Joncryl® 910

Product Description	**Joncryl 910 is a hydroxyl functional, fast drying polyol for higher solids polyurethane**
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 Properties

Appearance	clear liquid
Non-volatile at 150°C (0.5g, 60 minutes)	~ 71%
Hydroxyl number of solids	~ 94
Viscosity at 25.0 ± 0.5°C (Brookfield #4 LV, 30 rpm, 30 seconds)	4,000 – 10,000 cP
Density at 20°C	~ 1.04 g/cm^3 (8.7 lbs/gal)
Equivalent weight as supplied, of solids	~ 845, 600
Tg	~ 9°C
Solvent	Methyl n-amyl ketone

* These typical values should not be interpreted as specifications.

Applications

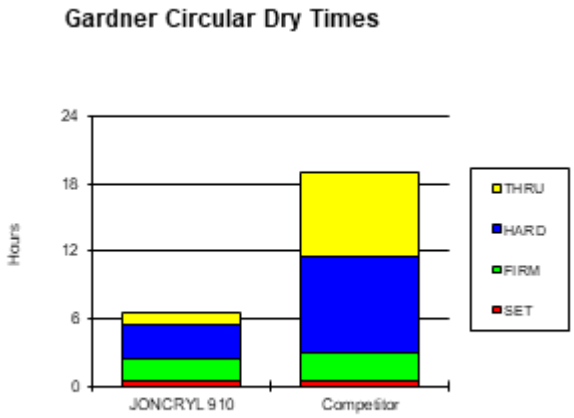
Joncryl 910 is a gloss-retentive acrylic polyol designed for higher solids polyurethane coatings. Joncryl 910 employs a novel technology which makes this polyol more reactive with isocyanate crosslinking agents. The result is the ability to formulate fast drying polyurethane coatings with good pot life 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

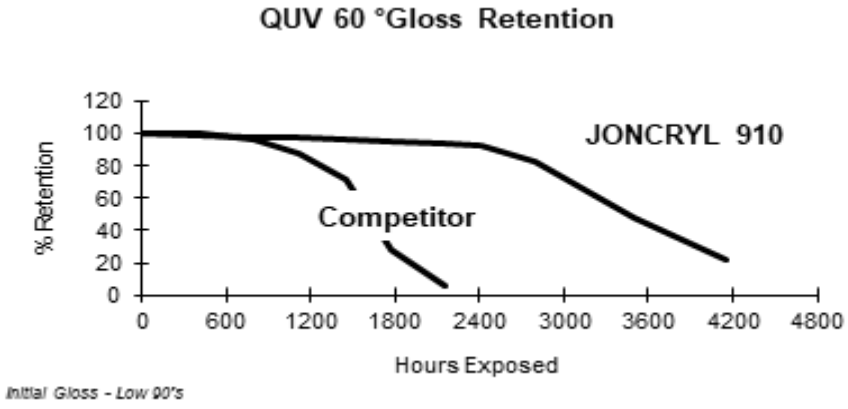
Cure/Dry Characteristics

The following graph compares the dry times of typical 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.)



