



# North American Coating Laboratories Abrasion Resistant Hard Coating Technical Data Sheet

North American Coating Laboratories polysiloxane based thermally cured hardcoating is designed for dip coating applications and provides excellent abrasion resistance, chemical resistance and outdoor durability. North American Coating Laboratories polysiloxane based thermally cured hardcoating can be used on variety of substrate materials. North American Coating Laboratories polysiloxane based thermally cured hardcoating is ideally suited for applications on polycarbonate parts such as automotive, aerospace, architectural, and mass transit glazing. North American Coating Laboratories polysiloxane based thermally cured hardcoating is also ideal for other applications where optical clarity and high durability are required.

## Key Performance Properties

- Primer-Free Adhesion to Polycarbonate or PMMA.
- Abrasion Resistance
- Chemical Resistance
- Optical Clarity
- Outdoor Durability

## Solution Properties

	Typical Values	Test Method
% Solids	31-33	104
Viscosity at 25°C	<10.0 cps	109B
Specific Gravity	1.01 G/ML	120
ph	4.4-5.2	110
% Water	12-14	111A
% Methanol	30-32	111A
% Isopropanol	20-22	111A
% Acetic Acid	3-4	112

## Cured Coating Properties

**Sample Preparation:** The following procedures were carried out in a temperature and humidity controlled Class 100 environment. 1/8" x 6" x 4" polycarbonate panels were cleaned with hexane and isopropanol and then blown dry with ionized nitrogen. The panels were dip coated under static conditions from a small container of North American Coating Laboratories polysiloxane based thermally cured hardcoating using a withdrawal rate of 10 inches/minute (4.2 mm/second). The coated parts were dried under ambient conditions for 30 minutes and cured in an oven at 82°C (180°F) for 4 hours.

**Specifications:** The coating solution properties and cured coating properties listed herein represent typical values for North American Coating Laboratories polysiloxane based thermally cured hardcoating and are not meant as specifications.



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## Outdoor Durability on Polycarbonate

Location	Adhesion	Light Transmission	Taber Abrasion
Initial	100	>90	<2.5 @ 100 <6.0 @ 500
Arizona 3 year exposure	100	>90	<2.5 @ 100 <6.0 @ 500
Florida, 3 year exposure	100	>90	<2.5 @ 100 <6.0 @ 500

Laboratories polysiloxane based thermally cured hardcoating at less than 25% RH can result in problems with flow lines and can contribute to poor adhesion. Humidity

Exposure over 45% RH can result in haze due to the formation of condensate on the wet coating surface. Prior to coating, parts should be clean and free of any possible surface residues including adhesives that may have been left by masking. Adhesive masked polycarbonate sheet should be wiped down thoroughly after removal of the masking using a soft rag wetted with a solution of aliphatic hydrocarbons (e.g., hexanes). Then, the sheets should be wiped down with isopropanol and blown off with filtered ionized air.

For application on polycarbonate, North American Coating Laboratories polysiloxane based thermally cured hardcoating should be cured according to the Recommended Operating Guidelines listed on page #3.

	Typical Values
Coating Thickness	3.0-5.0 $\mu$ m
Refractive Index	1.43
Taber Abrasion ( $\Delta$ % Haze): 100 Revolutions 500 Revolutions	<3 <7
Adhesion	100%
Chemical Resistance: Acetone 1% NaOH 1% HCl Windex	No effect No effect No effect No effect No effect

## Instructions for Use

**Application Environment:** North American Coating Laboratories polysiloxane based thermally cured hardcoating should be applied in a clean (preferably Class 100), temperature and humidity controlled environment. Recommended conditions for application are 20 - 25°C and 25-45% relative humidity (RH). Application of North American Coating

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### Solution Management

For optimum performance, North American Coating Laboratories polysiloxane based thermally cured hardcoating solution should be maintained in a % solids range of 31-33%. Higher or lower solids can cause appearance problems or lead to a coating deposition that is either too thick or too thin, respectively. The % solids should be measured on a regular basis and adjusted as needed through the addition of a 70/30 mixture of methanol and isopropanol. It is also recommended that the acetic acid concentration be checked and adjusted periodically. A low acetic acid concentration can cause adhesion problems when North American Coating Laboratories polysiloxane based thermally cured hardcoating is used on polycarbonate parts.

Currently North American Coating Laboratories services clients in the automotive, aeronautic, consumer electronic, military, medical, and ophthalmologic fields as well as many others. Our customers range from high end sunglass manufacturers to military attack planes. Because of the ubiquitous nature of our technology we are able to add value and increase the performance of virtually any optical element that light passes through or that images are viewed through.

**For more information** on North American Coating Laboratories Abrasion Resistant Hard Coating please contact North American Coating Laboratories at 866-216-6225, or visit our website at [www.nacl.com](http://www.nacl.com).