Industrial Coatings

Technical Data Sheet

Joncryl® 910

BASF
The Chemical Company

Product Description

Joncryl® 910 is a hydroxyl functional, fast drying, acrylic polyol for higher solids polyurethane coating applications.

Key Features & Benefits

- Outstanding gloss
- Color retention
- Outstanding durability
- Very fast dry time
- Early hardness development
- Good pot life

Chemical Composition

Acrylic polyol

Properties

Typical Characteristics

Appearance	clear liquid
Solids	71% wt
Solids	63% volume
Hydroxy number of solids	94
Viscosity	7,000 cps
Equivalent weight as supplied	845
Equivalent weight of solids	600
Density as supplied	8.7 lbs/gal, 1.04 g/mL
Density as solids	9.8 lbs/gal, 1.17 g/mL
Tg (measured)	9°C, 48.2°F
Solvent	Methyl n-amyl ketone

These typical values should not be interpreted as specifications.

Applications

Joncryl® 910 is a gloss-retentive acrylic polyol designed for higher solids polyurethane coatings. Joncryl® 910 employs a novel technology, which makes this polyol more reactive with isocyanate crosslinking agents. The result is the ability to formulate fast drying polyurethane coatings with good pot life and excellent dry time characteristics for maintenance, transportation, and other applications, at VOC levels as low as 3.2 pounds per gallon without exempt solvents.

Joncryl® 910 is recommended for applications such as:

- Interior/exterior general metal coating applications
- Automotive OEM and refinish applications
- Interior/exterior plastic component coating applications

Starting Point Formulation

The following starting point formulations are recommended for an initial evaluation of Joncryl® 910. Additional optimization of the formulations may be required to achieve desired results for specific applications. Because of Joncryl® 910's exceptional reactivity, it is recommended that initial evaluations be done without catalysis. If increased reactivity is desired, Joncryl® 910 will respond to typical polyurethane catalysts.

Joncryl® 910 ACRYLIC/URETHANE GLOSS WHITE TOPCOAT, Formula #137-AB

Part A	**Pounds**	**Gallons**
Joncryl® 910	210.0	24.2
BYK[1] 320	2.0	0.3
MAK	50.0	7.4
Add while mixing:		
Ti-Pure[2] R-960	291.0	9.0
Disperse to 6 – 7 Hegman, then add:		
Joncryl® 910	251.0	28.9
MAK	132.7	19.5
Subtotal	936.7	89.3
Part B		
Basonat® HI 100	104.2	10.7
Total	1,040.9	100.00

Formulation Attributes:		
Solids	69.5% by weight	57.6% by volume
Viscosity (A + B)	200 cps	
PVC	15.6%	
Pigment:Binder ratio	0.7	
NCO:OH ratio	1:1	
VOC (calculated)	3.17 lbs/gal	380.3 g/L

[1] *Registered trademark of BYK-Chemie.*
[2] *Registered trademark of DuPont.*

Joncryl® 910 HIGH BUILD URETHANE GLOSS WHITE COATING, Formula #1053111-02-10

Part A	**Pounds**	**Gallons**
Joncryl® 910	152.41	17.52
MAK	25.43	3.74
BYK[1] 320	4.77	0.71
Thixatrol[3] SR	15.22	2.07
Add while mixing:		
Ti-Pure[2] R-960	203.84	6.32
Barytes No. 1	162.89	4.65
Disperse to 6 – 7 Hegman, then add:		
Joncryl® 910	278.09	31.96
MAK	94.38	13.88
n-Butyl propionate	38.13	4.82
2-Ethylhexyl acetate	38.15	4.33
Subtotal	1,013.31	90.00
Part B		
Basonat® HI 100	97.30	10.00
Total	1,110.61	100.00

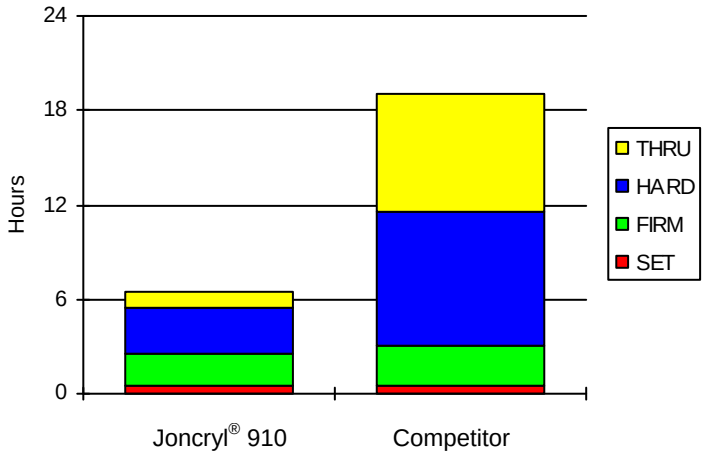
Formulation Attributes:		
Non-volatile	70.90% by weight	54.4% by volume
Weight per gallon	11.11 lbs/gal	
Mix ratio by volume	9:1	
NCO:OH ratio	1:1	
VOC (calculated)	3.23 lbs/gal	387.4 g/L

[3] *Registered trademark of Elementis Specialties, Inc.*

Cure/Dry Characteristics

The following graph compares the dry times of white topcoat formulations based on Joncryl® 910 with a competitive acrylic polyol that yields a similar viscosity/VOC. The competitive formulation is catalyzed with 0.005% dibutyltin dilaurate on vehicle weight solids. The Joncryl® 910 formulation is un-catalyzed. (Both systems are approximately 3.2 lbs/gal VOC at 200 cps.)

