



# ALIPHATIC - URETHANE TECHNICAL SUMMARY

## General Specifications

Alesta® aliphatic-urethane powders are designed for decorative end service applications where surface smoothness and/or exterior durability is a requirement. These coatings offer excellent flow characteristics, which provide the high surface Distinctness of Image (DOI) inherent to this chemistry. These flow characteristics are also responsible for the lack of edge coverage.

Aliphatic-urethanes can be formulated in premium durability powders, and graffiti-resistant products. Many aliphatic-urethanes have a variety of formal recognitions from Underwriters Laboratories, Caterpillar®, and automotive companies.

Aliphatic-urethanes usually employ a blocked catalyst curing mechanism that requires the substrate to reach threshold temperature before curing starts. \*A small amount of volatile is emitted during cure which is free from regulation. Coating thickness should be kept below 3 mils to avoid foam formation in cured films that can affect appearance and performance.

## Typical Performance Properties

Physical performance results were measured using 24-gauge Bonderite 1000 Parcolene® 60 steel panels with 1.5-2.0 mils of a high gloss formulation. Heavier ware require longer cure times or higher temperatures. Low gloss or textured finishes may require longer cure times. Physical properties typically decrease with decreasing gloss. Since results are formulation dependent, product specific testing is recommended.

### Typical Film Thickness

\*1.5-3.0 mils

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### Cure Schedules

<b>F-cure</b>	<b>L-cure</b>
15 minutes at 375°F	10 minutes at 350°F
10 minutes at 400°F	9 minutes at 360°F
8 minutes at 425°F	8 minutes at 400°F

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### Overbake Stability

Aliphatic-urethane powders can withstand twice the recommended cure time without discoloration.

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### Adhesion (ASTM D-3359, Method B)

Using pressure sensitive tape, no coating is lifted or removed between 1/8" cross-hatch scribes. (Rating = 5B).

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### Pencil Hardness (ASTM D-3363)

Using Eagle Turquoise pencil leads, surface hardness ranges from H to 2H.

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### Impact Resistance (Modified ASTM D-2794)

Using a falling weight impact tester, the film surface withstands up to 160 inch lbs. of direct and reverse impact.

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### Flexibility, Mandrel (Modified ASTM D-522)

The film surface withstands a 180° bend over a 1/8" diameter with no loss of adhesion or surface cracking.

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### Abrasion Resistance (Modified ASTM D-4060)

Coating weight loss after 1,000 cycles of Taber abraser equipped with CS-10 wheels loaded to 1 kg per wheel is approximately 40-60 mg.



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## Corrosion and Chemical Performance Properties

### Salt Spray Resistance (ASTM B-117)

Scribed Bonderite 1000 steel panels in a 5% salt fog at 95°F and 100% relative humidity, exhibit no undercutting, rusting, or blistering of the film after 500 hours exposure. After 1,000 hours the panel exhibits less than 3/16" undercutting. Alodine 1200 aluminum panels show no effect after 1,000 hours.

### Chemical and Solvent Resistance

After ambient temperature immersion in the listed solvent or reagent, the following results were reported for aliphatic-urethane formulations. \*Verification of resistance properties should be made for each chemical proposed for use with a specific coating, as results can vary greatly depending on formulation. Specific test results or additional testing can be acquired upon request.

SOLUTION	1 MONTH	3 MONTHS	6 MONTHS	12 MONTHS
0.1% Chlorine	No Effect	No Effect	No Effect	No Effect
Anti-Freeze (50% Ethylene Glycol)	No Effect	No Effect	No Effect	No Effect
15% Hydrochloric Acid	*No Effect Oxidizes Metallics	Dulls	Dulls, Softens	Blisters, Softens
40% Hydrochloric Acid	Discolors, Dulls	Discolors, Dulls	Discolors, Dulls	Discolors, Dulls
15% Sulfuric Acid	*No Effect Oxidizes Metallics	*No Effect Oxidizes Metallics	*No Effect Oxidizes Metallics	*No Effect Oxidizes Metallics
40% Sulfuric Acid	*No Effect Oxidizes Metallics	*No Effect Oxidizes Metallics	*No Effect Oxidizes Metallics	*No Effect Oxidizes Metallics
Isopropyl Alcohol	Dulls, Softens	Dulls, Softens, Crazes	Dulls, Softens, Crazes	Dulls, Softens, Crazes
Acetone	Wrinkles, Softens - 1 hour		Test Terminated - 1 hour	
Methyl Ethyl Ketone	Wrinkles, Softens - 1 hour		Test Terminated - 1 hour	
Brake Fluid D.O.T. Type 3	Dulls, Softens - 1 hour		Test Terminated - 7 days	
Dow Oven Cleaner	Dulls, Softens, Discolors - 24 hours		Test Terminated - 3 to 8 months	
87 Octane Unleaded Gasoline	Dulls, Softens - 1 hour		Test Terminated - 3 months	

\*Since aliphatic-urethane formulations may contain ingredients which enhance or detract from chemical resistance, performance has been summarized for this chemistry. This chart is intended as a general guide for chemical resistance.

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