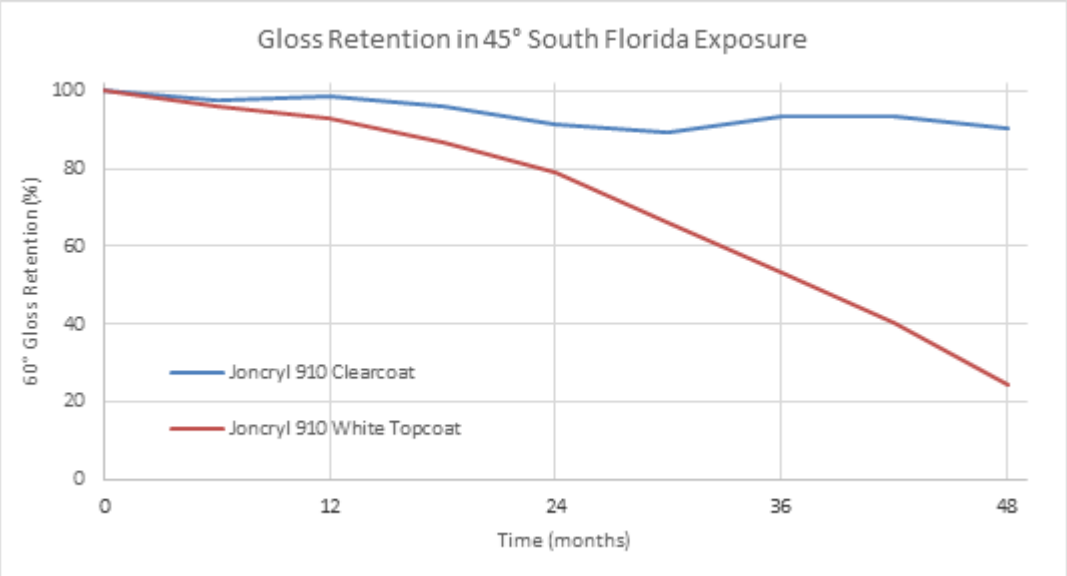
QUV Gloss Retention

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 stabilizers were used.



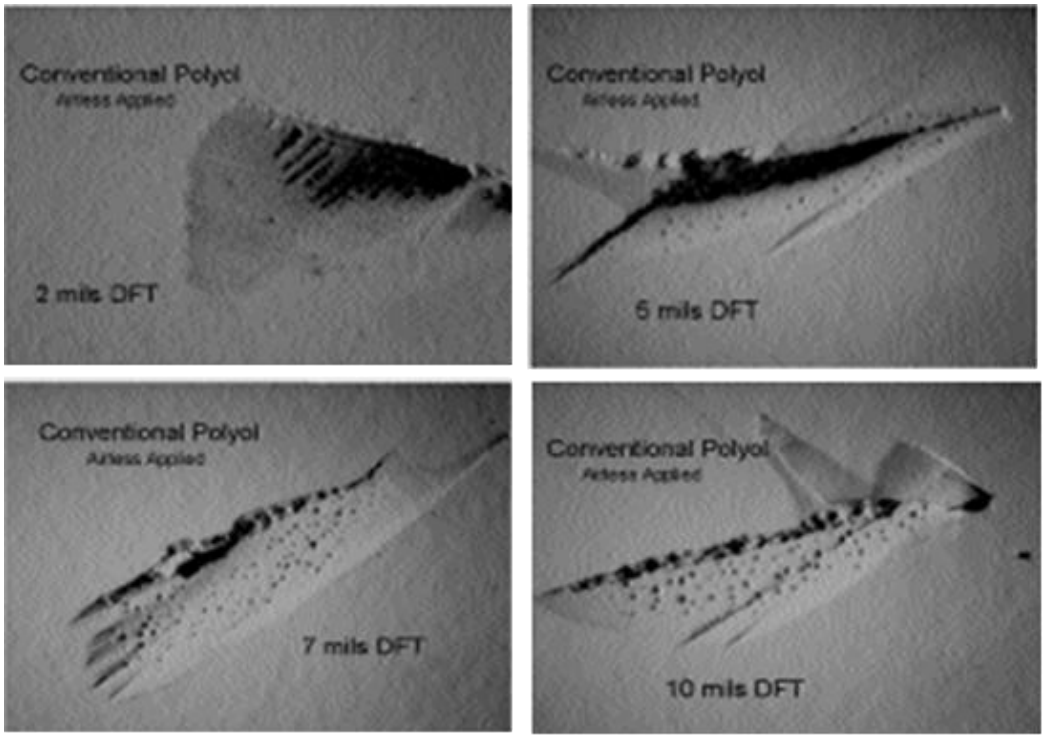
South Florida Weathering

The following graph demonstrates the 60° gloss retention of polyurethane coating formulations based on Joncryl 910 in South Florida weathering (ASTM G7-05). No UV stabilizers were used.



