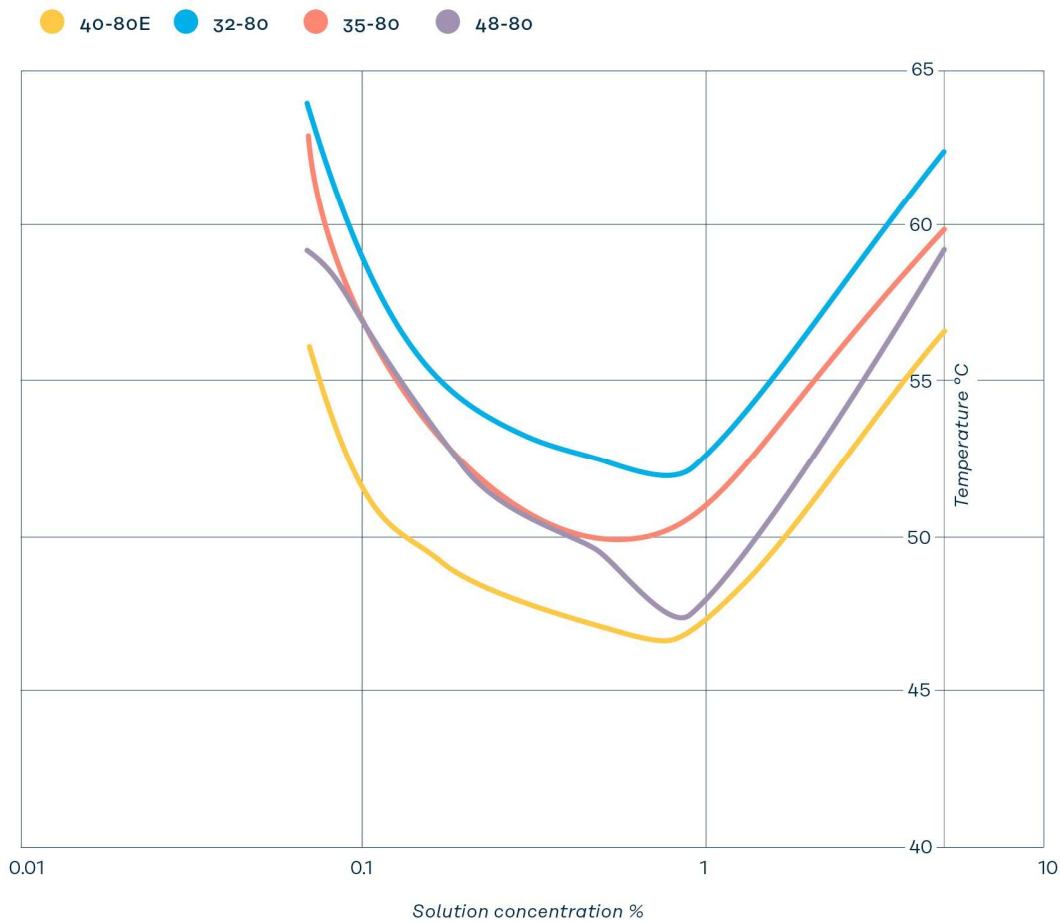
Cloud Point

The cloud point is the temperature at which a solution of polyvinyl alcohol starts to phase separate into lower and higher concentration phases and the solution gets turbid because of the difference in refractive index of the two phases. When the solution is stored above its cloud point without agitation sedimentation of the higher concentration phase happens. Generally aqueous solutions of primary suspending agents have cloud points as shown in the following graph. Solutions of Kuraray Poval™ grades should therefore be stored below their respective cloud points to avoid sedimentation issues.



Temperature (T) at 85%, wavelength 660 nm. Y axis at 5% solution concentration.

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Temperature (T) at 85%, wavelength 660 nm. Y axis at 5% solution concentration.

Preservation

Like any other polyvinyl alcohol, Kuraray Poval™ in the form of an aqueous solution can be attacked by micro-organisms under certain conditions. In the acidic pH range the main organisms reproduced are the fission fungi, whilst 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.

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Quantities of about 0.01 - 0.2 % by weight preservative, relative to the Kuraray Poval™ solution, are generally sufficient. Compatibility and efficiency must be tested. Information on the quantity to be used is available from the preservative suppliers.

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

Certain PVC applications where Kuraray Poval™ is used in polymerisation recipes may require the preservatives employed to be of approved types. In such instances it is essential for the relevant legal regulations regarding type approval be taken into account.

Storage

Kuraray Poval™ resin 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. Kuraray would recommend that our product is used within 12 months from the shipment date as given on the certificate of analysis.

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 Kuraray Poval™ webpage for regulatory information.

Kuraray Europe GmbH

Philipp-Reis-Str. 4

65795 Hattersheim am Main

Germany

Phone: +49 69 305 85351

Web: <https://www.kuraray-poval.com/>

pva@kuraray.com