Industrial Coatings

Technical Data Sheet

Joncryl® 920 Polyol

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Product Description **Joncryl® 920 is a fast curing acrylic polyol for high solids polyurethane coating applications.**

Key Features & Benefits

- Fast dry time
- Practical pot life
- Utility as a modifier
- Very good gloss development
- Excellent for low VOC systems

Chemical Composition **Acrylic polyol**

Properties

Typical Properties

Appearance	clear liquid
Non-volatile at 150°C (0.5g, 60 minutes)	~ 80%
Hydroxyl number of solids	~ 140
Viscosity at 25.0 ± 0.5°C (Brookfield #4LV, 60 rpm, 30 seconds)	3,600 – 8,000 cP
Density at 20°C	~ 1.03 g/cm^3 (8.60 lbs/gal)
Equivalent weight as supplied, of solids	~ 500, 400
Tg	~ -7°C
Solvent	Methyl n-amyl ketone

These typical values should not be interpreted as specifications.

Applications

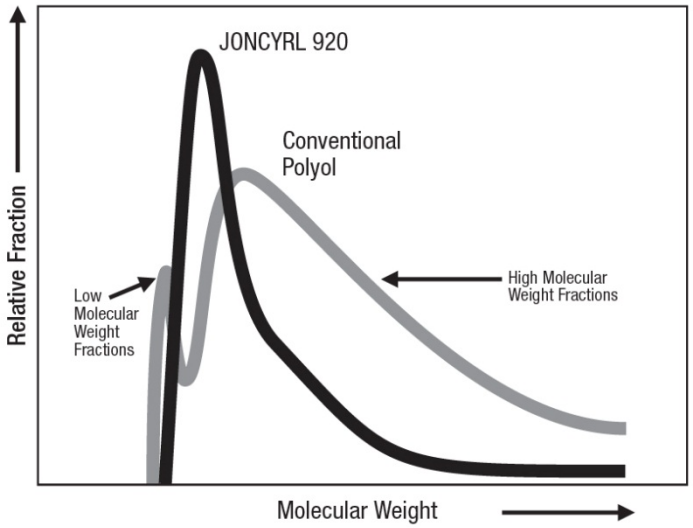
Joncryl® 920 is an innovative acrylic oligomer for high solids polyurethane coatings, which features fast cure with a practical pot life. High solids coatings that are as low as 2.3 pounds per gallon of VOC can be formulated to spray by conventional or airless equipment. It displays outstanding viscosity characteristics without the addition of low molecular weight reactive diluents. Joncryl® 920 should be considered as a candidate for high performance maintenance and transportation coatings as a replacement for conventional solids urethane finishes.

Joncryl® 920 is recommended for applications such as:

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

SGO Polymerization Process

Joncryl® 920 is produced by the patented SGO (Solid Grade Oligomer) polymerization process. This process results in extremely narrow molecular weight distribution and excellent batch-to-batch consistency. The poly-dispersity of Joncryl® 920 is 1.7, which is considerably less than oligomers produced by conventional polymerization methods. The following graph compares the molecular weight distribution of Joncryl® 920 to a competitive, high solids acrylic polyol.



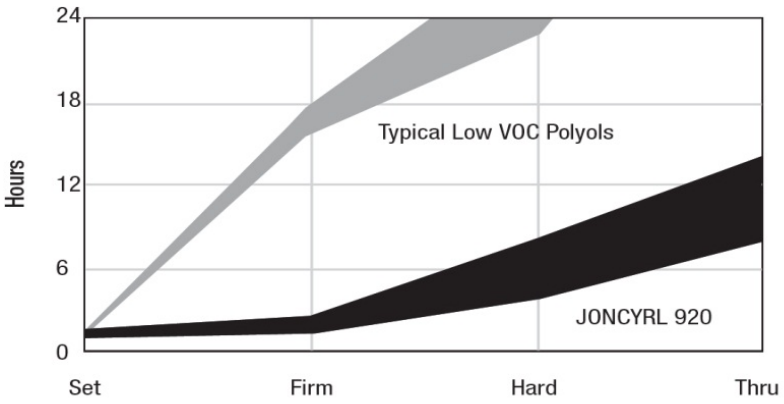
The following table illustrates the benefits of a narrow molecular weight distribution:

Features	Benefits
No low molecular weight fractions	- promotes flow and leveling - less tendency to crater - improved performance at same average molecular weight
No high molecular weight fractions	- lower viscosity at same average molecular weight - promotes flow and leveling

Cure/Dry Characteristics

The following graph illustrates the dry times/cure rates of a typical white topcoat formula based on Joncryl® 920. Due to the increased reactivity of Joncryl® 920, catalysts are not normally used. If increased reactivity is desired, typical urethane catalysts such as dibutyltin dilaurate can be used. If a catalyst is used, the dry time and the pot life will both be reduced. The pot life of this system will normally be between 4 – 6 hours when pot life is defined as the time to double an initial viscosity of 250 cP.

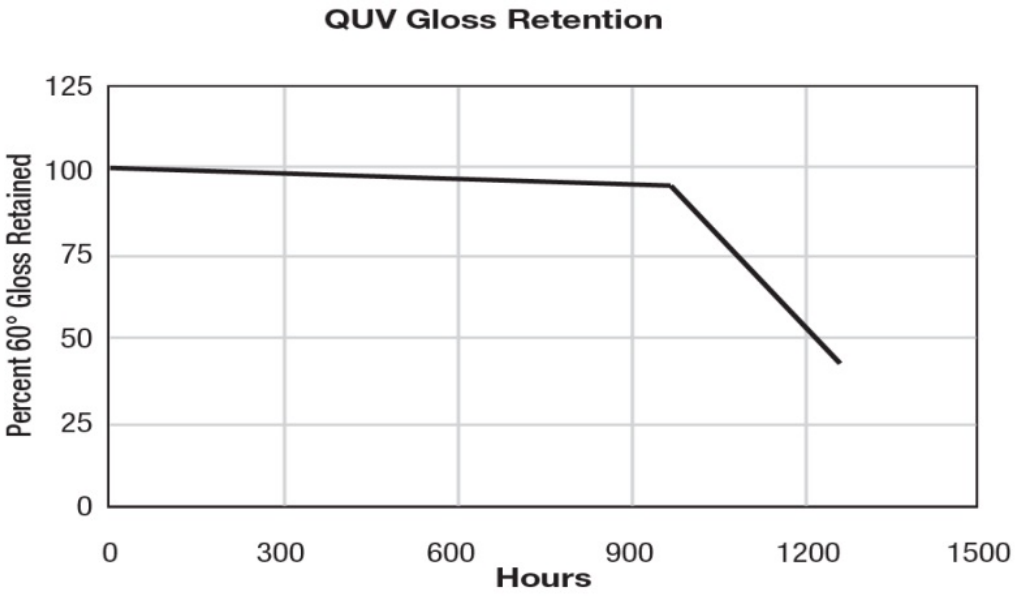
Gardner Circular Dry Times



Evaluations of Gardner dry times are very subjective. The dry times will normally lie somewhere within the area plotted on the chart above.

