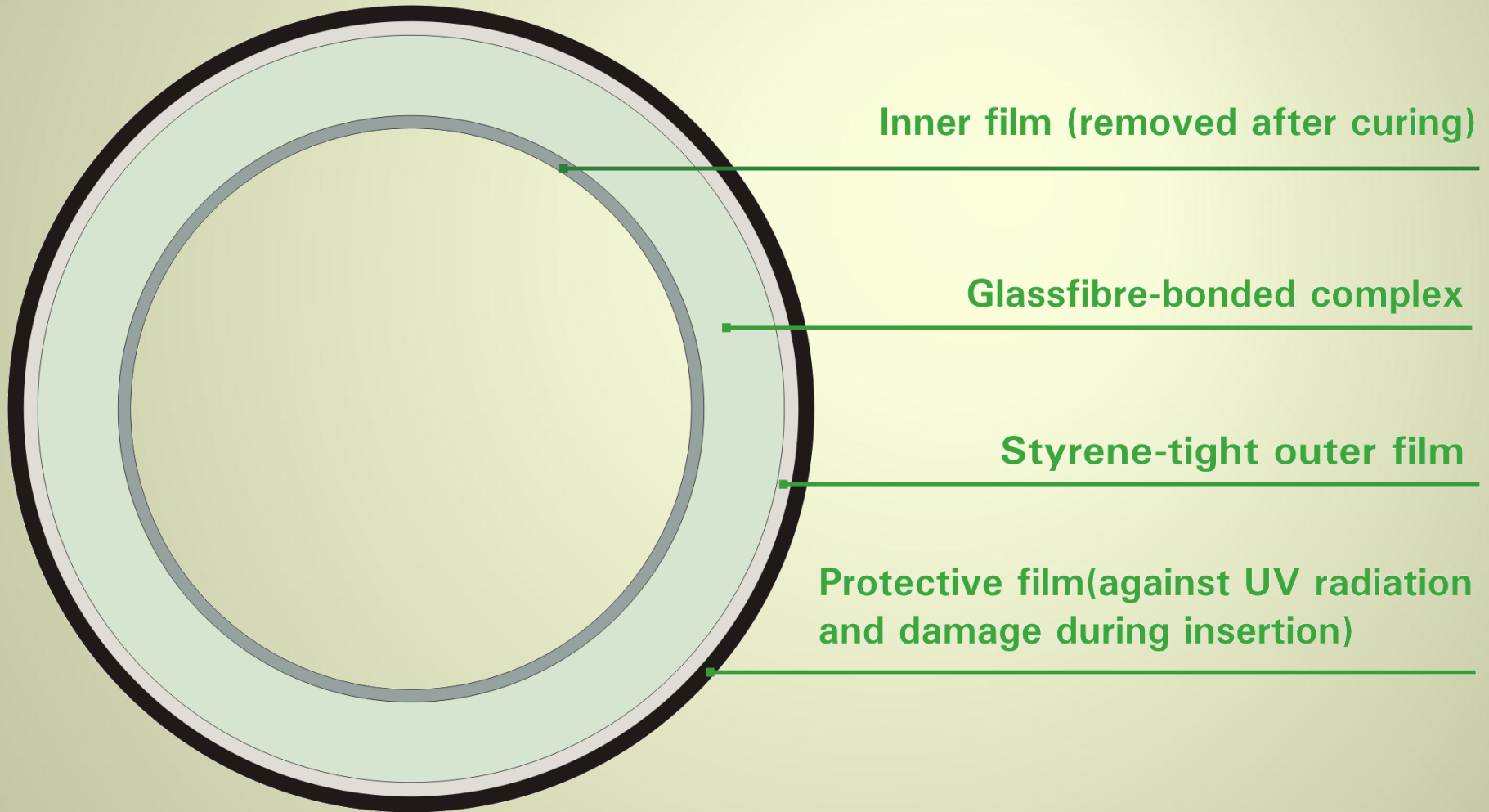


Advancements in UV Technology for Curing Glass Fiber CIPP Liners

Liner Construction



MANUFACTURING
ISO 9001 CERTIFIED

Glass Fiber Liners Begin as a Single Strand of ECR Glass Fiber



