

October 1, 2025

Thin and low water permeability textile scaffolds with microdenier fiber for cardiovascular applications

Swati Patel

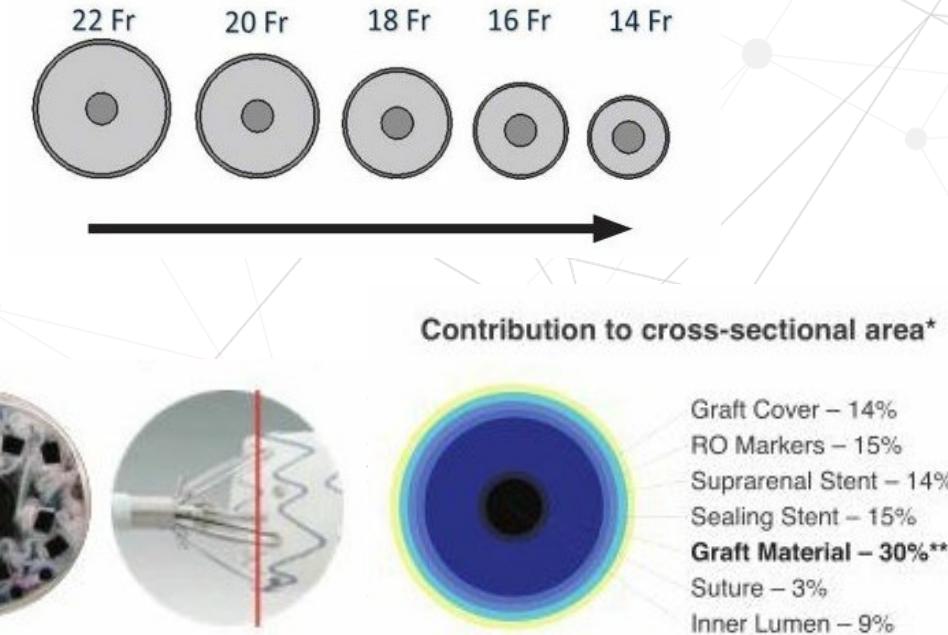
Senior Director, MedTech Product Development



The Push for **Thinner, Lower-permeability Scaffolds**

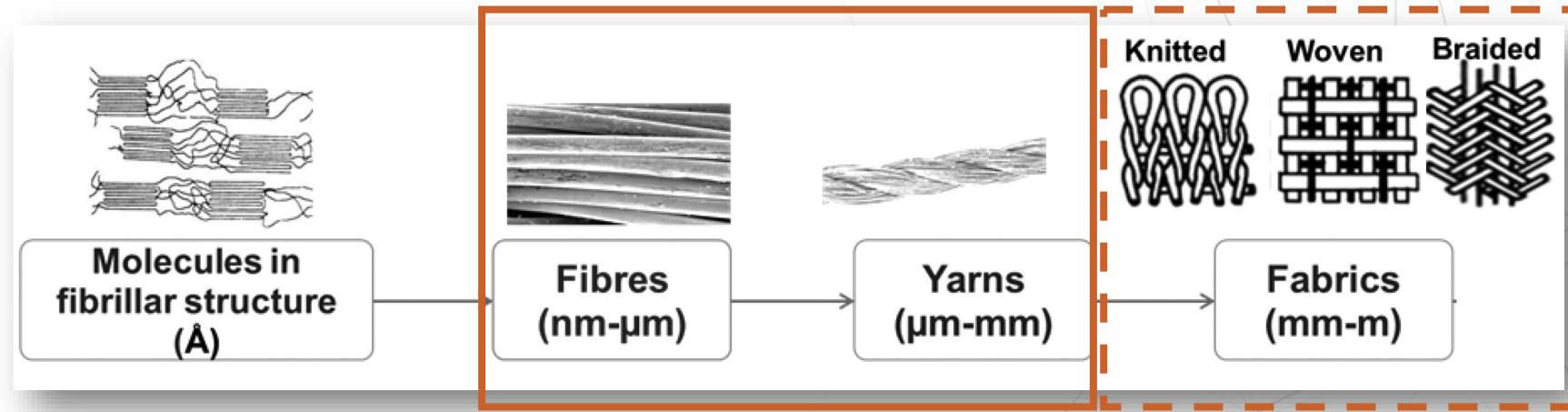
Meeting the Demand for Textile Innovation in Cardiovascular Devices

