

ISOCRYL® H-1871 MATTING ACRYLIC RESIN FOR POWDER COATINGS

Experimental Product



THE EDGE OF INNOVATION

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GENERAL DESCRIPTION

Isocryl® H-1871 is a solid, hydroxyl-functional acrylic resin specifically designed for one-shot, low to mid-gloss, exterior durable urethane powder coatings. Isocryl H-1871 is used in conjunction with conventional or superdurable hydroxyl polyesters cured with blocked isocyanates or uretdione hardeners. Powder coatings formulated with Isocryl H-1871 exhibit gloss in ranges of 10 - 50% with excellent burnish resistance in dark colors, exceptional weathering and the potential for cure at temperatures as low as 160°C.

TYPICAL PROPERTIES*

Appearance		Clear Flakes
Non-Volatile, weight %		99.0% minimum
Softening Point, RING & BALL		115 - 125°C
Specific Gravity (25/25)		1.0 - 1.2
Hydroxyl Equivalent Weight		1871
Hydroxyl Value		30

* Not to be used for specification purposes

COMPARISON TO SIMILAR TECHNOLOGIES

Isocryl H-1871 is recommended for gloss ranges of 10 - 20%. The final film properties, including gloss are dependent on the choice of polyester, pigmentation, hardener and flow control agent.

	Isocryl H-1871 PE Urethane	High/Low PE Urethane	Isocryl EP-570G	Isocryl EP-575G
Gloss Range (60)	10 - 20	5 - 40	< 10	<10
Reproducibility*	Good	Poor	Excellent	Excellent
Minimum Cure T (C)	160	180	180	170
Chemical Resistance	Good	Very Good	Good	Very Good
Appearance	Good	Very Good	Good	Good
Burnish Resistance	Excellent	Good	Excellent	Good

ISOCRYL H-1871 HIGHLIGHTS

Isocryl H-1871 is designed to replace the higher hydroxyl value polyester in more traditional high/low polyester urethane powder formulations. Utilizing Isocryl H-1871 results in formulations with a lower crosslinker demand, better batch to batch reproducibility and improved burnish resistance in dark colors. Final film characteristics such as gloss, appearance, impact and chemical resistance depend on the binder composition, pigmentation, choice of flow control agent, and addition of organic acid such as DDDA, dodecanedioic acid. In general, the following holds true:

- Polyester effects (Table 1):
 - Gloss
 - Durability (Standard or Superdurable)
- Type of Isocyanate – Caprolactam Blocked or Uretdione (Table 2)
 - Appearance and gloss reduction are optimized with blocked isocyanates
- Choice of Flow Control Agent
 - Resiflow P64F yields smoothest film appearance (Table 3)
- Addition of Organic Acid (Table 3)
 - Reduce gloss

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As with any raw material, laboratory evaluation is required for each formulation to determine the optimum concentration of Isocryl H-1871, best processing method and application equipment settings. Powder coatings containing Isocryl H-1871 may require lower kV settings on corona application equipment to achieve the best appearance.

TABLE 1. INFLUENCE OF POLYESTERS

Formulation	P1630 White	P1630 Black	P1680 White	P-1680 Black	Rucote 102 White	Rucote 102 Black	Rucote 102 (Unpigmented)
P1630 (DSM*) Standard Polyester	297	297					
P1680 (DSM) Superdurable Polyester			293.4	297			
Rucote 102 (Stepan) Standard Polyester					294	361.4	400
Isocryl H-1871	297	297	293.4	297	280	361.4	420
B-1530 (Evonik)	89	89	88.2	89	101		
Crelan NI-2 (Covestro)						137.2	148
BT-71						10	10
Octaflow ST-70	10	10	10	10	10		
Benzoin	5	5	5	5	5	5	7
Resiflow® P-64F	10	10	10	10	10	10	15
TR-60 Titanium	292		270		270		
Staphyloid AC-4030 (Sakai Trading)		30	30	30	30		
Monarch 1300 Black		10		10		15	
Sachtofine LG		252		252			
Blanc Fixe F						100	
Total	1000	1000	1000	1000	1000	1000	1000
Cure	15 min at 200°C						
Gloss							
20°	6.4	1.5	3.3	3.3	2.9	0.7	17.4
60°	20	11.8	14.3	22.1	8.6	5.3	46.8
85°	29.7	31.8	38.7	43.3	35	22	54.1
Direct Impact (in.lb.)	40	20	40	20	120	100	<20
Reverse impact (in.lb.)	40	<20	<20	<20	120	100	<20
MEK (double rubs)	25	50	50	50	50	100	25
PCI Smoothness	6	4	3	5	5	5	5

*Available only in China.

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TABLE 2. INFLUENCE OF HARDENERS

Blocked isocyanate hardeners tend to yield the lowest gloss values and smoother films in formulations with Isocryl H-1871. Optimal matting properties and smooth films are best achieved utilizing Resiflow P-64F as the flow control agent.