Glass Fiber Mats Manufactured into Tubes



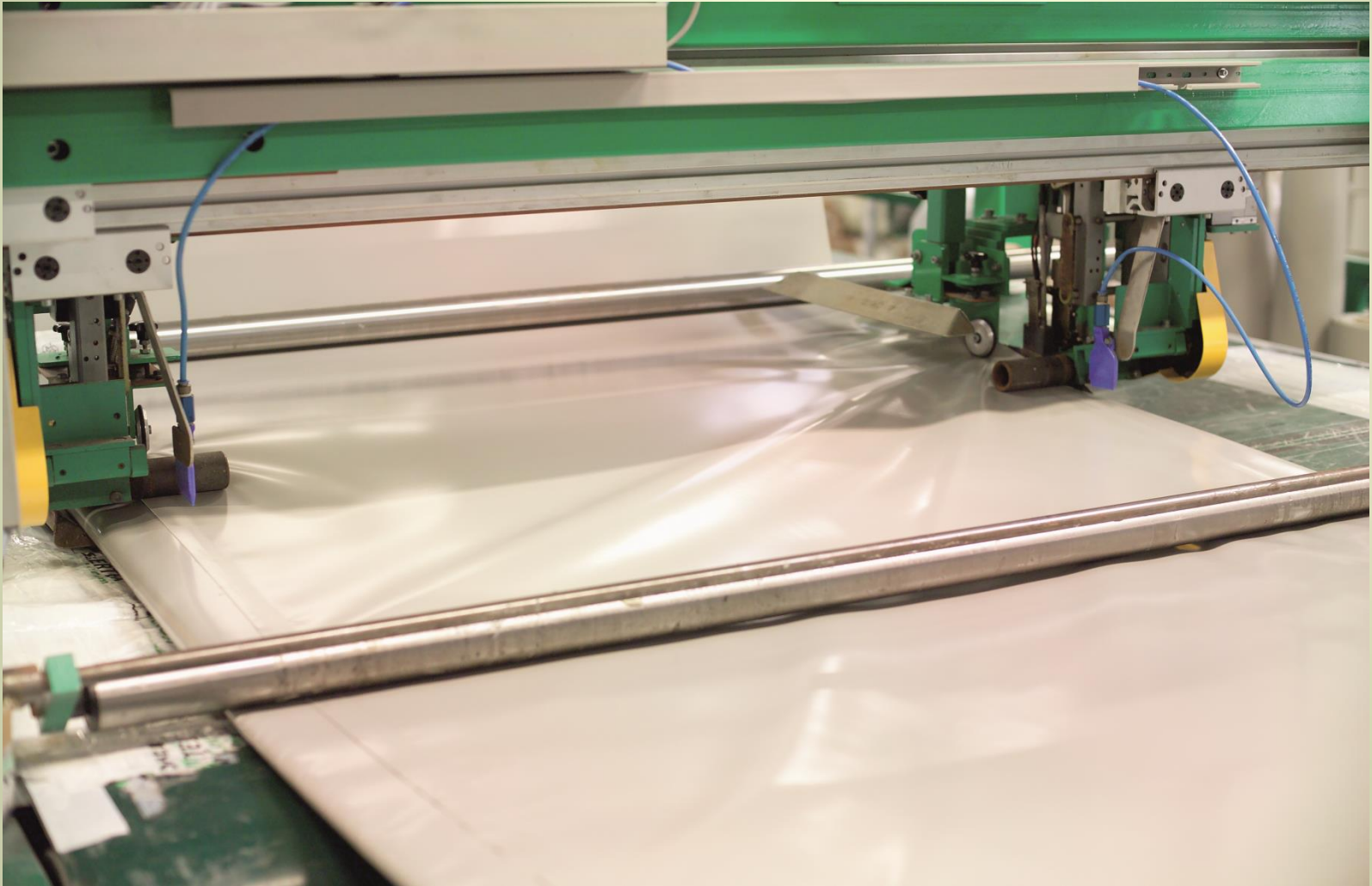
Wet Out Process



Applying the Outer Foil



Applying Protective UV Foil

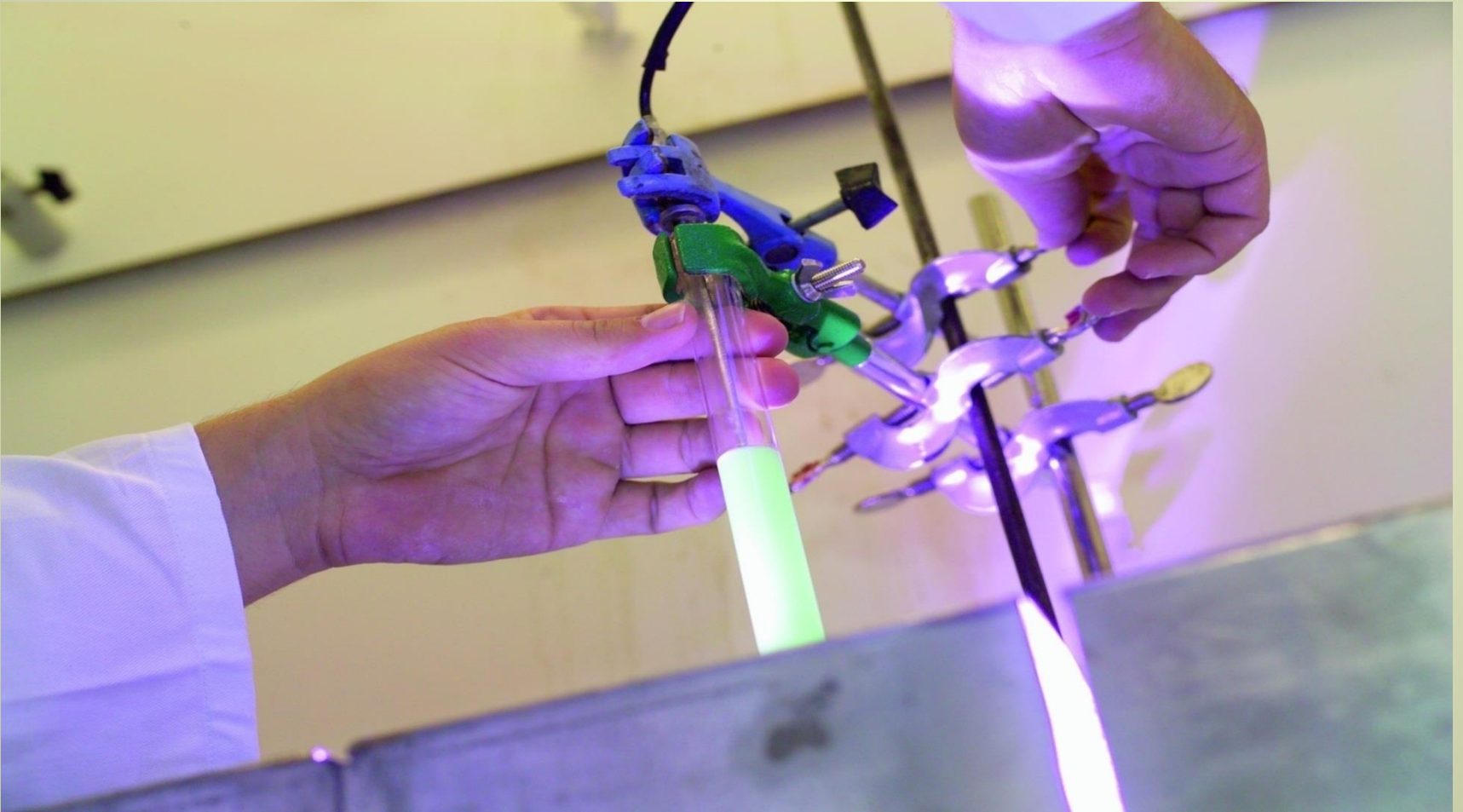