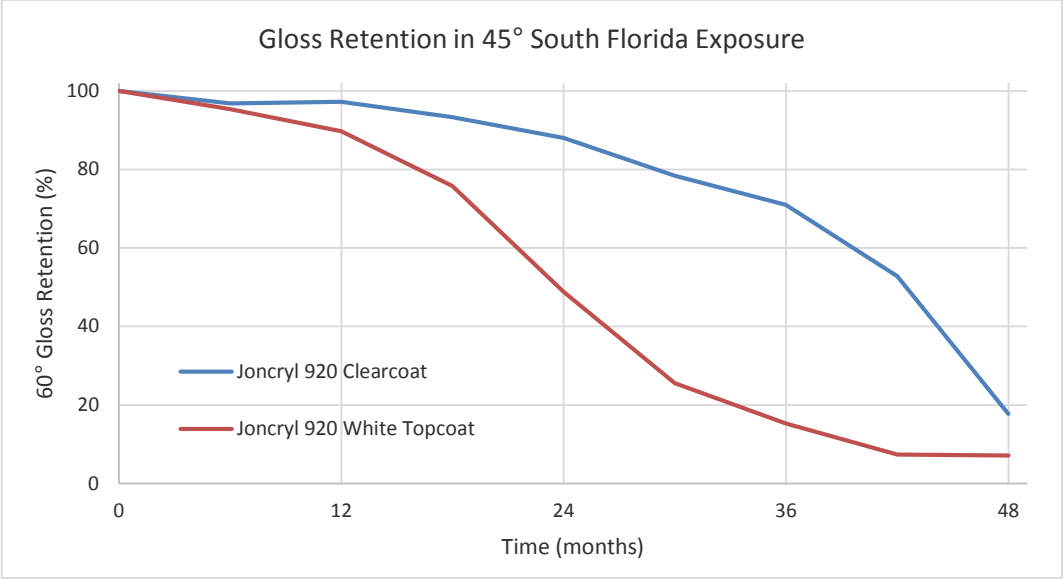
QUV Gloss Retention

The following graph shows the QUV gloss retention of Joncryl® 920 in a white topcoat formula. QUV gloss retention results were obtained using UVB-313 bulbs with 4 hours of light at 60°C followed by 4 hours of condensation at 40°C. Formula 192-A uses a 17% PVC, Basonat® HI 100 as the crosslinker, and MAK as the solvent. UV light stabilizers were not used. Due to the increased reactivity of Joncryl® 920, a catalyst is not normally needed and was not added to this information.



South Florida Weathering

The following graph demonstrates the 60° gloss retention of polyurethane coating formulations based on Joncryl® 920 in South Florida weathering (ASTM G7-05). No UV stabilizers were used.



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® 920, a catalyst is not normally required. If additional speed of cure is desired, typical urethane catalysts such as dibutyltin dilaurate can be utilized. Catalysis with 0.005% dibutyltin dilaurate on total binder solids is normally recommended. Higher catalyst level will result in shorter pot lives and faster cure rates. Other catalysts such as zinc octoate and other metallic soaps can also be used.

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.

Use as a Modifier - Joncryl® 920 can be used as a modifier to upgrade the performance of low molecular weight polyesters and acrylic polyols. It can be used to lower the viscosity/VOC of higher VOC systems including acrylics and polyesters.

Starting Point Formulation

The following starting point formulations are recommended for initial evaluations of Joncryl® 920. Additional optimization of the formulations will be required to achieve desired results for specific applications.

Joncryl® 920 GLOSS MAINTENANCE COATING, Formula 192-A

Part A	**Pounds**	**Gallons**
Joncryl® 920	200.00	23.30
Efka® FL 3670	2.45	0.30
MAK	25.00	3.70
Add while mixing:		
Ti-Pure[4] R-960	313.70	9.70
Disperse to 6 – 7 Hegman, then add:		
Joncryl® 920	178.30	20.70
MAK	181.60	26.70
Subtotal	901.05	84.40
Part B		
Basonat® HI 100	151.70	15.60
Total	**1,052.75**	**100.00**

Formulation Attributes

Solids	73% by wt, 57% by volume
Viscosity	120 – 160 cP
PVC	17%
Pigment: Binder ratio	0.7
NCO:OH ratio	1.05:1
VOC (calculated)	2.8 lbs/gal, 339 g/l

Coating Physical Properties and Chemical Resistance

The following table shows the physical properties and chemical resistance of Joncryl® 920 White Topcoat Formula 192-A. (Minimum cure time, 2 weeks at ambient temperature.)

Gloss, 60° / 20°	93 / 89
Pencil hardness	F
Direct impact	125 in/lbs
Reverse impact	45 in/lbs
Acid resistance	10
Caustic resistance	10
Solvent resistance	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.

[1]Registered trademark of King Industries, Inc.
[2]Registered trademark of Elementis Specialties, Inc.
[3]Registered trademark of The Chemours Company.

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® 920.

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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