

# Industrial Coatings

## Technical Data Sheet

# Joncryl<sup>®</sup> 540



<b>Product Description</b>	Joncryl <sup>®</sup> 540 is a thermosetting, Rheology Controlled (RC) acrylic emulsion for industrial coating applications.
<b>Key Features &amp; Benefits</b>	<ul style="list-style-type: none"><li>- <i>Thermoset vehicle</i></li><li>- <i>Rugged stability</i></li><li>- <i>Superior application</i></li><li>- <i>Excellent gloss characteristics</i></li><li>- <i>Low VOC</i></li></ul>
<b>Chemical Composition</b>	RC acrylic emulsion

### Properties

#### Typical Properties

Appearance	translucent emulsion
Non-volatile at 145°C (2g, 40 minutes)	~ 44.0 %
pH at 25°C	~ 8.5
Viscosity at 25°C (Brookfield #2LV, 60 rpm, 30 seconds)	~ 100 – 500 cps

#### Typical Characteristics

Density at 20°C	1.04 g/cm <sup>3</sup> (8.70 lbs/gal)
Acid value (on solids)	49
MFFT*	2.5°C
Hydroxyl number (on solids)	42
Mechanical stability (5 minutes, Waring blender)	No effect
Neutralizing Amine	Dimethyl amino ethanol
Freeze-thaw stable	Yes

These typical values should not be interpreted as specifications.

\*ASTM D-2345 0% relative humidity, 3 mil wet film.

### Applications

Joncryl<sup>®</sup> 540 emulsion is a RC acrylic emulsion used to produce thermosetting industrial coatings. Joncryl<sup>®</sup> 540 emulsion offers excellent application properties, inherent pigment dispersing ability without the need for surfactants, good adhesion and high gloss potential.

Joncryl<sup>®</sup> 540 is recommended for applications such as:

- Interior/exterior general metal industrial coating applications

## Starting Point Formulations

The following starting point formulation is recommended for an initial evaluation of Joncryl® 540. Additional optimization of the formulation may be required to achieve desired results for specific applications.

### HIGH GLOSS WHITE TOPCOAT, FORMULA 540-A

<u>Materials</u>	<u>Pounds</u>	<u>Gallons</u>
<b>Grind:</b>		
Joncryl® 540	170.0	19.54
Nalco <sup>1</sup> 2305	2.0	0.24
Titanium dioxide	197.6	5.74
AMP <sup>2</sup> -95	4.1	0.52
Surfynol <sup>3</sup> 104	3.4	0.46
<b>Disperse at high speed to 6.5+ Hegman</b>		
<b>Let-down:</b>		
<b>Add in the following order:</b>		
Joncryl® 540	266.0	30.58
Water	111.1	13.33
Nalco <sup>1</sup> 2303	2.0	0.25
<b>Premix and add to the above:</b>		
2-(2-butoxyethoxy)Ethanol	49.5	6.23
Luwipal® 066 LF	108.4	10.84
<b>Premix and add to the above:</b>		
Water	51.3	6.15
Joncryl® 142	48.1	5.46
Ammonia (28%)	5.0	0.66
<b>Total</b>	<b>1,018.5</b>	<b>100.00</b>

*Note: Reduce to application viscosity with water. Let paint stand overnight for viscosity stabilization.*

### Formulation Attributes

pH	8.5
Solids	51.4% by wt, 40.5% by volume
Equilibrated Viscosity	(Brookfield LVF#2, 50 rpm, room temp.) 300 cps
	Zahn #2 53 seconds
	Stormer 72.5 KU
	ICI (10,000 sec – 1) 0.95 Poise
Density	10.18 lbs/gal
Pigment/Binder ratio	0.62
PVC	14.2
Acrylic/Melamine ratio (on solids)	65/35
VOC* (excluding water)	1.46 lbs/gal

*\*The VOC includes the 2-(2-butoxyethoxy)ethanol coalescing solvent in the formula and the Dimethyl amino ethanol supplied in the emulsion.*

### Cure Conditions

Flash-Off Period                      1 to 10 minutes  
Recommended Bake Schedule        300°F, 15 minutes or equivalent

### Pigment Dispersing:

Joncryl® 540 emulsion possesses excellent pigment wetting ability and the use of additional dispersants is not recommended. The pigment dispersion should generally contain 60 – 70% latex to titanium dioxide (by weight) for proper grind viscosity control. Joncryl® 540 emulsion can be used in MorehouseCowels, pebble, sand or ball mill. If possible, run the MorehouseCowles blade at a peripheral speed of 3500 to 5000 linear feet per minute. Grind temperatures can reach 140 – 160°F with no harm to the latex.