If formulated with:	Rucote 102				Crylcoat 4890-0			
	Ni-2*	B-1530**	EF-403*	BF-1540**	Ni-2	B-1530	EF-403	BF-1540
Polyester	29.07	29.07	28.62	29.31	29.70	29.70	29.29	29.91
Isocryl H-1871	29.07	29.07	28.62	29.31	29.70	29.70	29.29	29.91
Hardener	10.16	10.16	11.07	9.68	8.90	8.90	9.71	8.48
R-960 Chemours	30	30	30	30	30	30	30	30
Benzoin	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Butaflow BT-71	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Resiflow P-64F	1	1	1	1	1	1	1	1
60° gloss	19	24	30	43	17	21	42	38

*Supplied by Covestro

**Supplied by Evonik

TABLE 3. INFLUENCE OF RESIFLOW P64F AND ORGANIC ACID

Gloss is dramatically influenced by the choice of flow control agent. Using Resiflow P-64F (carboxyl functional) yields lower gloss compared to formulations with Resiflow PL-200. Matte finishes using Resiflow P-64F can be lowered further by incorporating DDDA (0.5 - 1%). Little effect has been demonstrated by using DDDA in formulations with Resiflow PL-200.

	Rucote 102				Crylcoat 4890-0	
	PL-200	PL-200 + DDDA	P-64F	P-64F + DDDA	P-64F	P-64F + DDDA
Rucote 102 Stepan	29.07	29.07	29.07	29.07		
Crylcoat 4890-0 Allnex					29.7	29.7
Isocryl H-1871	29.07	29.07	29.07	29.07	29.7	29.7
Crelan NI-2 Covestro	10.16	10.16	10.16	10.16	8.90	8.90
R-960 Chemours	30	30	30	30	30	30
Benzoin	0.5	0.5	0.5	0.5	0.5	0.5
Butaflow BT-71	0.2	0.2	0.2	0.2	0.2	0.2
Resiflow PL-200	1	1				
Resiflow P-64F			1	1	1	1
DDDA		0.5		0.5		0.5
60° gloss	49	56	19	9	17	11

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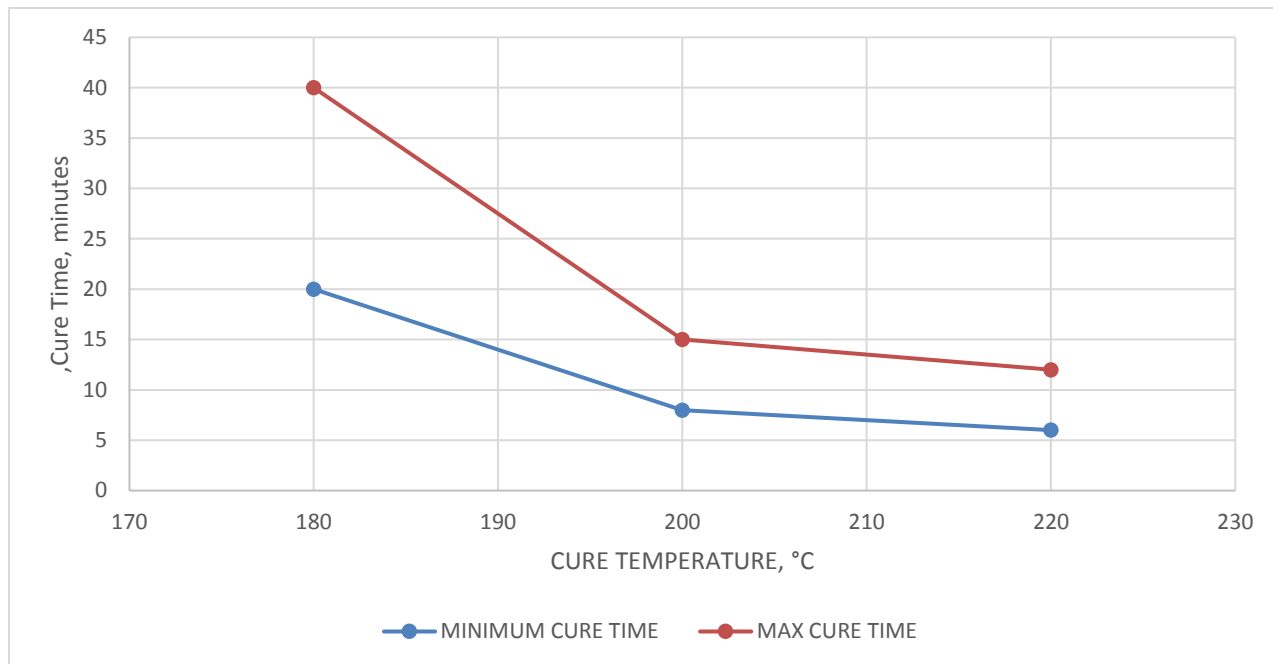


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CURE WINDOW:

Cure was determined by 40 in. lbs. Direct Impact, 25 double MEK rubs, Gloss change with ± 3 , and Color change Delta E < 1.0. Pigmented formulations with RUCOTE 102 from TABLE 1 were used to determine cure window.