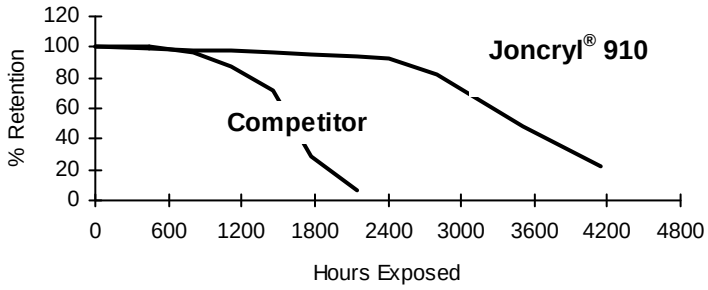
Gardner Circular Dry Times



UV Gloss Retention

QUV gloss retention results were obtained using UVA-340 bulbs with 4 hours of light at 60°C followed by 4 hours of condensation at 40°C. Both coatings are white topcoat formulations at a 17% PVC with Basonat® HI 100 as the crosslinker and n-MAK as the formulation solvent. The competitive formulation is catalyzed with 0.005% dibutyltin dilaurate on vehicle weight solids. The Joncryl® 910 formulation is un-catalyzed. No UV light absorbers were used.

QUV 60 °Gloss Retention



Initial Gloss - Low 90's

Coating Physical Properties and Chemical Resistance

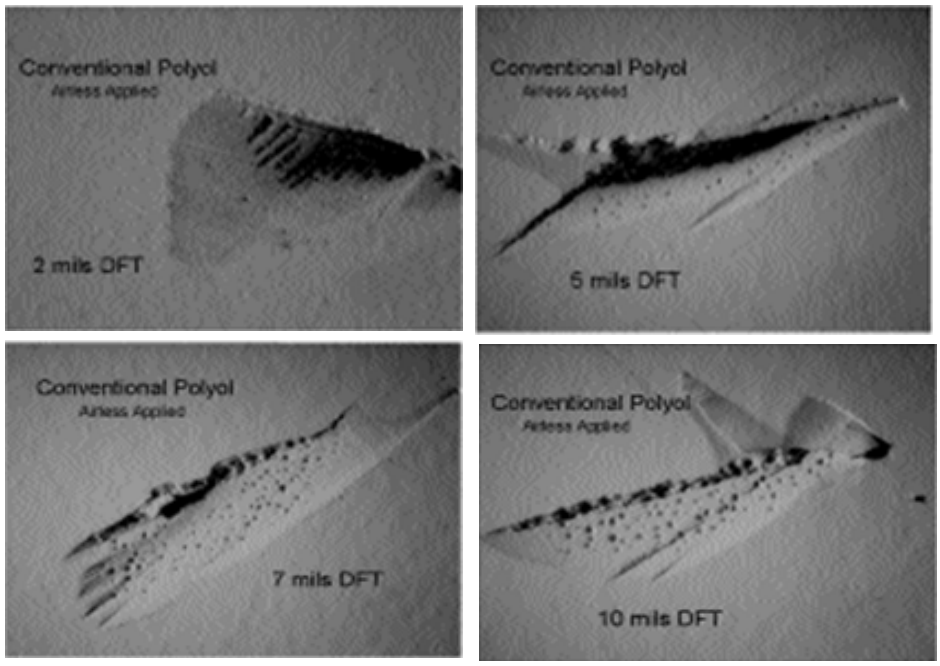
The following table compares the physical properties and chemical resistance of white topcoat formulations based on Joncryl® 910 to a competitive acrylic polyol.

	Joncryl® 910	**Competitor**
Gloss, 60°	92	94
Gloss, 20°	86	69
Pencil hardness	2H	2H
König hardness	105	119
Direct impact	44 in/lbs	24 in/lbs
Reverse impact	6 in/lbs	< 2 in/lbs
Acid resistance	9	9
Caustic resistance	10	10
Solvent resistance	9	9

Acid, caustic, and solvent resistances are rated on a scale of 1-10, with 10 equal to no effect after a 24-hour spot test.

