

Tie Layer

Bonding & Adhesion Aid

Overview-

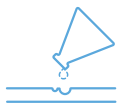
Delamination is a challenging failure mode in catheter construction that carries both risk and cost burden for device manufacturers. Detection typically does not occur until final inspection – after catheter assembly is complete – resulting in significant product loss. Delamination can also lead to failures in the field and product recalls.

Addressing this industry need, Zeus has developed a Tie Layer that improves jacket-to-liner bond strength and reduces the risk of delamination. By creating a stronger bond between the outer catheter jacket and inner liner, Tie Layer helps to improve consistency in catheter performance, reduce manufacturing costs, and increase product yields. Tie Layer is a true total solution in catheter design and manufacturing.

Multiple Options

Tie Layer can be applied to almost any round substrate. For catheter construction, products that can be manufactured with a tie layer include:

- PTFE Sub-Lite-Wall™
- PTFE Sub-Lite-Wall™ Multi-Lumen
- PTFE StreamLiner™
- PTFE StreamLiner™ NG
- Polyimide
- Reinforced Polyimide



CHEMICAL RESISTANCE



FLEXURAL MODULUS



HARDNESS/DUROMETER



Tie Layer creates a melt-bondable surface that improves adhesion to both the liner and catheter jacket during the reflow process.

APPLICATIONS

- Catheter construction
- Improves bondability of component layers in many applications

CAPABILITIES AND SIZING

- Standard ID ranges 0.015" – 0.350" (0.381 – 8.890 mm)
- Thicknesses 0.0001" – 0.0003" Ref. (0.0025 – 0.0076 mm Ref.)
- Max. cut length 78" (1981.2 mm)
- Tie Layer Materials:
 - Pebax® 25D* – 72D
 - Vestamid® 75D (Nylon)
 - Tecoflex® 80A
 - Other materials available upon request

KEY PROPERTIES

- Class VI approved resins available
- Reduces delamination
- Improves bond strength 20 - 40%¹
- Increases yields
- Lowers manufacturing cost/scrap
- Tailored catheter performance
- Maintains overall catheter profile

* Pebax® 25D and 35D feature an additive for easier handling.



Tie Layer

All liners with Tie Layer are produced based on customer specifications. The table below is a general capability guide. Users should evaluate the material to determine suitability for their own application.

TIE LAYER	
MATERIALS	Pebax® 25D* – 72D Vestamid® 75D (Nylon) Tecoflex® 80A
PROCESS	Film-Cast
INSIDE DIAMETER (ID)	0.015" – 0.350" (0.381 mm – 8.890 mm)
COATING THICKNESS	0.0001" – 0.0003" Ref. (0.0025 mm – 0.0076 mm Ref.)
CUT LENGTH	78" Max. (1981.2 mm Max.)

* Pebax® 25D and 35D feature an additive for easier handling.

Putting Tie Layer to the Test

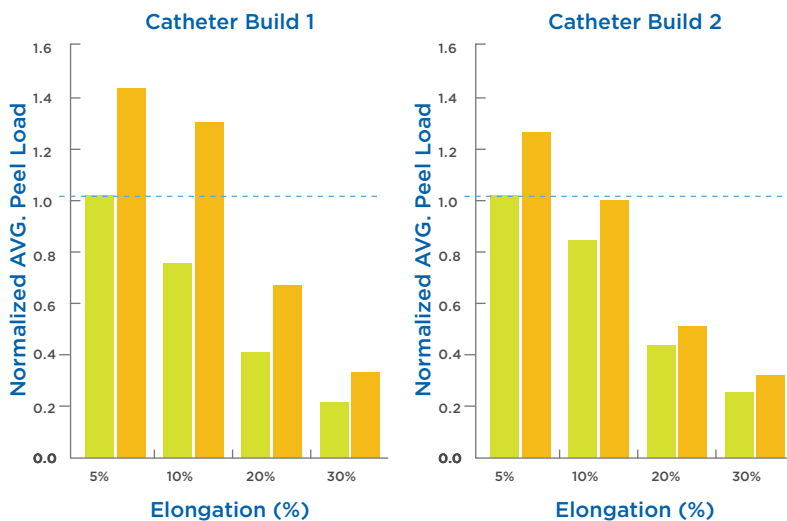


Figure 1: Two sizes of catheters were built with and without a Tie Layer. The peel force necessary to remove the jacket from the completed catheters was measured at various elongation levels to assess the effects of Tie Layer upon stretched jacket-to-liner adhesion in a series of tests. Catheters with a Tie Layer showed enhanced bond strength between the liner and jacket ranging from 20-40% with minimal to moderate liner stretching.

Comparison of Avg. Normalized Peel Load at Various Elongations ■ No Tie Layer ■ Tie Layer

¹ Based on test report, Overcoming Catheter Failure with Tie Layer. October 2020.

