

Industrial Coatings

Technical Data Sheet

Joncryl® 540



Product Description	Joncryl® 540 is a thermosetting, Rheology Controlled (RC) acrylic emulsion for industrial coating applications.
Key Features & Benefits	<ul style="list-style-type: none">- <i>Thermoset vehicle</i>- <i>Superior application</i>- <i>Excellent gloss characteristics</i>- <i>Low VOC</i>
Chemical Composition	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 ³ (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® 540 emulsion is a RC acrylic emulsion used to produce thermosetting industrial coatings. Joncryl® 540 emulsion offers excellent application properties, inherent pigment dispersing ability without the need for surfactants, good adhesion and high gloss potential.

Joncryl® 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>
Grind:		
Joncryl® 540	170.0	19.54
FoamStar® ST 2420	2.0	0.24
Titanium dioxide	197.6	5.74
AMP ¹ -95	4.1	0.52
Hydropalat® WE 3650	3.4	0.46
Disperse at high speed to 6.5+ Hegman		
Let-down:		
Add in the following order:		
Joncryl® 540	266.0	30.58
Water	111.1	13.33
FoamStar® ST 2420	2.0	0.25
Premix and add to the above:		
2-(2-butoxyethoxy)Ethanol	49.5	6.23
methanol-etherified melamine-formaldehyde resin	108.4	10.84
Premix and add to the above:		
Water	51.3	6.15
Joncryl® 143	48.1	5.46
Ammonia (28%)	5.0	0.66
Total	1,018.5	100.00

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.*

¹Registered trademark of ANGUS Chemie.

Cure Conditions

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

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

Pigmented Film Properties: High gloss white formula #540-A was applied to Bonderite² 1000 panels at 1.0 mils +0.1 DFT and cured for 15 minutes at 300°F. Performance properties were as follow:

Hours Exposure

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

For ultimate gloss retention, we recommend adding 1 – 2% (on total resin solids) Tinuvin® 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 1000 panels.

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

**Salt spray cabinet 5% NaCl, 105°F
ASTM B-117

²Bonderite is a registered trademark of Henkel Ag & Co. KGaA

Formulation Guidelines:

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 AMP¹-95 high boiling amine helps prevent latex skinning during the pigment grind. The AMP¹-95 also aids through-dry during film formation, which helps minimize oven blistering.

Hydrolat WE 3650 gives foam control and lowers paint surface tension for improved adhesion to oily and difficult substrates.

Let-down: 2-(2-butoxyethoxy) Ethanol and melamine-formaldehyde resin 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® 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 crosslinking groups and thus higher crosslink density.

Antifoam Agents: Joncryl® 540 emulsion is inherently low foaming. Should foam control be required, FoamStar ST 2420 is recommended. Other compatible defoaming agents may be used. As always, a ladder study is recommended to determine most efficient loading in a given formulation.

Catalysis: Joncryl® 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: highly methanol-etherified, melamine-formaldehyde resins 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.

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.

Important

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