

# Industrial Coatings

## Technical Data Sheet



# Joncryl<sup>®</sup> 504 Polyol

<b>Product Description</b>	Joncryl <sup>®</sup> 504 is a hydroxyl functional acrylic polyol for industrial baking coatings.
<b>Key Features &amp; Benefits</b>	<ul style="list-style-type: none"><li>- <i>Narrow molecular weight distribution</i></li><li>- <i>Xylene version of Joncryl<sup>®</sup> 500</i></li><li>- <i>Electrostatic application ability</i></li></ul>
<b>Chemical Composition</b>	Hydroxyl functional acrylic polyol

### Properties

#### Typical Properties

Appearance	clear liquid
Hydroxyl number	~ 150
Non-volatile at 150°C (0.5g, 60 minutes)	~ 81.5%
Viscosity at 25.0 ± 0.5°C (Brookfield #4LV, 60 rpm, 30 seconds)	~ 10,000 cps
Density at 20°C	1.04 g/cm <sup>3</sup> (8.66 lbs/gal)
Equivalent weight as supplied, of solids	500, 400
Tg (measured)	- 7°C (19.4°F)
Solvent	Xylene
Freeze-thaw stable	Yes

These typical values should not be interpreted as specifications.

### Applications

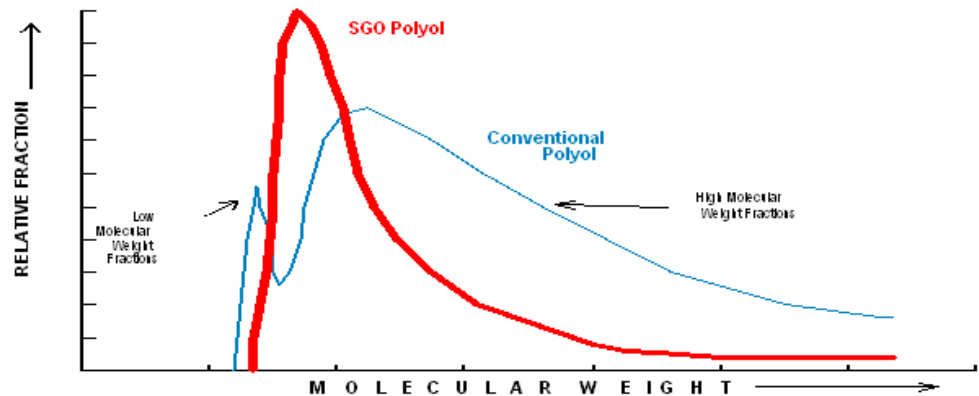
Joncryl<sup>®</sup> 504 is an innovative hydroxyl functional acrylic oligomer for high solids melamine baking systems. Coatings formulated with Joncryl<sup>®</sup> 504 feature a low viscosity at high solids and excellent flow and leveling with acrylic durability. In addition, Joncryl<sup>®</sup> 504 is supplied in xylene. The use of xylene as the carrier solvent allows the formulation of coatings with high resistivity for electrostatic application. Because it is supplied in xylene, Joncryl<sup>®</sup> 504 is also the most economical product from the Joncryl<sup>®</sup> 500 family of resins. Joncryl<sup>®</sup> 504 has also shown significant utility in urethane coating applications.

Joncryl<sup>®</sup> 504 is recommended for applications such as:

- Interior/exterior automotive refinish applications
- Interior/exterior general metal industrial coating applications

## SGO Polymerization Process

Joncryl® 504 is produced with the patented SGO (Solid Grade Oligomer) polymerization process. This process results in extremely narrow molecular weight distributions and excellent batch-to-batch consistency. The poly-dispersity of Joncryl® 504 is 1.7, which is considerably less than oligomers produced by conventional polymerization methods. The graph compares the molecular weight distribution of Joncryl® 504 versus a competitive, high solids acrylic polyol.



