**VIOSIOMER® TMCHMA – AN OVERVIEW**

Evonik offers a wide range of specialty methacrylates and strives to develop innovation-driven solutions that bring value to our customers’ business. Among these is the specialty methacrylate VIOSIOMER® TMCHMA (3,3,5-trimethyl cyclohexyl methacrylate), which is used in both adhesive and coating applications. The chemical structure is shown in Figure 1. VIOSIOMER® TMCHMA offers many benefits when incorporated into your polymer backbone, including:

- Low viscosity in solvent-based coatings (high solid monomer)
- High Tg of 127 °C
- Excellent chemical, heat and water resistance
- Excellent weatherability
- High abrasion resistance
- Low acid number

![Chemical structure of VIOSIOMER® TMCHMA.](image)

**ADHESIVE APPLICATIONS**

No matter the application, whether in the automotive, construction or electronic industry, adhesives always play a crucial role. In these applications, VIOSIOMER® TMCHMA is an ideal candidate due to its high glass transition temperature and excellent mechanical properties. VIOSIOMER® TMCHMA acts as a reactive diluent in reactive adhesives and shows good adhesion on different substrates. Table 1, below, offers an example of a structural adhesive formulation.

Table 1: Basic adhesive formulation.

<table>
<thead>
<tr>
<th>Component</th>
<th>Parts %</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMCHMA</td>
<td>30–35</td>
<td>Functional monomer for high mechanical and chemical resistance</td>
</tr>
<tr>
<td>IBOMA</td>
<td>6–9</td>
<td>Strength, temperature resistance</td>
</tr>
<tr>
<td>MMA</td>
<td>19–23</td>
<td>Strength</td>
</tr>
<tr>
<td>Crosslinker</td>
<td>5–7</td>
<td>Strength, chemical resistance</td>
</tr>
<tr>
<td>Rubber</td>
<td>30–35</td>
<td>Elasticity, impact resistance, peel strength</td>
</tr>
<tr>
<td>Organic Peroxide</td>
<td>1–2</td>
<td>Initiator</td>
</tr>
</tbody>
</table>

In order to demonstrate the performance of VIOSIOMER® TMCHMA, test bars were manufactured based on the adhesive formulation in Table 1 and evaluated regarding their mechanical properties. VIOSIOMER® TMCHMA was compared to different VIOSIOMER® specialty methacrylates well known to the adhesive industry. The results are shown in Figure 2. Compared to VIOSIOMER® THFMA (tetrahydrofurfuryl methacrylate), VIOSIOMER® BNMA (benzyl methacrylate) and VIOSIOMER® c-HMA (cyclohexyl methacrylate), VIOSIOMER® TMCHMA shows the highest E-Modulus and shear strength values.

![Figure 2: Results of the tensile test of adhesive formulations shown in Table 1.](image)
HIGH SOLIDS RESINS

To produce high solids and low VOC (volatile organic compound) coatings, VISIOMER® TMCHMA is an excellent building block due to its bulky side chain. Compared to VISIOMER® IBOMA, an established high solid monomer, the incorporation of VISIOMER® TMCHMA into resins leads to equal performance in all relevant film properties like hardness, gloss, flexibility and chemical resistance. As an example, the influence on the pendulum hardness in the respective resins is shown in Figure 3.

Figure 3: Pendulum hardness of IBOMA and VISIOMER® TMCHMA containing films.

A stronger reduction of the viscosity in comparison to VISIOMER® IBOMA qualifies VISIOMER® TMCHMA even for ultra–high solid formulations (Figure 4).

Figure 4: Influence of the high solid monomer content on the resin viscosity.

In conclusion, VISIOMER® TMCHMA is a specialty methacrylate monomer applicable in adhesives and high solid resins offering excellent properties.

VISIOMER® METHACRYLATES – READY FOR THE NEXT LEVEL

Specialty Methacrylates is looking forward to finding the best solution to your challenges. Contact us for further information on our new developments.

OUR PROMISE TO YOU

- We are methacrylate experts for specialty monomers
- We will support you with our globally available sales and applied technology organization
- We are your solution provider with tailor-made products and joint research & development projects
- We support your growth through a reliable and flexible global production & technology network
- We are looking for a long-term partnership and mutual value creation.

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