Waterline Renewal Technologies™

Product Name: UV Flex Liner (Inversion)
Product Description: Coated flexible fiberglass liner for use with various Light Ray technologies from 2" to 12"
Typical Applications:

Use this material with WRT's LightRay Inversion technology for CIPP repairs in as little as 6 minutes. Works well in systems with multiple 45° or 90° bends as well as transitions. Material's flexibility allows for ease of inversion as well as molding to the host pipe and leaving little to no void. Conditionally approved for use in PIP applications for size-on-size installations and those that utilize a TPU tapered restrictor sleeve.

Storage Guidelines

- Until time of use, leave liner in the UV protective film
- Do not expose to direct sunlight in storage
- Ideal storage temperature not to exceed 85^{0}F (30°C)

*** If product is utilized outside the limits defined below, warranty coverage is voided ****

Light Ray Technology: Inversion (LRI)

Characteristic	Spec	Comments	
General			
Typical dry Thickness (mm)	3.1 – 4.5		
Typical finished Thickness (mm)	2.8 – 4.2	Depends on installation pressures, pipe diameter, and number of bends (45° & 90°). Approx. 0.3mm thinner than dry thickness.	
Liner Sizes available (in.)	3, 4, 6, 8	Thicknesses available as 3mm or 4mm	
Liner Undersize %	20%	As compared to nominal pipe dimension	
Repairable Nominal Pipe Sizes (in.)	3 - 10	Liners can upsize 50% (e.g. 3"→4.5", 4"→6", 6"→9")	
Coating	TPU		
Resins			
Light Ray UV Vinyl Ester	YES	Product comes pre-wet with this resin. ****May work with other resins but use of other resin voids warranty****	
Install Design			
** Typical Max Depth of Install (ft) for Structural Integrity ⚠ DEPENDENT ON PIPE INSTALLATION CONDITIONS.	3" –> 9' 4" –>5' 6" –> 3' ≥8" –> 0'	**WORST CASE:**	- Pipe ovality = 10% - Very soft, uncompacted soil - Flood plains & High-Water Table - Pipe Condition = Fully Deteriorated
	3" –> 52' 4" –> 30' 6" –> 15' 8" (3mm) –> 11' 8" (4mm) –> 15' 10" (4mm)→10'	**TYPICAL CASE:** *(Fully Deteriorated)*	- Pipe ovality = 5% - Moderately compacted soil - 10ft water table below surface - Pipe Condition = Fully Deteriorated
	3" –> 65' 4" –> 37' 6" –> 19' 8" (3mm) –> 16' 8" (4mm) –> 23' 10" (4mm)→16'	**TYPICAL CASE:** *(Partially Deteriorated)*	- Pipe ovality = 5% - Moderately compacted soil - 10ft water table below surface - Pipe Condition = Partially Deteriorated

	3" – 10" –> Any Depth	**BEST CASE:**	- Pipe ovality = 2% - Highly compacted soil - No water above pipe - Pipe Condition = Partially Deteriorated
Can be used across Transitions?	YES	Stretch must be accounted for when upsizing	
Remote Start Allowed?	YES		
Install with Infiltration Allowed?	Not Recommended	High I&I situations may impact the structural integrity of any installed liner. **Contact representative to discuss specific application.**	
Resin per FT	Varies by size, resin type	**Light Ray UV Resin**: 3" – 0.37 lbs./FT, 4" – 0.55 lbs./FT, 6" – 0.83 lbs./FT, 8" – 1.1 lbs./FT → 10" use upsized 8"	
Maximum Continuous Operating Temperature	120°F (49°C)		
Installation			
Wet Out Gap Setting	9.8 mm	When using the WRT Wet Out Roller System and proper vacuum ****DO NOT USE FLOOR ROLLER FOR RISK OF RESIN SHY FINAL PRODUCT****	
Typical Inversion Pressures (psi)	8-15	Depends on installation length, pipe diameter, and number of bends (45° & 90°)	
Maximum Inversion Pressure (psi)	25	Pressures exceeding this limit run the risk of tearing the liner or excessive "thinning" around bends	
Max Curing Pressures (psi)	25	Pressures exceeding this limit run the risk of tearing the liner or excessive "thinning" around bends	
Stretch Factor - (Size on Size Installation)	1.03	Multiply Repair Length by value shown to determine liner length	
Stretch Factor - (Transition UP 50%)* 4" → 6" 6" → 9"	1.25	Multiply Repair Length by value shown to determine liner length **For intermediate sizes, contact Waterline representative*	
Suitable Host Pipe materials		Cast iron, ABS, PVC, Orangeburg, Clay	

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Light Ray Technology: Large Diameter PIP Packers (8”- 12”)