- Transcatheter devices aim for reduced delivery profiles while still meeting essential functional criteria like blood-tightness and mechanical strength (e.g., suture retention)
- The industry demands thinner fabrics with lower permeability



A Comprehensive **Approach to Textile Design**

Polymers to Fabric



**POLYMER &
CHEMISTRY**

**FIBER &
YARN
PROPERTIES**

**FABRIC
PROPERTIES**

Solutions: From Microfibers to Ultra-fine Filaments

Solution	Result
✗ Lower denier yarn	Compromises durability, strength, and suture retention
✗ Reduced density	Compromises durability, strength, and suture retention
✗ Reduced density + coating	Introduces new material, raising regulatory concerns for immediate needs
✓ Micro-fiber yarn	Traditional macro/micro-fiber textiles (10-12 µm filaments) meet many needs, but demand for greater reductions in thickness and permeability is growing.



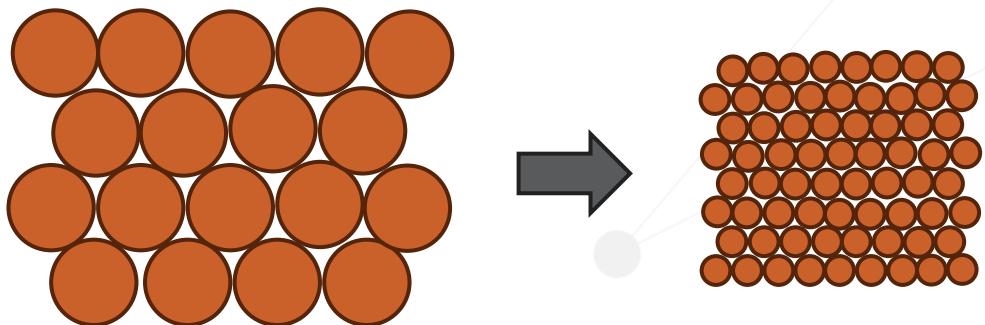
Innovating around the yarn



Transitioning from Standard to Low DPF

Shifting from Microfibers to Ultra-fine Filaments

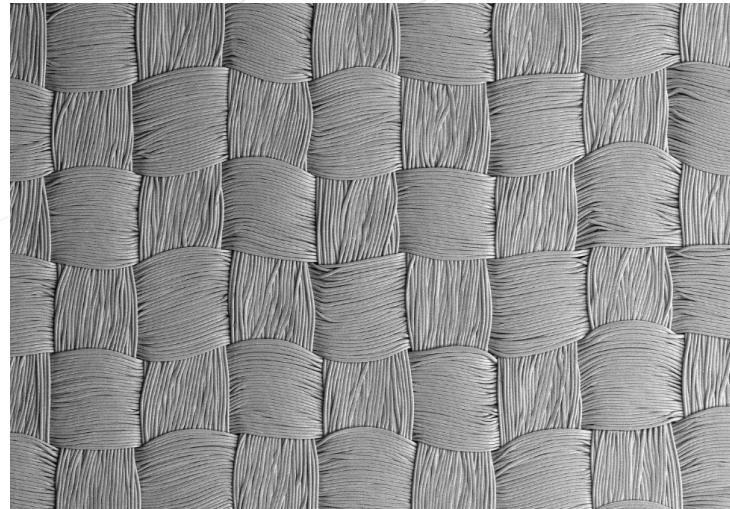
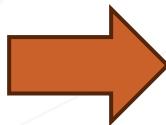
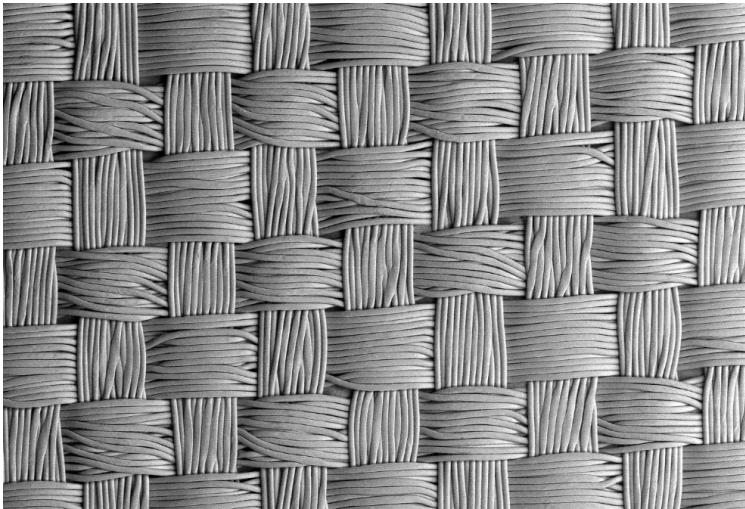
- Traditional low-profile **20/18** PET consists of **18 filaments** with diameters around 10 – 12 μm .
- Solesis' low-DPF **20/68** polyester yarn innovation replaces these with **68 filaments**, each measuring roughly **3–5 μm** —*maintaining the same yarn denier but significantly increasing surface area and coverage*