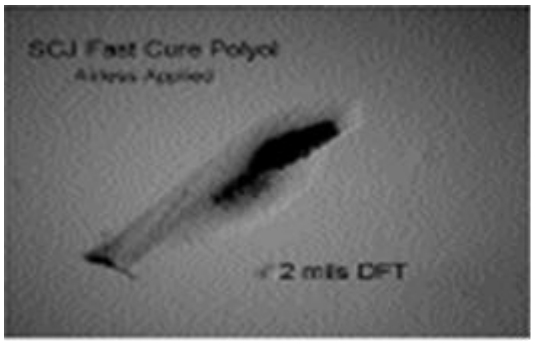
Conventional Polyol – Airless Applied

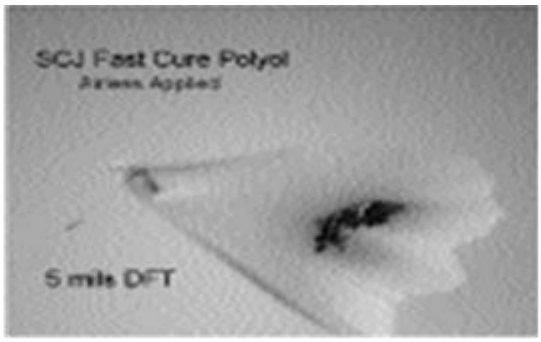
The following photomicrographs are of cross-sectional cuts of airless spray applied to high build polyurethane coating. Carbon dioxide foaming, typical of polyester or acrylic polyols using conventional technology, is demonstrated in the first set of photomicrographs. Note that significant CO_2 foam 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 Reverse Clean tip was used for this application. The panels were dried at 77° and 50% relative humidity.

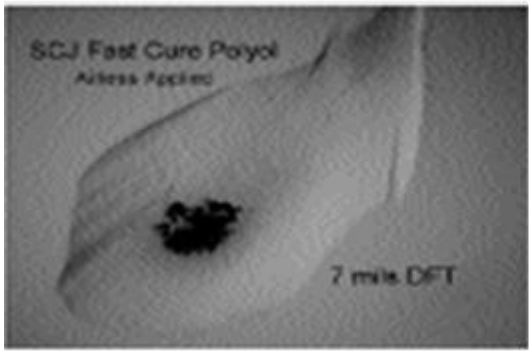


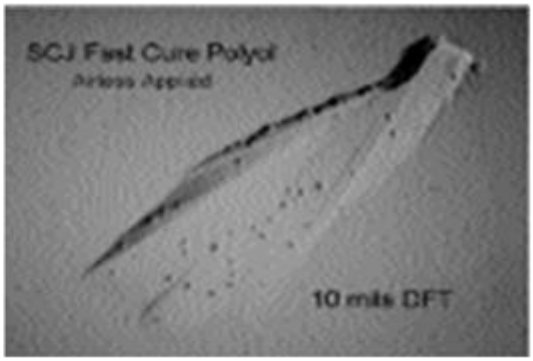
Fast Cure Polyol - Airless Applied

The following photomicrographs 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's 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 isocyanurate (trimer) or biuret versions of hexamethylene diisocyanate can be used. The trimer version may give 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 the hydroxyl functionality of alcohols and glycol ethers can react with isocyanates, their use should be avoided. 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 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 can be readily used in combination with the more polar solvents. Glycol ether acetates can be used but normally do not provide as 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 – Efka® FL 3670 results in excellent flow and leveling. If a dispersant is necessary, Lecithin or Disparlon[1] KS-273N is recommended. For higher film build, thixatropes such as bentonite clays, fumed silicas, or organic additives such as Thixatrol[2] can be used.

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
Efka® FL 3670	2.45	0.3
MAK	50.0	7.4
Add while mixing:		
Ti-Pure[3] 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	937.15	89.3
Part B		
Basonat® HI 100 NG	104.2	10.7
Total	**1,041.35**	**100.00**

Formulation Attributes, Formula 137-AB

Solids	69.5% by wt, 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 King Industries, Inc.
[2]Registered trademark of Elementis Specialties, Inc.
[3]Registered trademark of The Chemours Company.

Coating Physical Properties and Chemical Resistance
The following table compares the physical properties and chemical resistance of typical white topcoat formulations based on Joncryl 910 to a competitive acrylic polyol.

	Joncryl 910	**Competitor**
Gloss, 60°/ 20°	92 / 86	94 / 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

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
Efka® FL 3670	5.81	0.71
Thixatrol[2] SR	15.22	2.07
Add while mixing:		
Ti-Pure[3] 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	1,014.35	90.00
Part B		
Basonat® HI 100 NG	97.30	10.00
Total	**1,111.65**	**100.00**

Formulation Attributes, Formula 1053111-02-10

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

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 910.

Important

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