DOW CORNING

# *Dow Corning*® 2405 Resin for High-Temperature and Weather Resistant, Room-Temperature-Curing Coatings

*Improve Coating Flexibility and Impact Resistance*

Power Up YOUR COATINGS

## Features of *Dow Corning*® 2405 Resin

- Room temperature curing without tin catalyst
- High heat resistance (650°C with black or aluminum pigments)
- Improved flexibility and impact resistance
- Excellent gloss and color retention
- Hydrophobic
- Solventless delivery
- Low smoke generation on initial heating
- Compatible with other silicone resins
- Can be used as a primer and/or topcoat

### *Produce More-Sustainable Coatings Without Sacrificing Performance*

Paint formulators are under pressure to deliver more-sustainable coatings. This is reflected in the demand for lower-temperature, and hence lower-energy, curing systems. This is especially relevant to formulators who produce high temperature resistant coatings, which usually require high curing temperatures.

Traditional solutions have been methyl methoxy resins, but these suffer from stress due to their high crosslink density after curing, which limits flexibility and film build.

With *Dow Corning*® 2405 Resin, formulators have an option to significantly extend the formulating space for room-temperature-curing, high-temperature and corrosion resistant coatings.

### *Room Temperature Cure*

When catalyzed with appropriate hydrolysis and/or condensation catalysts, *Dow Corning* 2405 Resin is tack free in <15 min and cures within 60 minutes at ambient conditions (20°C) to form a medium-hard and solvent-resistant coating. Depending on film thickness, desired cure profile, and performance requirements, 0.5-3%wt (on resin solids) of catalyst is required.

Some traditional phenyl-methyl resins physically dry to provide high hardness (Figure 1). However, they have low solvent resistance and do not exhibit good (full) cure until heat-cured. In contrast, methyl methoxy resins, such as *Dow Corning*® US-CF 2403 Resin and *Dow Corning*® 2405 Resin, exhibit complete cure at ambient conditions and provide medium to high hardness and excellent solvent resistance.

A significant amount of data has been generated exploring how catalyst type and quantity impact cure rate and performance (hardness, flexibility, solvent resistance, etc.).

*Performance data and formulation guidance available upon request*

**Figure 1. Methyl methoxy resins: high-temperature resistance and room temperature cure**

| Resin | Catalyst | Pendulum | Drying | MEK Double Rubs |
|---|---|---|---|---|
| *Dow Corning*® RSN-0806 Resin | None | 110-120 | Dry touch – physical dry | 0 |
| *Dow Corning*® RSN-0805 Resin | None | 10-15 | Slightly sticky – physical dry | 0 |
| *Dow Corning*® US-CF 2403 Resin | 0.5 – 1.5% TnBT[1] | 60-70[2] | Dry touch – reacted | >20[2] |
| *Dow Corning*® 2405 Resin | 0.5 – 3.0% TnBT[1] | 50-60[2] | Dry touch – reacted | >20[2] |

1: Catalyst choice/ quantity depends on film thickness, cure and performance requirements.
2: 0.5%wt TnBT, cured for 60 minutes at 20°C. Can significantly increase hardness and solvent resistance (>100) with catalyst modifications.

*Contact Dow Corning Technical Service for additional formulating information.*

## Improved Flexibility/Impact Resistance

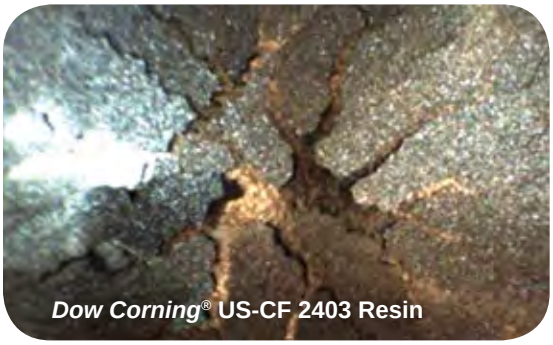
For selected substrates and where film thickness can be controlled, formulators can create very fast-curing systems using methyl methoxy resins such as *Dow Corning* US-CF 2403 Resin. However, the high crosslink density can result in films that are brittle and have poor impact resistance.

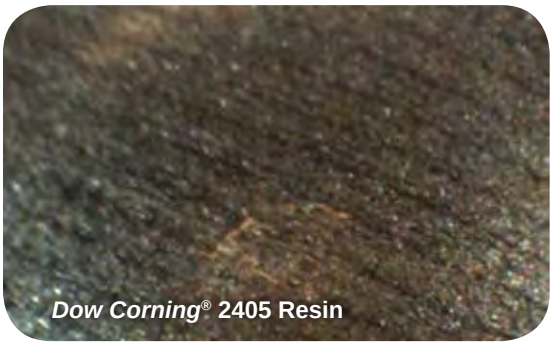
With *Dow Corning* 2405 Resin, the flexibility and impact resistance are significantly improved (Figure 2).

**Figure 2. Flexibility limitations of room-temperature-curing resins**

| Formulations | Impact Test: Visual Aspect (DFT ~50 µm) | | | |
|---|---|---|---|---|
| | 5 cm | 10 cm | 20 cm | 35 cm |
| *Dow Corning*® US-CF 2403 Resin | 8-9 | 5 | 4 | 3 |
| *Dow Corning*® RSN-0805 Resin | 10 | 10 | 10 | 10 |
| *Dow Corning*® 2405 Resin | 10 | 10 | 10 | 10 |

All samples contain 1% TnBT and 10% aluminum flake.
10 = excellent; 1 = failure (cracked/shattered)




## Excellent Weatherability

Clear and colored coatings were exposed to 1,500 hours of UVB radiation; gloss retention >90% and color change (ΔE) <2, which is visually undetectable by the average human eye, were observed. *Dow Corning* 2405 Resin is hydrophobic and provides good water beading. Clear coatings had a water contact angle of >95° and pigmented coatings showed higher water contact angles >112°.

The hydrophobicity and crosslink density of *Dow Corning* 2405 Resin enable utility in corrosion resistant coatings, when formulated with appropriate fillers and pigments, such as leafing aluminum. *Application data available upon request.*

## Solventless Delivery with Good Build/Viscosity

The low molecular weight of methyl methoxy resins can lead to difficulties when formulating easy-to-spray products with good build per coat. However, with the slight increase in molecular weight of *Dow Corning* 2405 Resin, formulators have more formulation options to achieve good build with less risk of sagging. In addition, *Dow Corning* 2405 Resin is delivered solventless!

## More Than Heat Resistance

Our innovative, silicon-based technologies can help you infuse your products with high-value performance attributes that can give you a competitive advantage in the marketplace. As a leader and innovator with a long history of success in the industry, Dow Corning's performance-enhancing coating technology platforms are well-aligned to the needs of the increasingly competitive global coatings market.

## For More Information

To learn how Dow Corning's innovative coatings technology platforms can help you power up your product line, visit **dowcorning.com/powerup** or email us at **coatings@dowcorning.com**.

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