

Thermoplastic Polyurethane (TPU) Films for flexible printed electronics applications

Stretching the possibilities of flexible circuits

Platilon®



Powering the potential of printed electronics with TPU Films

Printed electronics revolutionizes innovation by enabling the printing of electronic devices on various surfaces. It reduces costs and space constraints, offers design flexibility, and enables large-scale manufacturing. Meanwhile, this innovation enhances aesthetics and provides practical benefits.

At Covestro, we provide advanced substrate films solutions for printed electronics utilizing our **Platilon®** thermoplastic polyurethane (TPU) Films. Our expertise lies in developing customized monolayer, multilayer, and coextruded films that are tailored to meet your specific requirements.

Possible applications across multiple industries:

For flexible printed electronics, Platilon® TPU Film material caters to a wide range of applications, such as textile and sports equipment, flexible electronics, smart patches, wound dressings, and more. Not only can the TPU Films be printed with standard inks, but they also show good printability with conductive inks, such as silver-based.

Printability with those inks ensures good conductivity and allows sensor technology to be integrated more reliably. Our TPU Films excel in their unique ability to bend, stretch and reliably return to original shape over high cycles and can enhance design, functionality, and performance with flexibility and durability.

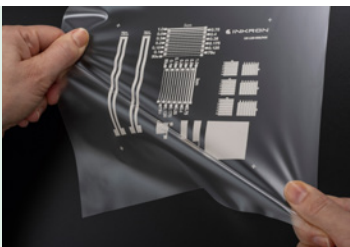


Textile and sports equipment: Integration of electronic components into flexible and wearable materials

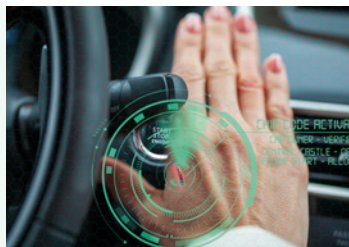


Conveyor belts: Require high flexibility, tensile strength and the ability to embedded circuitry and sensors for monitoring purposes

Flexible electronics: TPU carriers for embedded and printed circuitry enable lightweight designs



Sensors: Integration of RFID tags and other electronic components into formerly "idle" parts, such as load floors and steering wheels



Smart wound dressing: Smart wound dressing that can monitor wounds, detect infections, and provide comfort, as well as personalized treatment



Wearable sensor patches and heart rate monitor: Seamlessly integrated into wearable devices and heart rate trackers, monitoring vital signs, and temperature, thereby improving patient care

Full area heating: Resistive heating in virtually all decorative surfaces in electric vehicles (EVs) including interior trim parts, sunroofs, seats, and door panels



Automotive interior user interface: Custom contoured designs integrating touch controls, sensing, and indication improving safety, convenience, and aesthetics



Unique TPU Films properties:

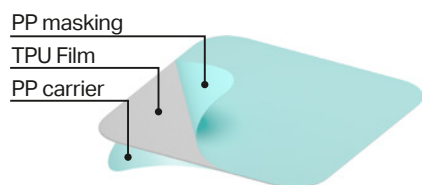
- Excellent printability in high resolution
- Abrasion and heat resistance
- Biocompatibility – skin contact medical grades
- Barrier – air and liquid barrier properties
- Solvent- and plasticizer-free grades
- Tear and puncture resistance
- Flexibility over a wide temperature range
- Ethylene oxide (ETO) / Gamma sterilizable
- High mechanical strength
- Adhesion – natural adhesion to a variety of substrates
- Lightweight
- Breathability
- Elasticity – high elasticity over the entire hardness range
- Sealing – bond with heat or ultrasonics without adhesives

TPU Films portfolio:

Platilon® grade	Thickness range TPU films	Polypropylene (PP) carrier stiffness	Masking	High-resolution printing	Mechanical stability	Hydrolytic stability	TPU Films type
FE* 5101	30 – 100µm	Good	Yes	Excellent	Good	Excellent	Ether-based
FE 9184	30 – 150µm	Excellent	No	Good	Good	Excellent	
MA** 5302	30 – 100µm	Good	Yes	Excellent	Good	Excellent	
MA 5304	30 – 150µm	Excellent	No	Good	Good	Excellent	
U 4201	30 – 150µm	Good	No	Good	Good	Excellent	
FE 9176	50 – 120µm	Excellent	No	Excellent	Excellent	Good	Ester-based
MA 5303	50 – 120µm	Excellent	No	Excellent	Excellent	Good	

*FE: Flexible Electronics / **MA: Medical-Grade

Layer configurations in Platilon® TPU Films:

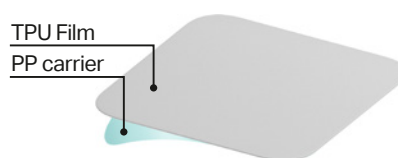


Platilon® MA 5302 / FE 5101

Multi-layer polyether TPU Film optimized for printed electronics

Layer structure:

1. PP masking film to protect the TPU Film printing surface
2. Functional TPU Film 30–100 µm with printing surface
3. Rigid thick PP carrier



Platilon® MA 5303 / FE 9176

Multi-layer polyester TPU Film optimized for printed electronics

Layer structure:

1. Functional TPU Film 50–120 µm with printing surface
2. Rigid thick PP carrier

The road to circular economy with more sustainable films:

Driving towards a circular economy, we are expanding our product portfolio to include alternative raw materials and reduce the dependency on fossil feedstocks. Our Platilon® U 4201 CQ EC series offers **partly bio-based TPU films with a reduced carbon footprint**. And they are a **drop-in solution for the fossil based** equivalent Platilon® U 4201.

Find out more about Specialty Films solutions
and printed electronics:



Solution Center | Films

<https://solutions.covestro.com/en/materials/films>



Solution Center | Printed Electronics

[https://solutions.covestro.com/en/highlights/articles/
theme/processing-technology/printed-electronics](https://solutions.covestro.com/en/highlights/articles/theme/processing-technology/printed-electronics)

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¹ Please see the "Guidance on Use of Covestro Products in a Medical Application" document.

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