LOW TEMPERATURE CURE

Isocryl H-1871 can be formulated for cure temperatures as low as 160°C utilizing the following formulations.

Formulation	White	Black
Rucote 102 (Stepan)	283.4	283.4
H-1871	293.6	293.6
Alcure 4450 (Polynt Composites)	98	98
Octaflow ST-70	10	10
Benzoin	5	5
Resiflow P-64F	10	10
Titanium TR-60	270	
Staphyloid AC4030(Sakai Trading)	30	30
Monarch 1300		10
Sachtofine LG		260
Total	1000	1000
Cure	30 min at 160°C	
Gloss		
20°	4.3	1.2
60°	16.9	9.3
85°	37.8	22.1
Direct Impact (n.lb.)	80	40
Reverse Impact (in.lb.)	60	20
MEK (double rubs)	25	25
PCI Smoothness	5	3

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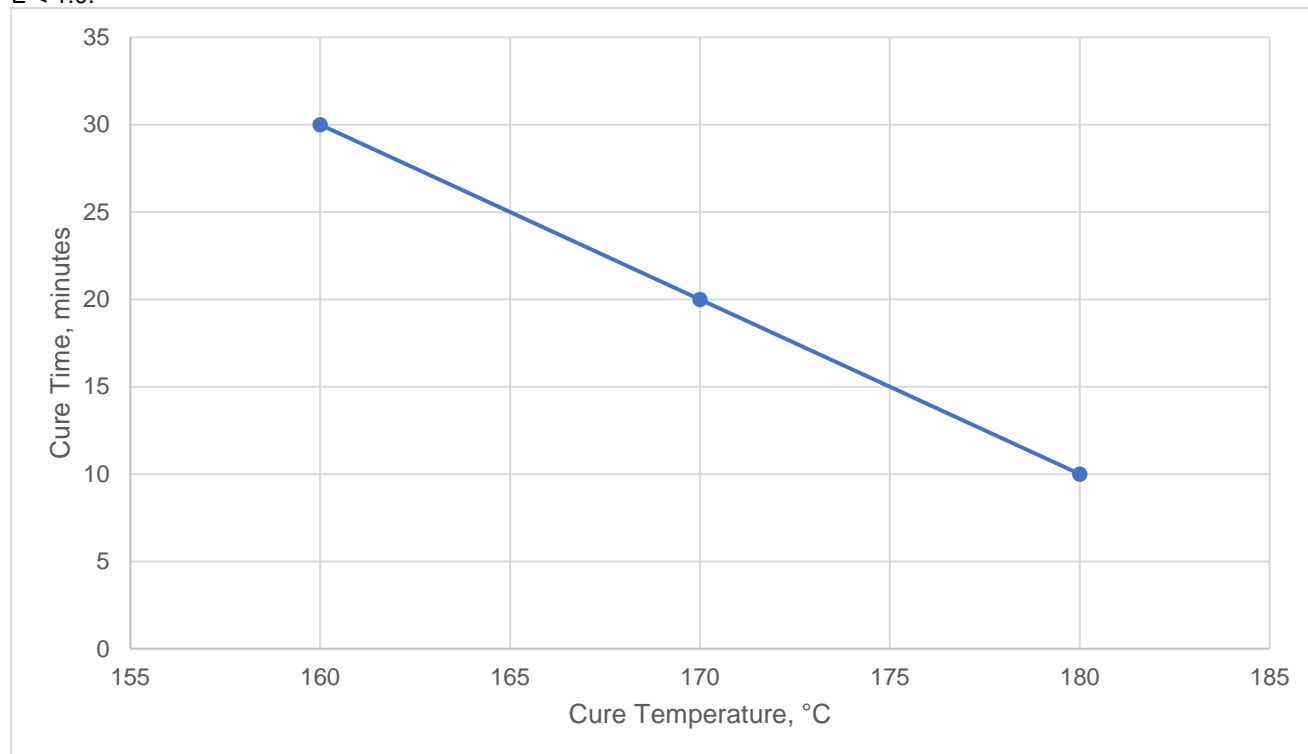


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LOW CURE CURVE

Cure was determined by 40 in. lbs. Direct Impact, 25 double MEK rubs, Gloss change with ± 3 , and Color change Delta E < 1.0.



REGULATORY LISTINGS

The components in this material are either listed or exempt from listing due to polymer exemption criteria for the following chemical listing inventories: AICS (Australia), DSL (Canada), EINECS (Europe), IECSC (China), TSCA (USA).

PACKAGING (NET WEIGHT)

55 lb. / 25 kg in fiberboard box with polyolefin liner.

PRODUCT AVAILABILITY

This product is experimental and subject to change. Please contact your Estron Sales Representative for lead time and availability.

STORAGE AND HANDLING

Store in a dry, cool area and avoid excessive heat. Shelf life of unopened containers is one year from date of shipment. Refer to the SDS for additional information.

CONTACT INFORMATION

807 N. Main Street
P.O. Box 127
Calvert City, KY 42029 USA

(270) 395-4195 PHONE
(270) 395-5070 FAX

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