Completion and Packaging



Quality Control

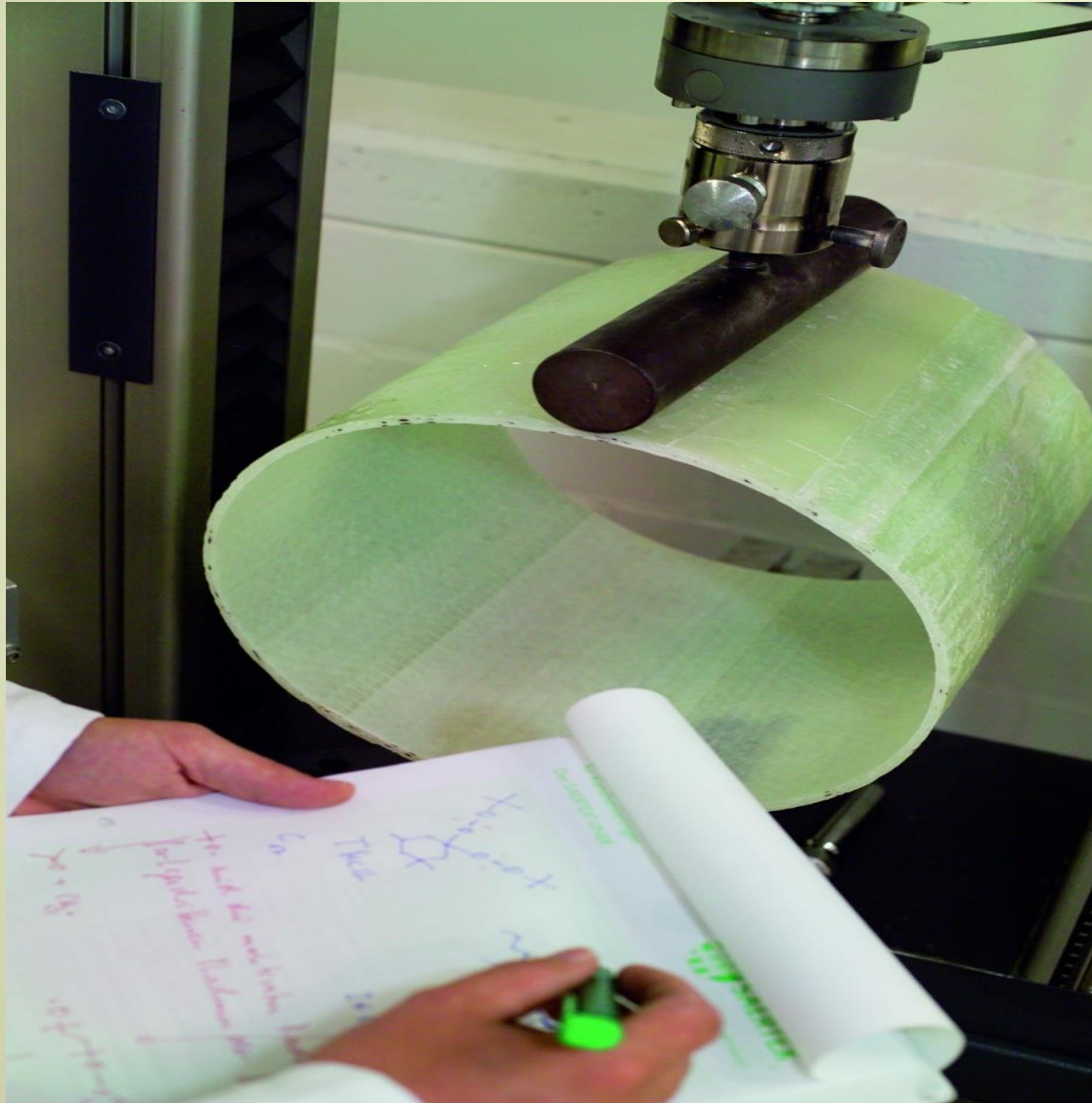
Resin Testing



Curing Test Samples



Flexural & Tensile Testing



INSTALLATION

Installation Benefits

- ❖ The ability to inspect the inside of the liner before curing and during curing
- ❖ Higher strength than felt or fold & form liners
- ❖ 70 year life expectancy
- ❖ Shorter cure times
- ❖ No resin slugging at laterals
- ❖ Uniform wall thickness