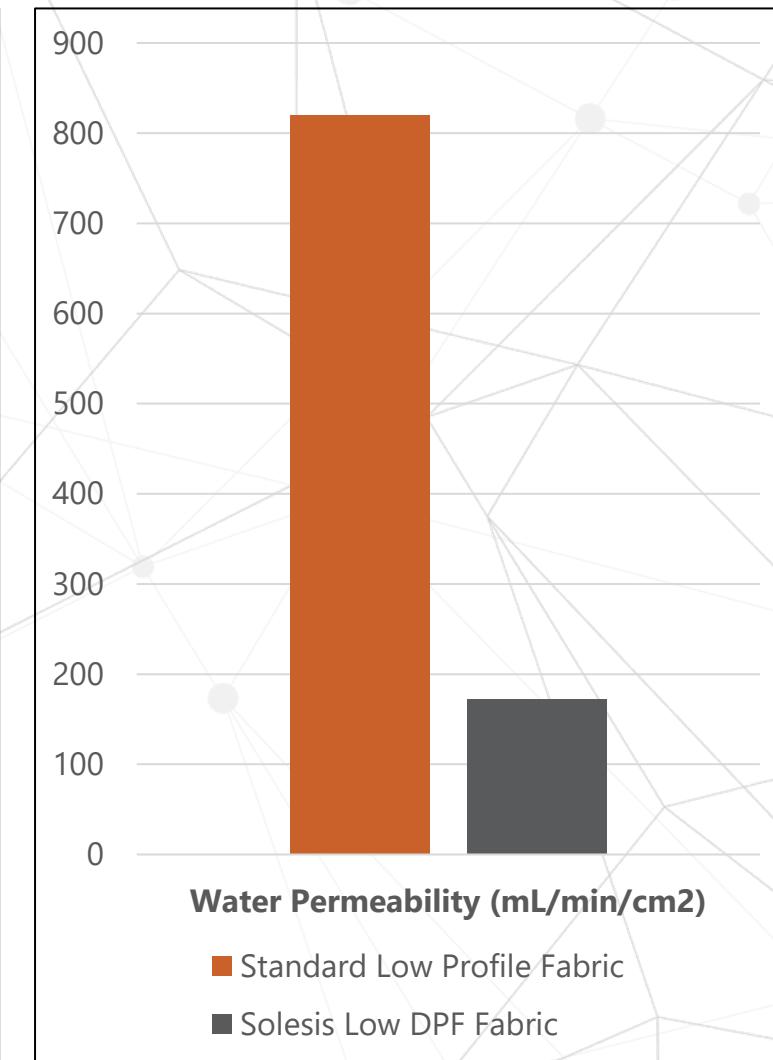
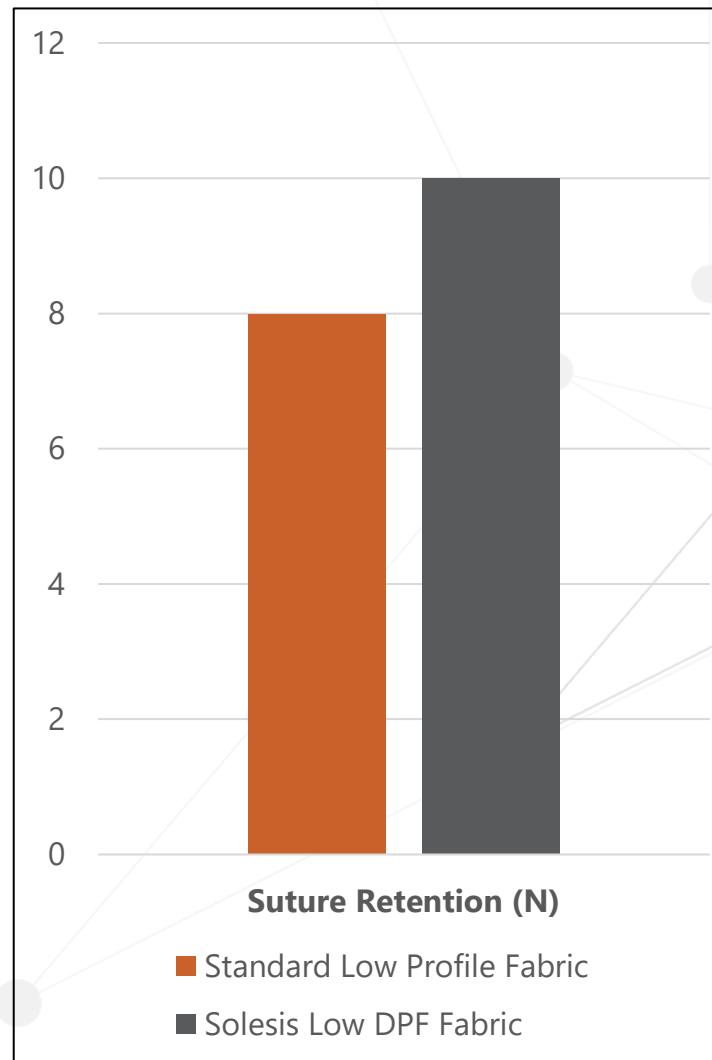
