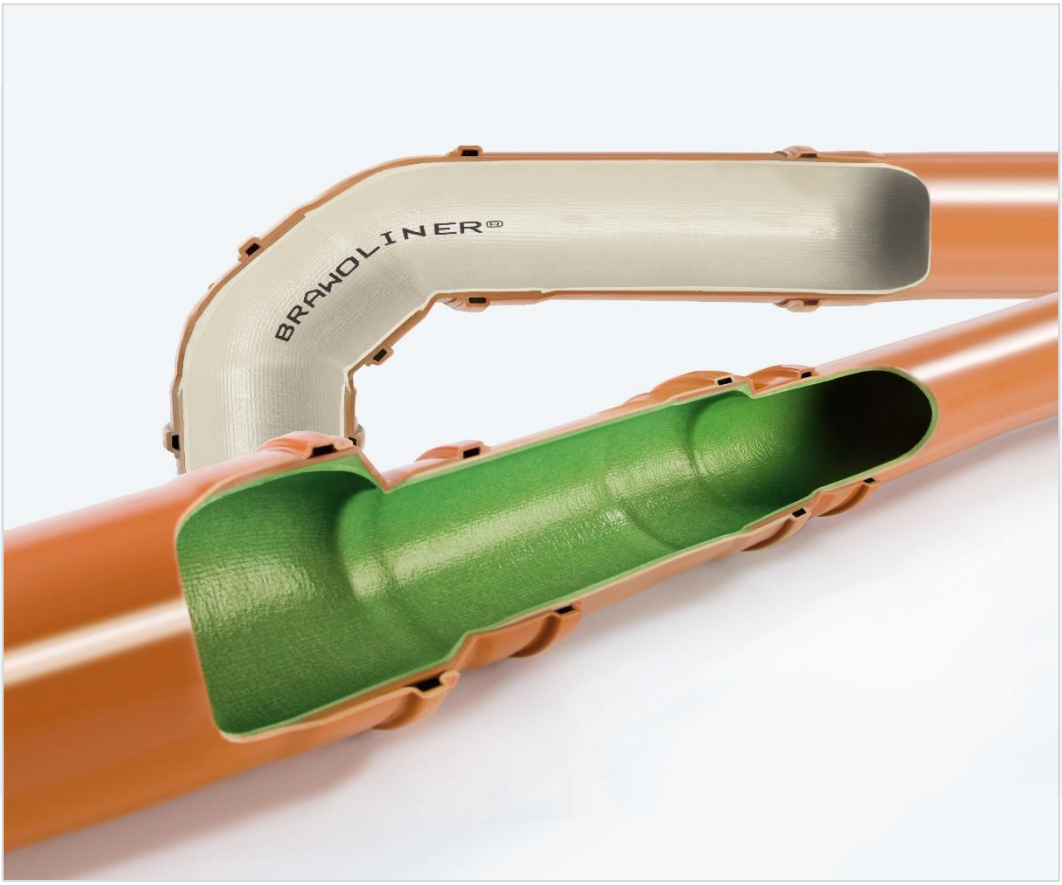
BRAWO SYSTEMS

Information booklet

Rehabilitation System BRAWOLINER®



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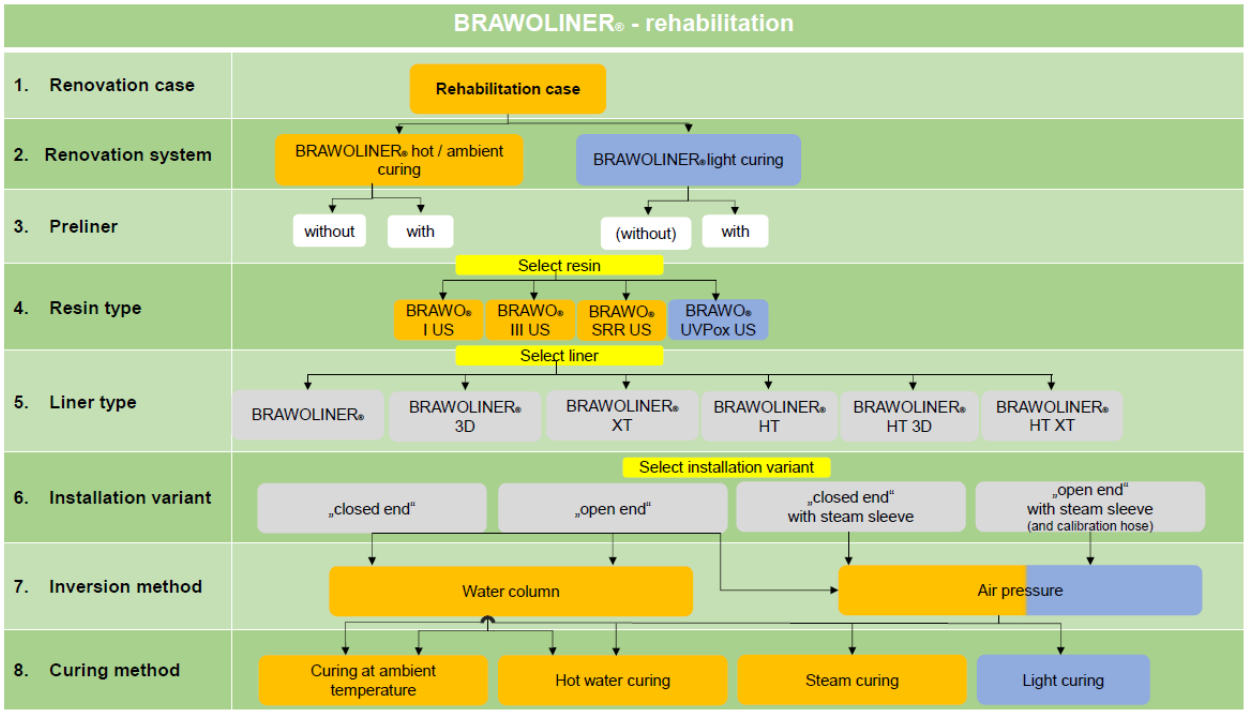
1. BRAWOLINER® rehabilitation overview