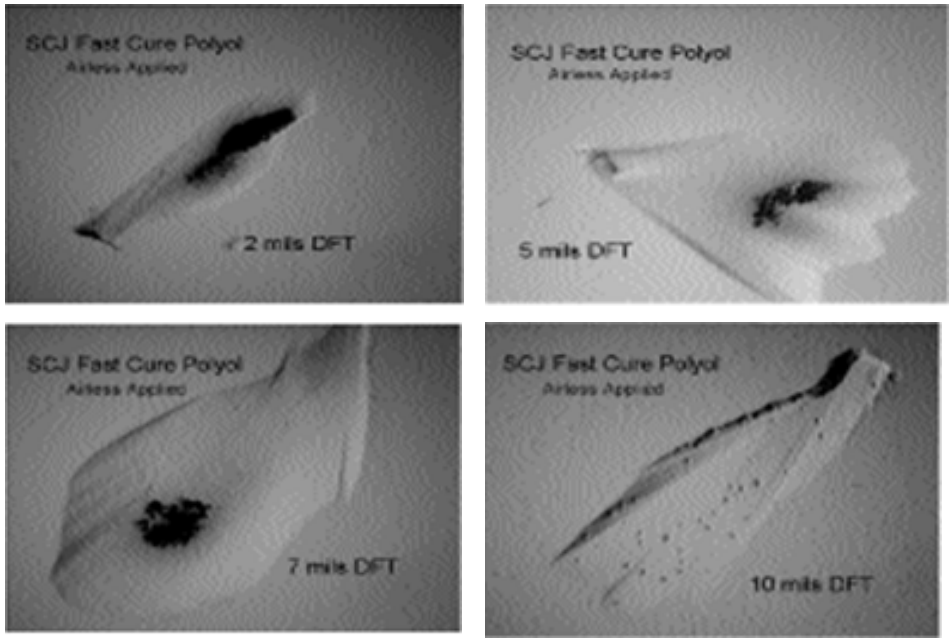
Conventional Polyol – Airless Applied

The following photo-micrographs are of cross-sectional cuts of airless spray applied to high build polyurethane coating. Carbon dioxide foaming, typical of polyester or acrylic polyols using conventional technology, is demonstrated in the first set of photomicrographs. Note that significant CO_2 foam occurs at or above 5 mils DFT. The airless application was accomplished with a Graco 30:1 President pump at 85 PSI of air line pressure. A Graco Silver Gun (Model 208663) with a .417 Reversa Clean tip was used for this application. The panels were dried at 77° and 50% relative humidity.



BASF Resins' - Fast Cure Polyol - Airless Applied

The following photo-micrographs are of a high build polyurethane coating based on Joncryl® 910. Note that at dry film thickness up to 7.0 mils and no CO_2 foaming was observed. Formulating high build polyurethanes is a very challenging task. Few people are successful in producing high build urethanes free from carbon dioxide foam. Polyols produced with BASF Resins' Fast Cure Technology provide a unique tool in achieving what many consider to be impossible.



Formulation Guidelines

Crosslinker Selection – For maximum gloss retention properties, aliphatic isocyanates are recommended. The Trimer or Biuret versions of hexamethylene diisocyanate can be used. The Trimer version gives better gloss retention and reactivity. A ratio of 1.05:1 of isocyanate to hydroxyl is normally recommended in the industry. However, a ratio of 1:1 of isocyanate to hydroxyl is more economical and does not sacrifice performance properties.

Solvent Selection – Because of their free hydroxyl functionality which can react with the isocyanate portion, alcohols and glycol ethers should not be used. Urethane-grade solvents should be used when available. Ketone solvents will give the best viscosity/VOC due to a combination of good solvency and low density. Esters generally provide the next best viscosity/VOC, but do not provide as low of 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 can be readily used in combination with the more polar solvents. Glycol ether acetates can be used, but normally do not provide low viscosity/VOC. PM-Acetate exhibits film retention characteristics.

Catalysis – Due to the increased reactivity of Joncryl® 910, it is recommended that the initial evaluation be completed without a catalyst. If increased reactivity is desired, Joncryl® 910 will respond to typical urethane catalysts such as dibutyltin dilaurate. Addition of a catalyst will result in a faster cure rate, shorter pot life, and reduced gloss retention.

Additives – BYK[1] 320 is recommended at 2 pounds per 100 gallons of combined formulation. BYK[1] 320 results in excellent flow and leveling as well as air release during manufacture and application. If a dispersant is necessary, Lecithin or Disparlon[5] KS-273N is recommended. For higher film build, thixatropes such as Bentonite clays, fumed silicas, or organic additives such as Thixatrols can be used.

[5] Registered trademark of King Industries.

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.

Material Safety Data Sheet All safety information is provided in the Material Safety Data Sheet for Joncryl® 910.

Important

While the descriptions, designs, data and information contained herein are presented in good faith and believed to be accurate, they are provided for guidance only. Because many factors may affect processing or application/use, BASF recommends that the reader make tests to determine the suitability of a product for a particular purpose prior to use. **NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESCRIPTIONS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS.** In no case shall the descriptions, information, data or designs provided be considered a part of BASF's terms and conditions of sale. Further, the descriptions, designs, data, and information furnished by BASF hereunder are given gratis and BASF assumes no obligation or liability for the descriptions, designs, data or information given or results obtained all such being given and accepted at the reader's risk.

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