

# CHASM AgeNT™ Express

## Hybrid Transparent Conductive Films



### PRODUCT DESCRIPTION

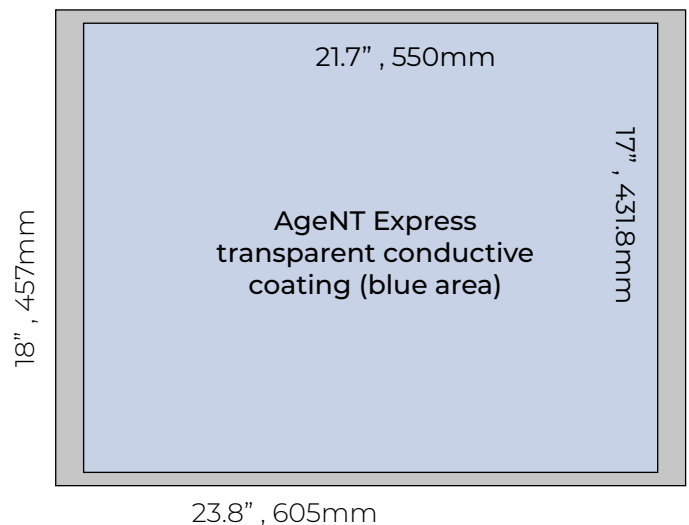
AgeNT Express is a pre-coated transparent conductive film from CHASM, facilitating the use of CHASM's AgeNT printed electronics platform while eliminating the need for CNT printing. AgeNT Express 10, 30 and 75 films are single side coated with silver nanowire and a carbon nanotube ink printed on top. AgeNT-1 G2 and G3 Express films are a combination of transparent copper metal mesh with a carbon nanotube ink printed over the top.

AgeNT Express is ideal for those looking to incorporate transparent, flexible heaters, EMI / RFI shielding and for other transparent conductive components where the parts can be cut from a solid area AgeNT coated film. Connections to the transparent conductive layer are typically printed with silver ink whether for the heater bus bars or connection pads.

### HOW AgeNT EXPRESS WORKS

AgeNT Express is a combination of a flexible, transparent and conductive substrate (either a silver nanowire or copper metal mesh) and CHASM's proprietary carbon nanotube ink pre-coated onto the film. When combined, these nanotube hybrid materials create transparent conductive films that are flexible and formable with low patterning costs and superior optoelectronic performance of low sheet resistance at high transparency. Individual conductive circuits can be fabricated by printing desired busbars and/or protective layers then cingulated using a variety of methods including laser, rotary or die cutting.

### FILM DIMENSIONS



### PRODUCT BENEFITS

- No printing of carbon nanotube inks required; utilize cutting edge AgeNT more easily to accelerate product innovation.
- Extremely low sheet resistance with high optical transparency
- Thin & flexible – can be easily be attached to flat or curved plastic or glass surfaces with OCA film
- Resistance, adhesion and optical properties are very stable with environmental aging.

### CONTACT INFORMATION

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## TARGET APPLICATIONS

Applications include transparent RF antennas, transparent heaters, transparent RF / EMI shielding, transparent wiring for micro-LEDs, etc.

- Transparent RF Antennas
- Transparent EMI/RF Shielding
- Transparent Heaters
- Transparent Electrodes for Lighting

## COMPATIBLE INKS AND ADHESIVES

There are many industry standard inks and adhesives that are compatible with AgeNT Express.

These can include:

- Silver inks
- Carbon inks for overprinting on silver inks for areas such as connector fingers to prevent silver migration and increase surface hardness. Carbon inks can also be used to overprint silver ink heater bus bars.
- Dielectrics inks as insulation materials, often printed in 2 layers to prevent pinholes.
- Clear overprint varnishes to environmentally protect the AgeNT component surface.
- Clear in mold coatings / tie coats to bond the molding plastic to the AgeNT surface.
- Optically clear (pressure sensitive) adhesives to bond AgeNT films / components to glass or other clear polymer sheets.

For a full list of inks and adhesives that can be used with AgeNT films, please see the [CHASM compatible inks and adhesives list](#).

## LASER ABLATION

AgeNT Express films can be laser ablated with either 1030-1060nm infrared or 515nm green lasers. Please contact CHASM for a service and equipment manufacturers list.

### EXAMPLE 1:

With an IPG Picosecond Marker laser (1030nm), line width was 25 microns.

- For AgeNT 10 Express, Laser power ranged from 4.3 to 20 watts and in all cases the 25 micron gaps were clean.
- For AgeNT 1 Express, Laser power ranged from 7.8 to 20 watts and in all cases the 25 micron gaps were clean.

### EXAMPLE 2:

With a 515nm FS laser, gaps of <30 microns were achieved.

- Focal length: 160mm
- Laser spot size: 10µm

## IMPORTANT

- Remove top cover film prior to printing
- During printing / curing / handling, care should always be taken not to scratch the top and bottom sides of film.
- AgeNT Express films are heat treated at 284°F / 140°C for 2.5 minutes prior to coating to dimensionally stabilize the film. It is recommended that any conductive / functional inks printed on AgeNT Express films have cure temperatures  $\leq 284^\circ\text{F}$  /  $\leq 140^\circ\text{C}$ .

AgeNT Express films can be further heat stabilized before silver printing up to 284°F / 140°C but all cover films should be removed.

## STORAGE

AgeNT & AgeNT Express films should be bagged and stored flat in a cool dry place away from direct sunlight.

## DISCLAIMER

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on CHASM's accumulated experience as of the date of publication. Product performance will vary based on application and operational environment, so CHASM Advanced Materials Inc. is not liable for the suitability of our product for the intended applications and results.

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## FILM STRUCTURES

### AgeNT-1 G2 EXPRESS

P/N CHASM-AGENT-AM210-EX

Cover film - 50 microns
Carbon nanotube ink
1 Ω/□ Copper metal mesh - 2 microns
PET film - 100 microns / 0.004"
PET side protective film - 35 microns

### AgeNT-1 G3 EXPRESS

P/N CHASM-AGENT-AM310-EX

Cover film - 50 microns
Carbon nanotube ink
0.2 Ω/□ Copper metal mesh - 2 microns
PET film - 100 microns / 0.004"
PET side protective film - 35 microns

### AgeNT-10 EXPRESS

P/N CHASM-AGENT-AW121-EX

Cover film - 50 microns
Carbon nanotube ink
10 Ω/□ Silver Nanowire
Polycarbonate (PC) film - 175 microns / 0.007"

### AgeNT-30 (PC) EXPRESS

P/N CHASM-AGENT-AW321-EX

Cover film - 50 microns
Carbon nanotube ink
30 Ω/□ Silver Nanowire
Polycarbonate (PC) film - 175 microns / 0.007"

### AgeNT-30 (PET) EXPRESS

P/N CHASM-AGENT-AW310-EX

Cover film - 50 microns
Carbon nanotube ink
30 Ω/□ Silver Nanowire
Polyester (PET) film - 125 microns / 0.005"
Hardcoat

### AgeNT-75 EXPRESS

P/N CHASM-AGENT-AW210-EX

Cover film - 50 microns
Carbon nanotube ink
75 Ω/□ Silver Nanowire
Polyester (PET) film - 125 microns / 0.005"
Hardcoat

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