The use of AMP<sup>2</sup>-95 high boiling amine helps prevent latex skinning during the pigment grind. The AMP<sup>2</sup>-95 also aids through-dry during film formation, which helps minimize oven blistering.

Surfynol<sup>3</sup> 104 gives foam control and lowers paint surface tension for improved adhesion to oily and difficult substrates.

<sup>1</sup>Registered trademark of Nalco Company.

<sup>2</sup>Registered trademark of The Dow Chemical Company.

<sup>3</sup>Registered trademark of Air Products and Chemicals, Inc.

**Let-down:** 2-(2-butoxyethoxy) Ethanol (or Butyl Carbitol<sup>2</sup>) and Luwipal<sup>®</sup> 066 LF should be premixed for best incorporation of the melamine. Some thickening will occur during their addition to the formula, so the water in the formula should be added prior to or included in the premix.

Although Joncryl<sup>®</sup> 540 emulsion has a low film forming temperature, 2-(2-butoxyethoxy)ethanol coalescing solvent has been added to swell the latex. This allows for better availability of crosslink groups and thus higher crosslink density.

**Antifoam Agents:** Joncryl<sup>®</sup> 540 emulsion is inherently low foaming. Ultimate foam prevention can usually be achieved with the following products:

Antifoam	Point of Use	Recommended Level* (%)
Nalco <sup>1</sup> 2305	Grind	2
BYK <sup>4*</sup> -020	Grind <sup>^</sup>	1 – 1.5
Nalco <sup>1</sup> 2303	Let-down	2 – 3
Surfynol <sup>3</sup> 104H	Let-down	5 – 12
BYK <sup>4*</sup> -080	Let-down <sup>^</sup>	1.5 – 2

\*Pounds per 100 gallons of finished coating

<sup>^</sup>Use only in higher viscosity paint (300 cps)

<sup>4\*</sup>These products are discontinued, contact your BYK rep for suitable alternatives.

Silicone-containing defoamers should always be added in the grind. The shear of the grind sufficiently disperses and incorporates these defoamers, thus preventing potential film defects.

**Catalysis:** Joncryl<sup>®</sup> 540 emulsion has sufficient functionality to self catalyze a coating at conventional bake schedules (300°F, 15 minutes or equivalent). If a faster reaction rate is required, pTSA can be incorporated. Typically 0.5 – 1.0 phr (% on total resin solids) pTSA should be added to 25 pounds of water. This mix should be neutralized with 28% ammonia to a pH of 8 or 9 prior to addition. Failure to neutralize the catalyst will result in latex seeding. Very high catalyst levels (>1% on total resin solids) may require additional water for heat absorption during the neutralization process. Note that unnecessary catalyst addition will have an adverse effect on water and corrosion resistance.

**Melamine:** Luwipal<sup>®</sup> 066 LF or a more polymeric melamine can be successfully utilized. Levels generally range from 85:15 to 60:40 acrylic to melamine ratio. A 20 – 40% melamine level is suggested for optimal QUV gloss retention, hardness and corrosion resistance.

**Pigmented Film Properties:** High gloss white formula #540-A was applied to Bonderite<sup>5</sup> 1000 panels at 1.0 mils +0.1 DFT and cured for 15 minutes at 300°F. Performance properties were as follow:

**Dry Film Properties**

Gloss 60°, 20°	90, 60
Pencil hardness	H
König hardness	100
Direct impact resistance	40 in-lbs
Solvent resistance MEK (200 double rubs)	No effect

**Gloss Retention\*:** No U.V. absorbers in formula

**Hours Exposure**

	<b>500</b>	<b>650</b>	<b>825</b>	<b>1000</b>
% Retained Gloss (60°)	100	94	76	38

For ultimate gloss retention, we recommend adding 1 – 2% (on total resin solids) Tinuvin<sup>®</sup> 1130 UV absorber to the let-down.

\*QUV cabinet with high-energy UVB 313 bulb, 4x4 hour cycle, 60°C x 40°C ASTM G-53 Aluminum Substrate.

**Salt Spray Resistance\*\*:**

Unprimed Bonderite<sup>8</sup> 1000 panels.

Hours Exposure	250
Blisters	Slight blistering near scribe
Surface rusting	None
Creep from scribe	<1/16"

\*\*Salt spray cabinet 5% NaCl, 105°F ASTM B-177

<sup>5</sup>Registered trademark of Henkel AG & Co.

## 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 protective goggles.

### Material Safety Data Sheet

All safety information is provided in the Material Safety Data Sheet for Joncryl® 540.

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