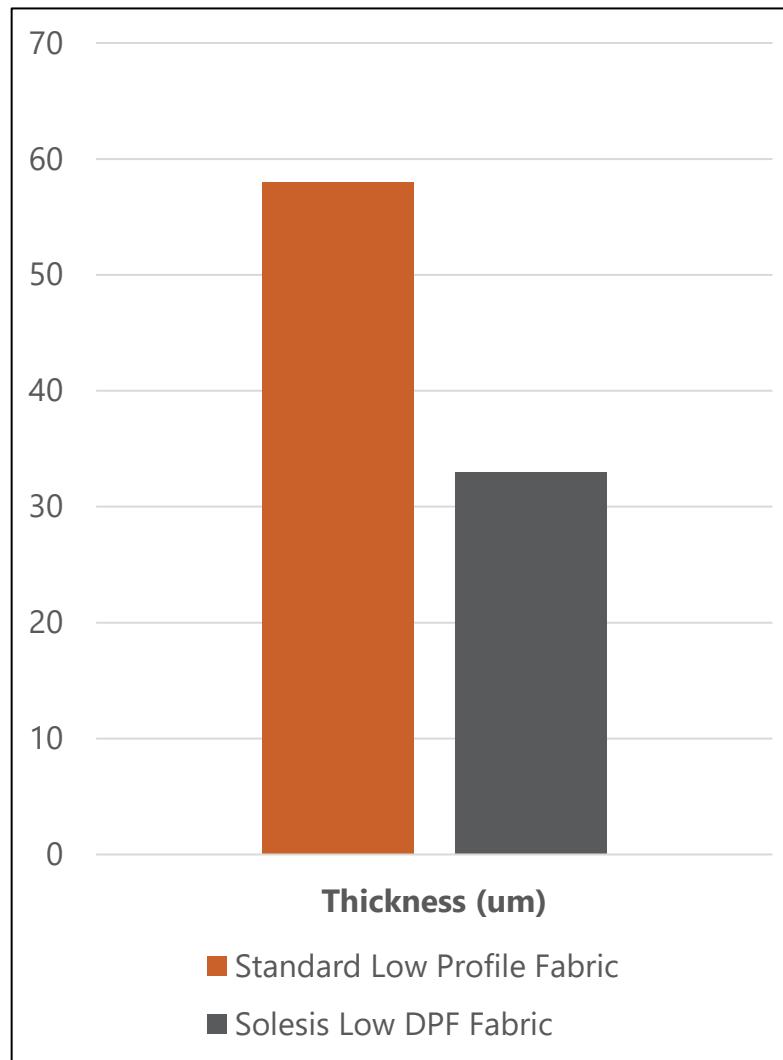
Engineering at the Micron Level

