Gas Barrier Adhesive System

MAXIVE®

- Working Procedure -

MITSUBISHI GAS CHEMICAL COMPANY, INC.
**Properties**

**Agent A**  
*Component:* Poly Epoxy Resin  
*Appearance:* Colorless Clear Liquid  
*NVM:* 100 %  
*Viscosity (25°C):* 2000 mPa·s

**Agent B**  
*Component:* Polyamine Resin  
*Appearance:* Colorless Clear Liquid  
*NVM:* 65 % (Solvent: EtOH or MeOH)  
*Viscosity (25°C):* 1300 mPa·s
Typical Formulation

◆ Laminate Method: Dry Laminate (Gravure Roll)
◆ Solvent: Methanol (Ethanol) : Ethyl Acetate = 9 : 1 – 8 : 2
◆ Non-Volatile Materials of the Solution: 30~45wt%
◆ Amount of the Resin: dry 3~5g/m²
◆ Aging Conditions (°C/day): 40/2~60/1
# Mixing Ratio of MAXIVE

<table>
<thead>
<tr>
<th>NVM (wt%)</th>
<th>M-100 (kg)</th>
<th>C-93 (kg)</th>
<th>Methanol (kg)</th>
<th>Ethyl Acetate (kg)</th>
<th>Initial Viscosity (25°C) (sec) Zahn Cup #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>5</td>
<td>16</td>
<td>50</td>
<td>6</td>
<td>10.7</td>
</tr>
<tr>
<td>25</td>
<td>5</td>
<td>16</td>
<td>36</td>
<td>5</td>
<td>11.3</td>
</tr>
<tr>
<td>30</td>
<td>5</td>
<td>16</td>
<td>27</td>
<td>4</td>
<td>12.3</td>
</tr>
<tr>
<td>35</td>
<td>5</td>
<td>16</td>
<td>20</td>
<td>3</td>
<td>13.0</td>
</tr>
<tr>
<td>40</td>
<td>5</td>
<td>16</td>
<td>15</td>
<td>2</td>
<td>14.6</td>
</tr>
</tbody>
</table>

Composition of the solvents: Methanol / Ethyl Acetate = 9/1 (counting a part of methanol originally contained in C-93)
Pot life (Temperature Dependence)

Viscosity (Zahn Cup No.3) (sec)

Time after mixing (hr)

- 30°C
- 25°C
- 20°C
- 15°C
- 10°C

NVM35wt%
Methanol/Ethyl acetate=9/1
Caution on Work of Dry Lamination

1. Adhesives gas barrier resin consists of poly epoxy resin and polyamine resin (epoxy resin curing agent). Especially an amino moiety of the polyamine resin promptly react and have a possibility of gelling with an isocyanate moiety of poly isocyanate resin which is a component of general polyurethane adhesive. In order to avoid mixing with the polyurethane adhesives which is, for example, adhering to the pan of dry laminate machine, please remove the polyurethane adhesives by washing with ethyl acetate, then wash with methanol (or ethanol) before the use of adhesive gas barrier resin.

2. Mixing the poly epoxy resin and the epoxy resin curing agent should be performed just before dry lamination work, and the concentration of non-volatile materials should be controlled within the range of 10 - 45wt% by appropriate solvents. It should be avoided absolutely to mix the poly epoxy resin and the epoxy resin curing agent directly and leave the resin mixture without adding the solvent. If the resin mixture without solvents should react with remarkable generation of heat, please add a lot of water (more than twice of the amount of the resin mixture) in the resin mixture.

3. The viscosity of the solution increases along with progress of time. The increase speed of the viscosity shown by technical data sheet is a standard, and changes with the temperature of a work place, or the area of a pan of dry laminate machine. Please check it by zahn cup properly. The solution become to gell and solidifies if a long time passes. After finishing dry lamination work, the solution should be extracted promptly from a pan of dry lamination machine and the pan and roll should be washed with methanol (or ethanol). In a case of using the polyurethane adhesives that use ethyl acetate as a solvent for the next work, the pan should be used for a lamination work after being washed with methanol (or ethanol), then with ethyl acetate.
Caution on Preservation and Treatment

<Caution on Preservation>

• Keep in closed containers tightly when not in use. Store in cool dry place with adequate ventilation. Do not store near heat or open flames.

• Regarding the poly epoxy resin, it is more desirable to store it under refrigerate condition (below 5°C). When it is kept beyond room temperature, there is a possibility that the viscosity of the resin may increase and sometimes gel may arise.

• Avoid contact with amines, alcohols, carboxylic acids, or water to the poly epoxy resin. Avoid contact with isocyanates, carboxylic acids, or epoxy to the polyamine resin.

<Caution on Treatment>

• Avoid high temperature substances, a spark, and flames, and avoid contact with strong oxidizer.

• Avoid contact with skin, eyes and clothing. Avoid inhalation of vapors. Wear protective goggles and gloves and impervious clothing when handling the resins. Wash thoroughly after handling.

• Be sure to read Material Safety Data Sheet (MSDS) well before handling.