The following table illustrates the benefits of a narrow molecular weight distribution:

Features	Benefits
No low molecular weight fractions	<ul style="list-style-type: none"> <li>- promotes flow and leveling</li> <li>- less tendency to crater</li> <li>- improved performance at same average molecular weight</li> <li>- reduced oven volatiles: less oven smoking</li> <li>- less thermal sagging</li> </ul>
No high molecular weight fractions	<ul style="list-style-type: none"> <li>- lower viscosity at same average molecular weight</li> <li>- promotes flow and leveling</li> </ul>

## Formulation Guidelines

The following formulating guidelines represent basic direction, which has proven useful to most formulators. Specific applications and special situations can be discussed with your Account Manager or with Technical Service personnel.

**Crosslinker Selection** - For most applications, a standard Hexamethoxy methyl melamine resin is satisfactory. A variety of melamines, urea-formaldehydes, benzo-guanamines, and other specialty resins are available for special requirements and applications.

**Acrylic-to-Melamine Ratio** - Because of steric hindrance associated with the bulky melamine molecule, it is necessary to determine the optimum acrylic-to-melamine ratio experimentally. A ratio of 70:30 acrylic to melamine by solid weight has been found to provide good overall performance in most applications and should be considered a starting point. Ladder studies generally run in the 55:45 to 85:15 acrylic-to-melamine range.

**Solvent Selection** - Ketone solvents will give the best viscosity/VOC due to a combination of good solvency and low density. Ester and glycol ethers generally provide the next best viscosity/VOC, but do not provide as low of a viscosity/VOC as the ketones due to their higher density. Generally, the lower the molecular weight of the solvent within the family, the lower the viscosity/VOC that is obtainable. Aromatics, such as Xylene and Toluene, provide good solvency and are favored for electrostatic applications. Because the melamine molecule has a tendency to self-condense, primary alcohols should be included to stabilize the formulation. Butanol levels of 25% to 50% of the total available solvent are normally recommended for greatest stability.

**Catalysis** - The addition of 0.5% of a pTSA catalyst on total resin solids is normally recommended. Higher catalyst levels can be employed to speed the cure response, but it is also advisable to evaluate amino resins with higher imino content such as Luwipal® 072. In addition, a variety of acid catalysts designed to address specific problems such as package stability, moisture resistance, etc. are available from various suppliers.

**Additives** – Dow Corning<sup>1</sup> 57 reduced to 10% solids in an appropriate solvent is recommended for improving flow and leveling. For applications where a silicone-free coating is desired, BYK-Chemie offers a variety of non-silicone and modified organo-siloxane flow and leveling additives. For higher film build or control of sagging, thixotropes such as bentonite clays, fumed silicas, or organic additives such as Thixatrol<sup>2</sup> can be used.

### Starting Point Formulation

The following starting point formulation is recommended for an initial evaluation of Joncryl<sup>®</sup> 504. Additional optimization of the formulation will be required to achieve desired results for specific applications.

#### Joncryl<sup>®</sup> 504 GLOSS CLEAR TOPCOAT, Formula 32002-4A

<b>Part A</b>	<b>Pounds</b>	<b>Gallons</b>
Joncryl <sup>®</sup> 504	468.50	54.10
Irgaflow <sup>®</sup> 110	0.80	0.098
MAK	171.10	25.16
DBTDL (1% in MAK)	5.00	5.00
Subtotal	645.40	84.36
<b>Part B</b>		
Basonat <sup>®</sup> HI 100	194.60	19.94
<b>Total</b>	<b>840.00</b>	<b>104.30</b>

#### Formulation Attributes for Formula 32002-4A

Solids	67.2% by wt, 60.1% by volume
Viscosity (Brookfield)	75 – 85 cps
NCO:OH ratio	1.05:1.0
Catalyst level, DBTDL on TRS	0.005%
VOC (calculated)	325 g/l, 2.8 lbs/gal

<sup>1</sup>Registered trademark of Dow Corning Corporation.

<sup>2</sup>Registered trademark of Elementis Specialties, Inc.

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## Safety

### General

The usual safety precautions when handling chemicals must be observed. These include the measures described in Federal, State, and Local health and safety regulations, thorough ventilation of the workplace, good skin care, and wearing of personal protective equipment.

### Safety Data Sheet

All safety information is provided in the Safety Data Sheet for Joncryl<sup>®</sup> 504.

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