

KODAK HCF Film / ESTAR Base

—Put a century of science in your hands—

February 2015



KODAK HCF Film / ESTAR Base is a polyester (PET) film with a proprietary conductive PEDOT/PSS coated in-line during the polyester manufacturing process. The unique manufacturing process produces an exceptionally uniform material, which is optically clear with excellent surface quality.

The manufacturing process produces a flexible conductive film which is a cost-effective alternative to many other conductive films, including indium tin oxide (ITO).

KODAK HCF Film / ESTAR Base can be used as manufactured for many applications where resistive technology is required, or it can be patterned for use with projected capacitive technology.

If a pattern is required, there are currently two options to produce the pattern. The first is to print CLEVIOS™ SET-S as a mask and then process the sheet using CLEVIOS™ Etch to render areas of the sheet non-conductive. When the mask is removed, the result is an invisible pattern, allowing it to be used in display applications. To learn more about the use of CLEVIOS™ materials, please visit www.heraeus-clevios.com. The second method to pattern KODAK HCF Film / ESTAR Base is to use a laser patterning process. While Kodak has not patterned the material using a laser, customers have been successful using a Nd YAG with a wavelength of 1065 nm, max power set at 10 watts and a pulse frequency of 30 kHz. You may need to adjust your settings base on your laser and specific pattern requirements.

Uses

Projected Capacitive Applications

- Touch Displays
- Smart watches
- Appliance Touch Panels

Resistive Applications

- Point of Sales devices
- Resistive Touch Displays
- Kiosk applications
- Membrane Touch Switches

Physical Condition

Roll Integrity

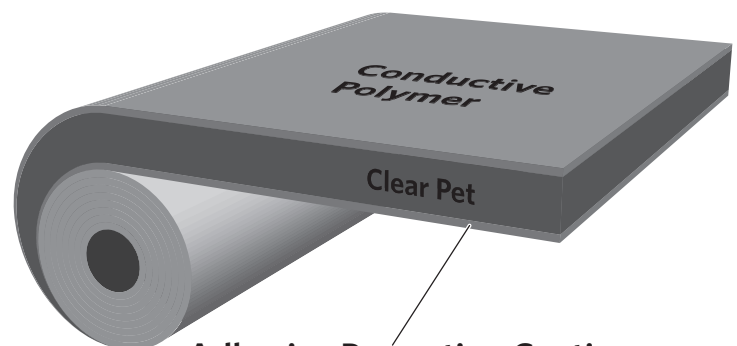
- The edge of the roll will be free of nicks, cuts or visible telescoping greater than ± 6.3 mm (0.25 inches)
- The roll will not contain gauge bands which visibly distort the film surface
- There are no splices or cutouts in the roll

Surface Quality

- Support will be free from surface imperfections which, by their severity or frequency, affect subsequent operations by the customer. Examples of such imperfections are:
 - scratches, bubbles, creases, holes, cinches, surface dirt
- Standards used for the above imperfections are current Kodak internal standards.

Packaging

- Standard core, fiber board or plastic core; inside diameter 152 mm \pm 3 mm (6 inches \pm 0.04 inch)
- Each roll is suitably wrapped to seal the product
- Each roll is horizontal, supported on core ends
- Each container is labeled with product and roll identification



Adhesive Promoting Coating or Conductive Polymer (dual sided)

KODAK HCF Film / ESTAR Base

Properties

| Property | Typical Value | | | | | | Test Method |
|--|---|-----------|------------------|-----------|------------------|-----------|-----------------------------------|
| | 150 ohms /square | | 225 ohms /square | | 385 ohms /square | | |
| Surface Resistivity | 150 ohms /square | | 225 ohms /square | | 385 ohms /square | | 4 point probe |
| PEDOT/PSS Coating Thickness | <0.50 micron | | <0.35 micron | | <0.20 micron | | Calculated nominal thickness |
| | Single Side | Dual Side | Single Side | Dual Side | Single Side | Dual Side | |
| Haze | <1% | <1% | <1% | <1% | <1% | <1% | ASTM D 1003 |
| Visible Light Transmittance | >86% | >79% | >88% | >83% | >90% | >86% | ASTM D 1003 |
| Adhesion | Dry Tape Adhesion, No Removal | | | | | | Kodak Method |
| | Wet Adhesion Rating of Good | | | | | | Kodak Method |
| Environmental Testing | 60°C, 90% RH @ 240 hours <12% change | | | | | | |
| Etching | Material can be laser and chemically etched to create a pattern | | | | | | |
| Thermal Change | ≤ 1.0% Average Machine Direction | | | | | | 30 minutes @ 150°C |
| | ≤ 1.0% Average Transverse Direction | | | | | | |
| Change in resistivity when exposed to: | Acetone | | <10% change | | | | Kodak Method 10 minutes @ 24°C |
| | IPA | | <5% change | | | | |
| | Methanol | | <12% change | | | | |
| | Toluene | | <4% change | | | | |
| | Water | | <8% change | | | | |

SIZES AVAILABLE

| Ohms/Square | CAT No. | Class | Thickness (micron) | Width (mm) (1/2" knurl) | Length (m) |
|--|----------|-----------|--------------------|-------------------------|------------|
| KODAK HCF Films Conductive one side, acrylic coating other side | | | | | |
| 150 | 190 7591 | 6RF1-911T | 127 | 1384 | 914 |
| 225 | 161 8644 | 6RF1-921T | 127 | 1384 | 914 |
| 385 | 743 4467 | 6RF1-931T | 127 | 1384 | 914 |
| KODAK HCF Films Conductivity both sides | | | | | |
| 150 | 123 9896 | 6RF1-912T | 127 | 1384 | 914 |
| 225 | 172 9532 | 6RF1-922T | 127 | 1384 | 914 |
| 385 | 743 3386 | 6RF1-932T | 127 | 1384 | 914 |

Contact your Kodak Account Representative for other product sizes or specific requirements.

MORE INFORMATION

Kodak has many publications to assist you with information about KODAK Products, Equipment, and Materials.

For the latest version of technical support publications for KODAK Industrial Materials Group, please visit Kodak online at <http://www.kodak.com/go/img>.

To find out what PET Films can do for your business, please send us an email at PETproducts@kodak.com.

NOTICE: While the data in this publication are typical of production coatings, they do not represent standards which must be met by Kodak. Varying storage, exposure, and processing conditions will affect results. Kodak makes no guarantee of results and assumes no obligation or liability whatsoever in connection with this information. The company reserves the right to change and improve product characteristics at any time.

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Revised 2-15
KODAK HCF Film / ESTAR Base
KODAK Publication No. E-4058

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