Enabling a New Innovation in Textile Design

- **Higher filament count means:**
 - Smoother, denser coverage
 - Smaller effective pores
 - Reduced pressure-induced pore dilation under permeability test conditions
- **More fiber-to-fiber contacts means:**
 - Increase in-plane filament mobility/packing
 - Enable calendering/compression to lower thickness without sacrificing integrity across a variety of patterns



Optimized for Thickness, Suture Retention, and Permeability



Designed for Cardiovascular Applications

Initial Development:

- Focused on creating **next-gen low-profile woven fabrics** for valve skirts and stent-grafts

Benefits:

- High-surface-area, thin, sealing (knits), occlusion, and tissue in-growth

Future opportunities:

- Creating ultra-thin composite materials through the addition of **coatings, laminations, or additive manufacturing techniques** (e.g., electrospinning)
- Enabling the ability to achieve near-zero permeability while maintaining **low profile, flexibility, and strength**



Bringing Ultra-low Profile to the Market

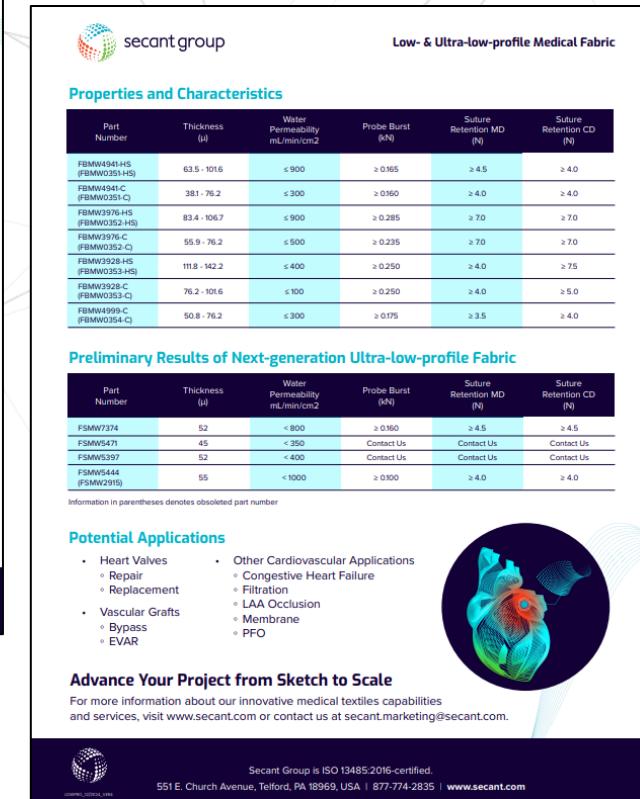
Expanding an Off-the-shelf Platform

Solesis has transitioned this ultra-low-profile technology fiber innovation from concept to product.

