

EddyCus® TF lab 2020A – Anisotropy Tester

P_T_2020A_20



Highlights

- ▶ Contact-free and real time
- ▶ Accurate single-point measurement
- ▶ Manual mapping guided by an easy-to-handle software
- ▶ Measurement of encapsulated layers
- ▶ Characterization of multilayer systems upon request

Applications

- ▶ Touch panel sensors (TPS)
- ▶ Printed electronics
- ▶ Wearable electronics
- ▶ Smart textiles
- ▶ Photovoltaics
- ▶ Smart / switchable films
- ▶ Medical surfaces and devices
- ▶ Biological sensors
- ▶ Aerospace, automotive, transport
- ▶ Semiconductor and memory
- ▶ Energy storage

Device Series

- ▶ Metal thickness (nm, μm)
- ▶ Sheet resistance (Ohm/sq)
- ▶ Emissivity
- ▶ Conductivity / resistivity (mOhm·cm)
- ▶ Electrical anisotropy (%)
- ▶ Weight (g/m^2) and drying status (%)
- ▶ Permeability (H/m) *Beta*

Materials

- ▶ Nanowire films
 - ▶ Conductive NW (Ag, Ni, Pt, Au)
 - ▶ Semiconductor NW (Si, SiC)
 - ▶ Magnetic NW (Fe₃O₄-AgNWs)
 - ▶ Multilayer NW (ZnO/AgNW/ZnO)
- ▶ Carbon Nano Tubes and Buds
- ▶ Fiber reinforced composites
- ▶ Metal meshes, smart meshes
- ▶ Anisotropic grain / domain materials
- ▶ Anisotropic effect / defect directions (cracks, line defects)

SURAGUS GmbH
Maria-Reiche-Strasse 1
01109 Dresden
Germany

For further questions:
+49 351 32 111 520

sales@suragus.com

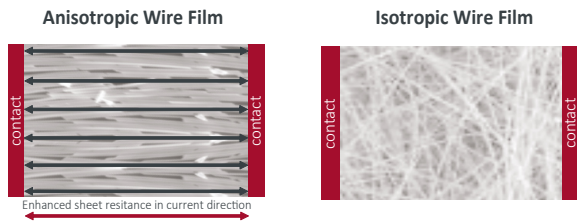
Visit us at:
www.suragus.com
www.suragus.com/calculator
www.suragus.com/EddyCusLab2020

Made and Engineered in Germany 



Anisotropy Term and Concept

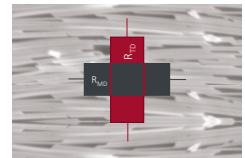
- ▶ Electrical anisotropy refers to a difference in electrical resistance depending on the direction of current flow
- ▶ Wire and mesh structures can have anisotropic resistances
- ▶ Bulk materials with dominant directional characteristics \ effects \ defects can also have electrical anisotropy
- ▶ Anisotropy can be optimized to the layout of the contacts
- ▶ Anisotropy can save material and improve optical transparency to sheet resistance ratio
- ▶ Described by anisotropy direction and strength
- ▶ Both characteristics must be obtained at the same position
- ▶ The anisotropy strength is calculated using the lowest and highest resistance that align in perpendicular directions
- ▶ Inline deposition, eg. slot die coating on moving web, tends to create lower resistances in machine direction “MD” and higher resistance in traversing direction “TD”
- ▶ Calculation as ratio of lowest and highest resistance



$$\text{Anisotropy Ratio} = \frac{R_{\text{HIGHEST}}}{R_{\text{LOWEST}}}$$



$$\text{Anisotropy Ratio} = \frac{R_{\text{TD}}}{R_{\text{MD}}}$$



Device Characteristics

Sheet resistance measurement technology	Non-contact eddy current sensor with directed current induction
Substrates	e.g. foils, glass, wafer, etc.
Substrate area	8 inch / 204 mm x 204 mm (open on three sides)
Max. sample thickness/ sensor gap	1 / 2 / 5 / 10 / 25 mm (defined by the thickest sample)
Sheet resistance range	0.01 – 1,000 Ohm / sq; 1 to 5 % accuracy
Anisotropy range	0.33 – 3 (larger on request)
Device dimensions (w/h/d) / weight	11.4" x 17.5" x 5.5" / 290 mm x 140 mm x 445 mm / 10 kg
Available features	Metal thickness measurement

Device Control and Software

Real Time Measurement

Machine Direction: 17.38 Ohm/Sq (28.06%)

Traverse Direction: 44.56 Ohm/Sq (71.94%)

87.75 % Anisotropy (Absolute)

Set No of Digits: 0.00

Id	Time	Series N.	Value	Unit
20	10:19:23	Sample 1	1.14e+00	Ohm/Sq
21	10:19:23	Sample 2	1.14e+00	Ohm/Sq
22	10:19:40	Sample 3	1.28e+00	Ohm/Sq
23	10:19:40	Sample 4	1.28e+00	Ohm/Sq