

# 3M™ Automotive Converted Optically Clear Adhesive

## ACO 05U-XXX Series

- High durability for automotive display bonding
- Superior UV durability
- Excellent bonding to curved displays

### Product Description

3M™ Automotive Converted OCA (ACO) films are specialized optically clear adhesives offering excellent clarity and adhesion to display substrates. 3M ACO 05U-XXX is designed for automotive applications requiring high UV durability. 3M ACO 05N-XXX adhesive is UV curable for increased mura resistant and can even bond curved displays.



### Construction

Product	3M ACO 05U-050	3M ACO 05U-100	3M ACO 05U-175	3M ACO 05U-200	3M ACO 05U-250
Adhesive Type:	Acrylic	Acrylic	Acrylic	Acrylic	Acrylic
Adhesive Carrier:	None	None	None	None	None
Approximate Thickness:					
Release Liner:	50 um (2.0 mils) Clear Polyester	50 um (2.0 mils) Clear Polyester	50 um (2.0 mils) Clear Polyester	50 um (2.0 mils) Clear Polyester	50 um (2.0 mils) Clear Polyester
Adhesive:	50 um (2.0 mils)	100 um (4.0 mils)	175 um (7.0 mils)	200 um (8.0 mils)	250 um (10.0 mils)
Release Liner:	75, 100 or 125 um (3.0, 4.0, or 5.0 mils) Clear Polyester	75, 100 or 125 um (3.0, 4.0, or 5.0 mils) Clear Polyester	75, 100 or 125 um (3.0, 4.0, or 5.0 mils) Clear Polyester	75, 100 or 125 um (3.0, 4.0, or 5.0 mils) Clear Polyester	75, 100 or 125 um (3.0, 4.0, or 5.0 mils) Clear Polyester

## Typical Physical Properties and Performance Characteristics

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

### Performance to Environmental Conditions:

The following environmental tests were conducted in the 3M laboratory under the conditions specified without any appreciable deterioration in visible appearance (no bubbles, delamination, haze <0.2%, b\* <1). Sample construction is cover glass/ACO 05U-XXX/cover glass.

	Condition	Duration
High Temperature	+105°C	1000 hours
Low Temperature	-40°C	1000 hours
High Temp/Humidity-1	+65°C/90%RH	1000 hours
High Temp/Humidity-2	+85°C/85%RH	1000 hours
Thermal Shock	-40°C and +85°C (1 hour dwell, <1 min ramp time)	300 cycles
UV	.55 W/m <sup>2</sup> at 340nm	1000 hours

### Peel Adhesion:

ASTM D3330 modified, 180 degree peel from glass, 1 cm wide peel strips, 12 in/min (305 mm/min), 2.0 mil polyester backing, 3M ACO 05U-XXX cured 3J/cm<sup>2</sup>

Peel Adhesion to Glass	
Dwell Time	3 days dwell at 25°C/50%RH
Units	N/cm
3M ACO 05U-250	14.0

### Color:

Ultra Scan Pro (Hunter Lab), ASTM E308, D65/10°  
3M ACO 05U-XXX on LCD glass, uncured

3M ACO 05U-250
L* = 96.4
a* = -0.53
b* = 0.49

### Refractive Index: 3M ACO 05U-XXX uncured and cured (3J/cm<sup>2</sup>)

(+ 0.0005 Metricon measurements)

	3M ACO 05U-XXX		
	405 nm	532 nm	633 nm
Uncured	1.4916	1.4798	1.4750
Cured	1.4909	1.4794	1.4747

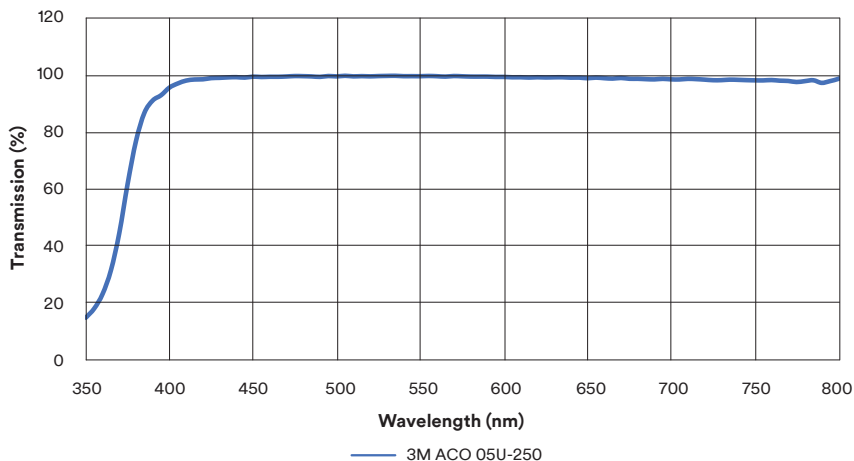
**Haze:**

Haze is measured according to ASTM D1003-92, 3M ACO 05U-XXX Auto on LCD glass, uncured.

3M ACO 05U-250
0.16%

**Transmission Curve:**

Transmission vs. Wavelength (Corrected for Reflection Loss of LCD) for 3M ACO 05U-250 on Glass



**Typical Electrical Properties of 3M™ ACO 05U-XXX at Room Temperature**

ASTM-D150-92. 3M ACO 05U-XXX cured 3J/cm<sup>2</sup>

**Dielectric Constant:**

3M ACO 05U-XXX	
Frequency (kHz)	Dielectric Constant
100	4.1
500	3.9

## Suggested Lamination Process

Step 1: Remove secondary liner, and then laminate 3M ACO 05U-XXX Auto to first adherent substrate by roller at room temperature

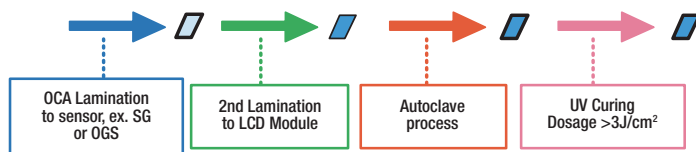
Recommendation: roller pressure 0.1 – 0.2 MPa, roller speed 0.5 – 1 m/min

Step 2: Remove primary liner, and then laminate 3M ACO 05U-XXX Auto/first adherent to second adherent by vacuum lamination

Recommendation: Vacuum condition < 50 Pa, pressure around 0.1 – 0.2 MPa

Step 3: Autoclave process recommendation: 30-60°C/3-5kgf/cm<sup>2</sup>/20-30 min

Step 4: UV curing with minimum 3J/cm<sup>2</sup> dosage



## UV Cure Guidance

- UV range: 340-375nm (max absorption = 342nm)
- Minimum UV dosage and intensity: 3 J/cm<sup>2</sup>, 10 mW/cm<sup>2</sup>
- Suggest using lower wavelengths of the UV-A spectra. Suitable UV sources would be Fusion D bulb and medium pressure Hg.
- LED sources, which output at longer UV-A wavelengths would be less ideal.

## Storage

- Avoid applying pressure or resting objects on the product to prevent marking, denting, or deforming the surface.
- Wear gloves to prevent fingerprints or nail marks when handling.
- Product needs to be unpacked and handled in a clean-room facility.
- Product must be protected from light exposure.
- Store in sealed, foil bag under -20°C to 30°C and less than 70% relative humidity. If removed from cold storage, ensure no condensation on packaging.



### 3M Display Materials & Systems Division

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## Regulatory

For regulatory information about this product, please contact your 3M representative.

## Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes reliable, but the accuracy or completeness of such information is not guaranteed.

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