Installation Benefits

- ❖ Not weather dependent, can line anytime of the **year**
- ❖ Can line any shape



7 different layers to UV cured fiberglass CIPP



Outer protective UV removal-curing begins within minutes



Fully deteriorated culvert



Pre-Jetting Lines and CCTV



Marking the lateral's



Install Gliding Foil



Pull in Liner



Liner is winched into place



Preparing to insert light train and outer sleeve



Insertion of UV Light source



12" line and protective outer sleeve install



24" installation



Ready for air



Liner pulled through middle MH



Packer Install



Curing of CIPP



Before. During. And After.



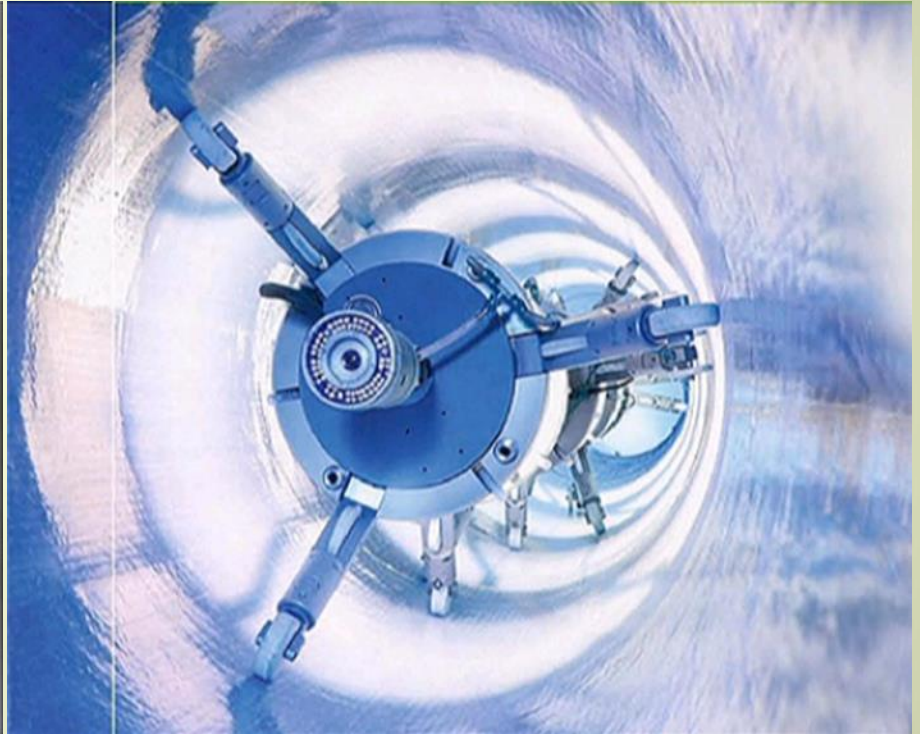
Camera once train is inserted and control panel for curing



Control & Recording



Document the curing process



Little disruption to traffic flow



View one manhole to the other



24" 120 LF Pre-Install



Finished Liner



Finished Liner



Before

After





Up to 66 inch

Challenging Locations



Environmental Benefits

- ❖ No resin washout
- ❖ No Styrene odors
- ❖ No discharge of Styrene laden water an 8" line with a 400 LF Run will need about 1,100G of water, a 48" line will need over 37,000 G!
- ❖ No resin discharged downstream or into wetlands
- ❖ Up to 90% less fuel consumed
- ❖ Smaller carbon foot print
- ❖ Environmentally friendly

End User Benefits

- ❖ Thinner wall profile
- ❖ Uniform wall thickness
- ❖ Higher strength than Felt liners and Fold & Form – 1M+ PSI vs 350,000 PSI for Felt
- ❖ Longer life = Longer Asset Depreciation
- ❖ Less disruption to the public