Characteristic	Spec	Comments	
General			
Typical finished Thickness (mm)	• 3.1 mm • 4.2 mm	• 8” repairs (6” x 3mm tubes) ← recommended for 8” pipes • 8”, 10” & 12” pipe repairs (8”x 4mm tubes)	
Liner Sizes available (in.)	• 6” x 3mm tube • 8” x 4mm tube	• Recommended for 8” pipe repairs (non- transition) • Recommended for 10” & 12” pipe repairs and transitions up from 8” pipes	
Liner Undersize %	20%	• As compared to nominal pipe dimension	
Coating	TPU		
Resins			
Light Ray UV Vinyl Ester	YES	Product comes pre-wet with this resin. ****May work with other resins but use of other resin voids warranty****	
Install Design			
** Typical Max Depth of Install (ft) for Structural Integrity ⚠ DEPENDENT ON PIPE INSTALLATION CONDITIONS.	8” –> 3’ 10” –>3’ 12” –> 3’	**WORST CASE:**	- Pipe ovality = 10% - Very soft, uncompacted soil - Flood plains & High-Water Table - Pipe Condition = Fully Deteriorated
	8” –> 13’ 10” –>13’ 12” –> 12.5’	**TYPICAL CASE:** *(Fully Deteriorated)*	- Pipe ovality = 5% - Moderately compacted soil - 10ft water table below surface - Pipe Condition = Fully Deteriorated
	8” –> 20’ 10” –>19’ 12” –> 18’	**TYPICAL CASE:** *(Partially Deteriorated)*	- Pipe ovality = 5% - Moderately compacted soil - 10ft water table below surface - Pipe Condition = Partially Deteriorated
	8” –> 24’ 10” –>22’ 12” –> 21’	**BEST CASE:**	- Pipe ovality = 2% - Highly compacted soil - No water above pipe - Pipe Condition = Partially Deteriorated
Can be used across Transitions?	YES	Stretch must be accounted for when upsizing. See limitations in note above	
Install with Infiltration Allowed?	Not Recommended	High I&I situations may impact the structural integrity of any installed liner. **Contact representative to discuss specific application.**	
Maximum Continuous Operating Temperature	120°F (49°C)	Intermittent exposure to 140°F (60°C) fluids acceptable	
Installation			
Stretch Factor	• 1.175 (17.5%) • 1.135 (13.5%) • 1.265 (26.5%)	• Stretching 6”→ 8” • Stretching 8” → 10” • Stretching 8” → 12”	***** Multiply required patch length by value shown to determine liner cut length***
Suitable Host Pipe materials		Cast iron, ABS, PVC, Orangeburg, Clay	
Recommended product temperature at time of installation	50°F - 70°F (10°C - 21°C)	• Resin viscosity changes with temperature (hotter=thinner & colder= thicker). • If the liner is installed with the resin hotter than 70°F, it may migrate from the liner leading to resin shy areas. • If the liner is installed with resin lower than 50°F, it may make inflation more difficult	

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Light Ray Technology: Small Diameter PIP Packers (2")

Characteristic	Spec	Comments
General		
Typical finished Thickness (mm)	2.0 – 2.2	Depends on installation pressures, pipe diameter, and number of bends (45° & 90°)
Liner Sizes available (in.)	2	Thicknesses available only as 2mm
Liner Undersize %	20%	As compared to nominal pipe dimension
Coating	TPU	
Resins		
Light Ray UV Vinyl Ester	YES	Product comes pre-wet with this resin. ****May work with other resins but use of other resin voids warranty****
Install Design		
** Typical Max Depth of Install (ft) for Structural Integrity	10 ft	⚠ DEPENDENT ON PIPE INSTALLATION CONDITIONS.
Can be used across Transitions?	Not Recommended	Product Pulls back when upsizing. If upsizing, Warranty Void.
Install with Infiltration Allowed?	Not Recommended	High I&I situations may impact the structural integrity of any installed liner. **Contact representative to discuss specific application.**
Resin per FT		**Light Ray UV Resin**: 2" – 0.19 lbs./FT
Installation		
Wet Out Gap Setting	7.8 mm	When using the WRT Wet Out Roller System ****DO NOT USE FLOOR ROLLER FOR RISK OF RESIN SHY FINAL PRODUCT****
Maximum Continuous Operating Temperature	120°F (49°C)	Short term exposure to 140°F (60°C) fluids acceptable
Typical Inflation Pressures (psi)	70	Depends on installation length, pipe diameter, and number of bends (45° & 90°)
Max Curing Pressures (psi)	75	Pressures exceeding this limit run the risk of tearing the liner or excessive "thinning" around bends
Stretch Factor (Transitioning up in size)	-20%	***see note above – Warranty Void
Recommended product temperature at time of installation	50°F - 70°F (10°C - 21°C)	Resin viscosity changes with temperature (hotter=thinner & colder= thicker). If the liner is installed with the resin hotter than 70°F, it may migrate from the liner leading to resin shy areas. If the liner is installed with resin lower than 50°F, it may make expansion more difficult
Suitable Host Pipe materials		Cast iron, ABS, PVC, Clay

Please contact your representative at 1-866-336-2568 if you have any questions.

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