Dow Corning® RM 2051 Thickening Agent: **Properties**

- **INCI Name:** Sodium Polyacrylate, Dimethicone, Cyclopentasiloxane, Trideceth-6, PEG/PPG – 18/18 Dimethicone

- **Description:** Water in silicone emulsion with Sodium Polyacrylate in the water phase

- **Appearance:** Viscous liquid – pale yellow

- **Viscosity:** 1000-4000 cPs

- **Thickener Polymer:** 24-28 %

- **Silicone Content:** ~ 29%

- **Flash Point:** >100°C

- **D4 content:** < 1%

- **Shelf Life:** 9 months

**INTERNAL PHASE:** Water droplets containing Na Polyacrylate

**CONTINUOUS PHASE:** Dimethicone (Dow Corning® 200 Fluid 5 cSt) and Cyclopentasiloxane (Dow Corning® 245 Fluid)
Dow Corning® RM 2051 Thickening Agent: Mechanism

- Sodium Polyacrylate is dispersed in silicone together with an “inverting” surfactant.
- When Dow Corning® RM 2051 Thickening Agent is mixed with water, the “inverting” surfactant helps bring water in contact with the polymer.
- The polymer “blooms” into the water phase.
- Both emulsification and thickening can be achieved from the same ingredient.
- Product is designed for gels, O/W or Si/W emulsions.
Dow Corning® RM 2051 Thickening Agent: Appearance in water

5% dispersion of Dow Corning® RM 2051 at 400x magnification
Dow Corning® RM 2051 Thickening Agent: Key Benefits

- Multifunctional product: thickening and emulsifying
- Ready and Easy-to-use fluid emulsion
- Silicone carrier that provides aesthetics
- Designed for formulating with elastomers, gum blends and other “hard to emulsify” silicones
- Provides smooth, non greasy and non sticky formulations
Main products seen in the Market are based on carrier oils such as Isoparaffin, mineral oil, polyisobutene...

Dow Corning® RM 2051 Thickening Agent carrier is Dimethicone and Cyclopentasiloxane
Dow Corning® RM 2051 Thickening Agent: Ease of use

- Liquid form
- No pre-mixing
- No neutralization
- No heating
- Gels are instantaneously obtained by simply adding water

5% dispersion of Dow Corning® RM 2051 Thickening Agent in water
- Linear thickening effect which facilitates optimization of fluid formulations
- To obtain thick gels, 5% addition level is recommended
Dow Corning® RM 2051 Thickening Agent: pH influence

- Effective pH: 5.5 – 11
- Suitable for use in high pH products
- Not recommended for use in acid conditions
Addition of electrolytes results in a reduction of the viscosity.
Can be overcome by increasing the amount of thickener used.
Dow Corning® RM 2051 Thickening Agent: Polar solvents effect

Dow Corning® RM 2051 Thickening Agent thickens with high solvent content
Dow Corning® RM 2051 Thickening Agent: Surfactants effect

- Compatible with non ionics surfactants
- Thickening efficiency reduced with ionic surfactants
Dow Corning® RM 2051 Thickening Agent: Rheological profile

Shear-thinning behaviour: Very high viscosity at low shear rate
Low viscosity at high shear rate
Dow Corning® RM 2051 Thickening Agent: Emulsifying Properties

- Emulsify high amount of oil phase (3% of Dow Corning® RM 2051 Thickening Agent)

<table>
<thead>
<tr>
<th>SILICONE</th>
<th>ESTER</th>
<th>HYDROCARBONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dow Corning® 1501 Fluid 40%</td>
<td>Isopropyl Myristate 30%</td>
<td>Mineral oil 50%</td>
</tr>
<tr>
<td>Viscosity (Sp5-10RPM)</td>
<td>80200 cPs</td>
<td>38500 cPs</td>
</tr>
<tr>
<td>Stability</td>
<td>&gt; 2 month at 40°C</td>
<td>&gt; 2 month at 40°C</td>
</tr>
</tbody>
</table>

- 1% of Dow Corning® RM 2051 Thickening Agent can emulsify «hard to disperse» silicones

<table>
<thead>
<tr>
<th>Dow Corning® 9040 Silicone Elastomer Blend 10%</th>
<th>Dow Corning® 200 Fluid 300 000 cSt 5%</th>
<th>Dow Corning® 1501 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity (Sp5-10RPM)</td>
<td>10700 cPs</td>
<td>6500 cPs</td>
</tr>
<tr>
<td>Stability</td>
<td>&gt; 2 month at 40°C</td>
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</tr>
</tbody>
</table>
Paired test (18 panelists)
Formulation: 3% Thickener
3% Glycerin
0.3% Biocide
qs water

Dow Corning® RM 2051 Thickening Agent offers improved attributes versus a current market product based on Isoparaffin with regard to speed of absorbency and reduction of tackiness.
Dow Corning® RM 2051 Thickening Agent: Sensory Profile

Paired test (18 panelists)
Formulation: 3% Thickener
3% Glycerin
0.3% Biocide
qs water

Dow Corning® RM 2051 Thickening Agent offers improved attributes versus a current market product based on Mineral oil with regard to wetness, spreadability and reduction of tackiness.
Compatible with formulations containing:

- A wide range of mineral and organic oils,
- Silicones,
- Esters,
- Sunscreens,
- Vitamins, …
Suitable in Skin and Hair care formulations

Formulation tips:
- Suggested level: 3-6%
- Can be used with high solvent content (30% ethanol, isopropyl alcohol or acetone, 50% glycerin or propylene glycol)
- O/W or Si/W emulsions can be easily prepared by adding Dow Corning® RM 2051 Thickening Agent in the oil phase
- Not recommended for ionic surfactant based formulations
- Avoid salt and acid pH
For more information

If you have any further questions or comments please contact your local Dow Corning representative

Thank you for your attention