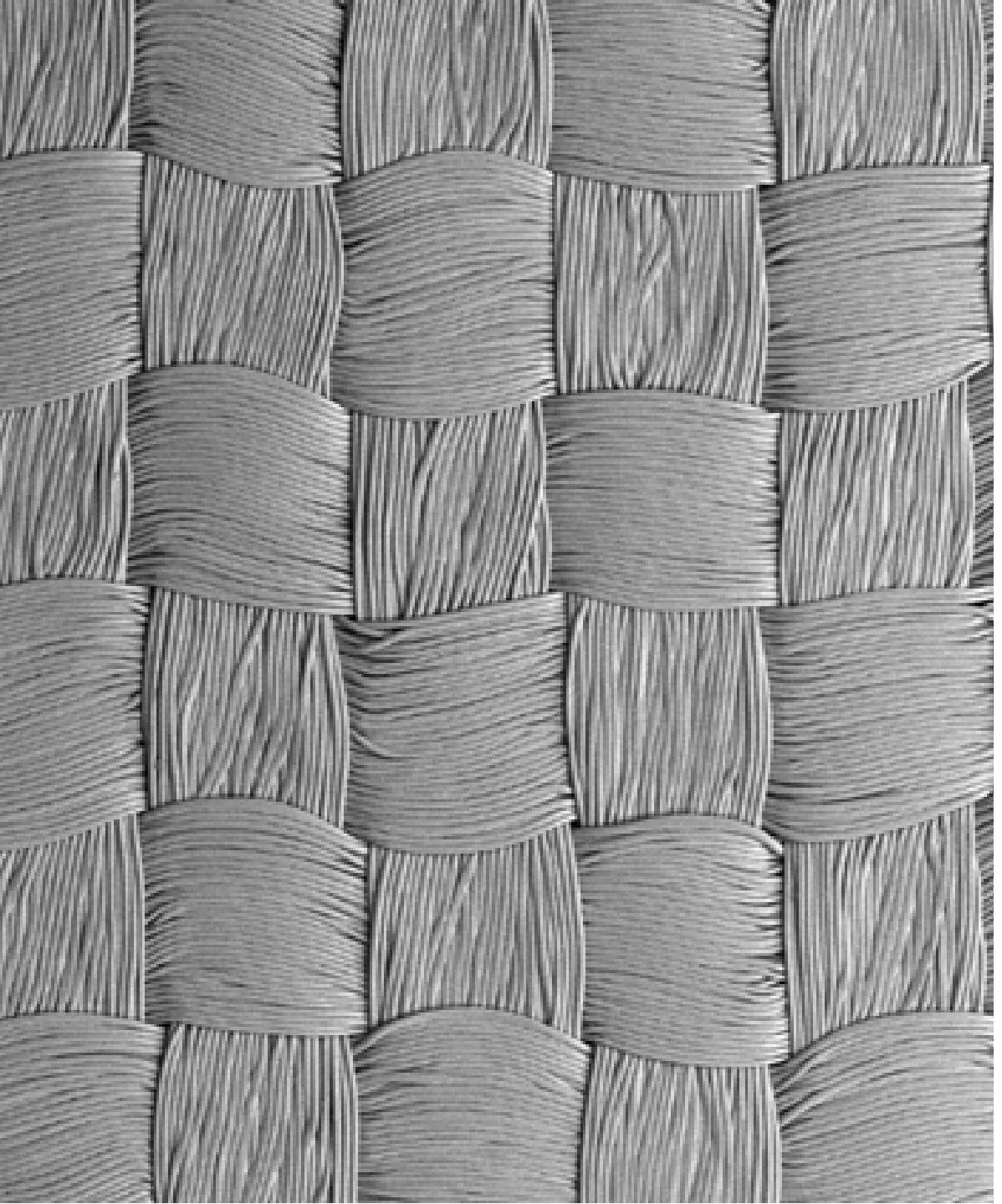
- The fabric is now available as part of our quick-ship, off-the-shelf platform of ready-to-use materials.



The page features the Secant Group logo at the top. Below it is a large image of a hand in a blue glove holding a white, ultra-thin fabric sample against a textured gray background. The title "Low- & Ultra-low-profile Medical Fabric" is prominently displayed. A detailed description follows, mentioning the reduction of fabric thickness for minimally invasive catheter delivery and the availability of off-the-shelf customization. The "Properties and Characteristics" table is located on the right side of the page, listing various part numbers, thicknesses, and performance metrics. The "Key Product Features" section highlights availability off-the-shelf, compaction for delivery, high burst strength, and low permeability. The "Customization Options Include" section lists density, laser-cut shapes, permeability, polymer coatings, pore size, stretch properties, and thickness.



The page features the Secant Group logo at the top. Below it is a large image of a hand in a blue glove holding a white, ultra-thin fabric sample against a textured gray background. The title "Low- & Ultra-low-profile Medical Fabric" is prominently displayed. A detailed description follows, mentioning the reduction of fabric thickness for minimally invasive catheter delivery and the availability of off-the-shelf customization. The "Properties and Characteristics" table is located on the right side of the page, listing various part numbers, thicknesses, and performance metrics. The "Key Product Features" section highlights availability off-the-shelf, compaction for delivery, high burst strength, and low permeability. The "Customization Options Include" section lists density, laser-cut shapes, permeability, polymer coatings, pore size, stretch properties, and thickness. The "Preliminary Results of Next-generation Ultra-low-profile Fabric" table is located on the right side of the page, listing various part numbers, thicknesses, and performance metrics. The "Information in parentheses denotes obsoleted part number" is mentioned. The "Potential Applications" section lists various medical applications including heart valves, vascular grafts, and other cardiovascular applications. The "Advance Your Project from Sketch to Scale" section encourages users to contact Secant Group for more information. The page footer includes the Secant Group logo, ISO 13485 certification, address, and website.



Thank you for your time.

Questions?



Swati Patel
Senior Director,
MedTech Product Development

Email: swati.patel@solesis.com

