AgeNT-75

AgeNT™

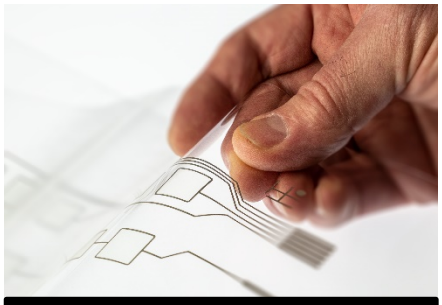
Hybrid Transparent Conductive Films

AgeNT-75 is a **CNT Hybrid Transparent Conductive Film (TCF)** made by printing Carbon Nanotube (CNT) ink onto Silver Nanowire (AgNW) film to create a flexible TCF that is substantially better than either CNTs (more conductive) or AgNWs (more robust and lower cost patterning).

AgeNT-75 - 75 Ω/□ at 98% VLT

Key Features:

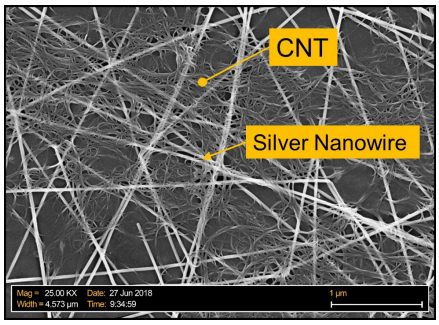
- ✓ Low sheet resistance with extremely high optical transparency
- ✓ Low materials and processing costs for creating patterned TCFs
- ✓ Can be flexed or formed for flexible, wearable, or 3D products
- ✓ Resistance, adhesion and optical properties are very stable with environmental aging.



Transparent capacitive touch sensors made from AgeNT-75
(image courtesy of ClickTouch)

Target Applications

- ✓ Transparent Touch Sensors
- ✓ Touch Screens
- ✓ Transparent Electrodes for Biosensors
- ✓ Transparent Electrodes for Lighting



How AgeNT Works:

CNT ink is formulated for screen printing and is comprised of a mixture of our single-walled CNTs (CoMoCAT™ technology), an optically clear polymer binder and our proprietary ink vehicle (V2V™ technology). The grade of CNT ink that is used for making AgeNT-30 product structures is **CHASM-AGENT-VC200**. CNT ink is available in standard 1L bottles. AgNW film is made by coating AgNWs to random network of AgNWs on a continuous roll of clear plastic film substrate. AgNW layer is ~ 0.2µm thick. There is one substrate option for AgeNT-75: 5-mil PET film with hard coat (HC) on the backside. The grade of AgNW film that is used for making AgeNT-75 product structures is **CHASM-AGENT-AW210**. AgNW film is available in standard sheet size of approx. 300mm X 600mm and can also be provided in approx. 600mm or 1,200mm wide rolls.

AgeNT-75

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PE Release Liner
75 Ω/□ AgNW coating
5 mil PET film
Hardcoat

AW210

AgeNT-75

Supporting Data

Fabrication Process

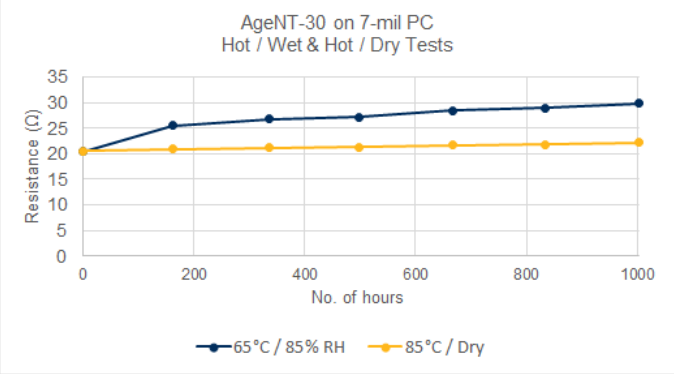
Flexible printed circuit (FPC) patterns are created by: 1) screen printing CNT ink on top of the AgNW film; 2) hot air drying at ~ 100°C; 3) chemically etching the exposed AgNW areas. Typical etchant is Ferric Nitrate (industry standard for etching Silver). This affordable circuit patterning process is suitable for mass production and is referred to as "Print / Etch / Done". It has fewer steps & less waste streams than photolithographic etching, and is much faster than laser ablation. The CNT ink is a multi-functional material that acts as a printed etch mask (for low-cost patterning) and also encapsulates the AgNWs (to create a more robust TCF).

Optoelectronic Properties

	AgeNT-75 on 5-mil PET	
	TCF + Substrate	TCF Only
Sheet Resistance (Ω/□)	75	75
VLT (%)	89.9%	98.1%
Haze (%)	1.4%	0.2%
L*	95.30	-
a*	-0.37	-
b*	1.43	-

Optical properties are measured by R-chek 4-point resistance meter, BYK Haze-gard transparency meter or X-Rite spectrophotometer

Environmental Stability



Resistance, adhesion and optical properties exhibit very stable behavior with environmental aging. *Note: The test results shown reference AgeNT-30. Tests are underway for AgeNT-75 and results are expected to be similar.*

Let us help you!

The material scientists and engineers at CHASM's Application Development Center are available to help you integrate AgeNT into your application. Email sales@chasmtek to request additional information.