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3M Display Materials & Systems Division | Technical Data 2024

3M™ Automotive Converted Optically Clear Adhesive Film (ACO 03U-XXX Series)

- **XXX represents thickness between 50 & 250 µm (availability of samples and product may vary)**
- **High durability in reliability testing**
- **High conformability to surfaces steps**
- **Superior mura resistance**

Product Description

3M™ Automotive Converted OCA (ACO 03U-XXX) Series film is a specialized optically clear adhesive offering clarity and adhesion to various transparent display substrates. 3M ACO 03U-XXX Series film is designed for applications that require soft OCA for filling thick ink step (lens border frame), ITO compatibility and high adhesion. 3M ACO 03U-XXX is UV curable which makes it suitable for film touch panel and display bonding applications.

Product Construction

Product	3M ACO 03U-050	3M ACO 03U-100	3M ACO 03U-200	3M ACO 03U-250
Adhesive Type:	Acrylic	Acrylic	Acrylic	Acrylic
Adhesive Carrier:	None	None	None	None
Approximate Thickness:				
Release Liner:	50 µm (2.0 mils) Clear Polyester			
Adhesive:	50 µm (2.0 mils)	100 µm (4.0 mils)	200 µm (8.0 mils)	250 µm (10.0 mils)
Release Liner:	75, 100 or 125 µm (3.0, 4.0, or 5.0 mils) Clear Polyester			

The 3M family of optically clear adhesives for automotive displays are usually available in two forms. 3M Automotive Roll OCA (ARO) comes in roll good form and 3M Automotive Converted OCA (ACO) is available in die-cut form.

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.

Environmental Testing:

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 and minimal change in color). Sample construction is optical glass/3M ACO 03U-XXX Series film/optical 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)	>500 cycles*
UV	0.55 W/m^2 at 340nm, Daylight filter	>500 hours*

*For specifics on duration and color, contact a 3M expert

Peel Adhesion:

ASTM D3330 modified, 180 degree peel from glass, 1cm wide peel strips, 12 in/min (305 mm/min), 2.0 mil polyester backing, 3M ACO 03U-XXX Series film, cured (3J/cm^2).

Peel Adhesion to Glass		
Dwell Time	20 min dwell at 25°C/50%RH	3 days dwell at 25°C/50%RH
Units	N/cm	N/cm
3M ACO 03U-050 film	7.1	11.1
3M ACO 03U-250 film	9.9	15.8

Color:

Ultra Scan Pro (Hunter Lab), ASTM E308, D65/10° 3M ACO 03U-XXX Series film on LCD glass, uncured.

3M ACO 03U-XXX Series film			
3M ACO 03U-050 film	L* = 97.0	a* = -0.01	b* = 0.15
3M ACO 03U-250 film	L* = 97.0	a* = 0.00	b* = 0.20

Refractive Index:

(+ 0.0005 Metricon measurements from standard deviation of ellipsometry) 3M ACO 03U-XXX Series film, uncured and cured (3J/cm^2)

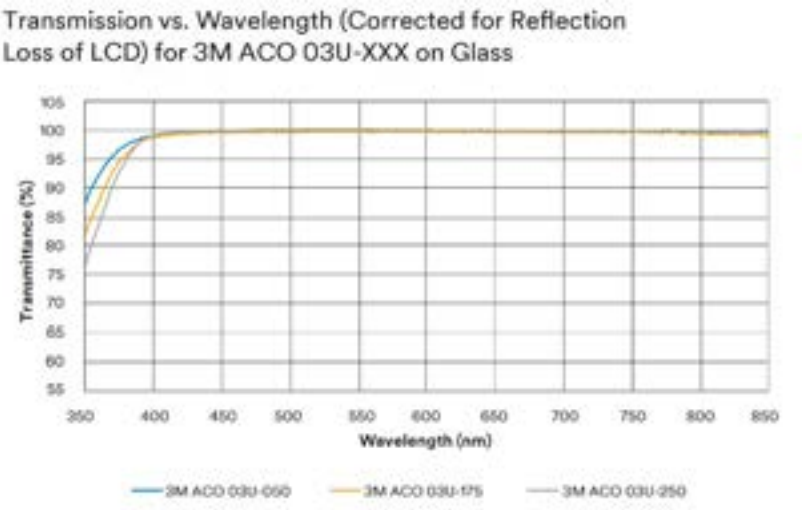
3M ACO 03U-XXX Series film			
	405 nm	532 nm	633 nm
Uncured	1.4879	1.4765	1.4717
Cured	1.4903	1.4783	1.4735

Haze:

Haze is measured according to ASTM D1003-92, 3M ACO 03U-XXX Series film on LCD glass, uncured.

3M ACO 03U-050 film	3M ACO 03U-250 film
0.1%	0.2%

Transmission Curve:



Typical Electrical Properties at Room Temperature

ASTM-D150-92. 3M ACO 03U-XXX Series film cured (3J/cm^2)

Dielectric Constant:

3M ACO 03U-XXX Series film	
Frequency (kHz)	Dielectric Constant
100	4.2
500	3.9

Suggested Lamination Process

Step 1: Remove secondary liner, and then laminate 3M ACO 03U-XXX Series film to first adherent substrate by roller at room temperature

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

Step 2: Remove primary liner, and then laminate 3M ACO 03U-XXX/first adherent to second adherent by vacuum lamination (if rigid-to-rigid bonding)

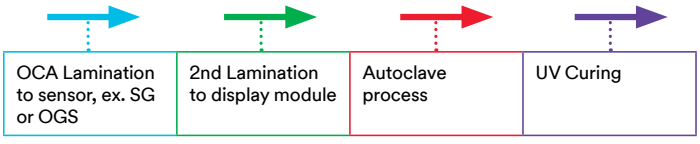
Recommendation: Vacuum condition < 50 Pa, pressure around 0.1 – 0.2 MPa

Step 3: **Autoclave process recommendation:** 30-60°C/3-5kgf/cm2/20-30min

Step 4: UV curing with minimum 3 J/cm^2 dosage

UV Cure Guidance

- UV range: 340-375nm (max absorption = 342nm)
- Minimum UV dosage and intensity: 3 J/cm^2, 10 mW/cm^2
- 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.



Technical Information

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

Product Use

Many factors beyond 3M's control and uniquely within the user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for the user's method of application.

Regulatory

For regulatory information about this product, please refer to the Product Article Information Sheet (AIS) and Regulatory Data Sheet (RDS) that can be obtained at 3M.com/3M/en_US/company-us/SDS-search searching by the product trade name. The RDS provides product responses to various regulations (such as the EU Restriction on Hazardous Substances (RoHS) Directive, the EU REACH Substances of Very High Concern (SVHC)), halogen content, chemicals of concern and more. For additional regulatory information, please contact your 3M representative.

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.
- For additional storage conditions see products customer quality specifications (CQS) document.

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