1.1. Schematic flow diagram



The above decision matrix is used for an overview of all possible BRAWOLINER® rehabilitation variants.

The contents of the individual steps are explained in detail in the following subsections and help in the selection of the suitable variant in individual cases.

2. Hot / ambient curing

2.1. Resin types for hot / ambient curing

Depending on the requirement the following resins can be selected:

Resin types and areas of use									
BRAWO® resin type	Buried lines	Connection nozzle	Line length			Processing time saturated liner	Curing time Cold curing	Curing time Hot curing 122 °F	Curing time Hot Curing 148 °F
			shorter than 5 m (197")	shorter than 15 m (590")	longer than 15 m (590")				
BRAWO® SRR US **)	X	X	(X)			**30 min at 59 °F**	**2 h at 68 °F**	**30 min**	**-**
BRAWO® I US	X	X	X	X	(X)	**50 min at 59 °F**	**13 h at 50 °F**	**100 min**	**45 min*)**
BRAWO® III US	X	X	X	X	X	**3,5 h at 59 °F** ***)	**24 h at 50 °F**	**220 min**	**140 min*)**

*) Only in combination with BRAWOLINER® HT or with a suitable calibration CIPP

**) Attention: When curing BRAWO® SRR with steam, there is a risk of extreme temperature development because of the exothermic resin reaction. Therefore, curing with steam is not recommended.

***) Attention: Larger quantities of resin shorten the processing time. Please refer to the technical data sheet for the resin. At 59 °F recommended resin quantity is max. 440 lbs (200 kg).

(X) Limited processing time. Only recommended with favorable conditions.

2.2. Liner types for hot / ambient curing

Liner types and field of application																	
Liner type	Liner name	Buried lines	House internal lines	Steam curing	Ø 50 (1,97")	Ø 70 (2,76")	Ø 80 (3,15")	Ø 100 (3,94")	Ø 120 (4,72")	Ø 150 (5,91")	Ø 175 (6,89")	Ø 200 (7,87")	Ø 225 (8,86")	Ø 250 (9,84")	Ø 300 (11,81")	Ø 375 (14,76")	Ø 400 (15,75")
BRAWOLINER®	DN 50 (2")	X		X *)	X	X											
	DN 70/80 (3")	X		X *)		X	X										
	DN 100 (4")	X		X *)				X									
	DN 125 (5")	X		X *)					X	X							
	DN 150 (6")	X		X *)						X	X						
	DN 200 (8")	X		X *)								X	X	X			
XT	DN 100 (4")	X		X *)				X	X								
	DN 125 (5")	X		X *)					X	X							
	DN 150 (6")	X		X *)						X	X						
	DN 200 (8")	X		X *)								X	X	X			
3D	DN 70-100 (3"-4")	X		X *)		X	X	X									
	DN 100-150 (4"-6")	X		X *)				X	X	X							
	DN 150-225 (6"-9")	X		X *)						X	X	X	X				
	DN 200-300 (8"-12")	X		X								X	X	X	X		
	DN 300-400 (12"-16")	X		X											X	X	X
BRAWOLINER® HT	DN 50 (2")	X	X	X	X	X											
	DN 70/80 (3")	X	X	X		X	X										
	DN 100 (4")	X	X	X				X	X								
	DN 125 (5")	X	X	X					X	X							
	DN 150 (6")	X	X	X						X	X						
	DN 200 (8")	X	X	X								X	X	X			
HT XT	DN 100 (4")	X	X	X				X	X								
	DN 125 (5")	X	X	X					X	X							
	DN 150 (6")	X	X	X						X	X						
	DN 200 (8")	X	X	X								X	X	X			
HT 3D	DN 70-100 (3"-4")	X	X	X		X	X	X									
	DN 100-150 (4"-6")	X	X	X				X	X	X							
	DN 150-225 (6"-9")	X	X	X						X	X	X	X				

*) with the use of a suitable calibration CIPP

The following installation and curing pressures are recommended for the various liner types:

Liner type	Inversion pressure	Curing pressure	Curing pressure with calibration CIPP
BRAWOLINER®/ XT / HT / XT HT	approx. 0.2 bar / 2.9 psi	approx. 0.4 bar / 5.8 psi	approx. 0.4 bar / 5.8 psi
BRAWOLINER® 3D / HT 3D (DN 70-300 / 3"-12")	approx. 0.2 bar / 2.9 psi	approx. 0.4 bar* / 5.8 psi*	approx. 0.4 bar* / 5.8 psi*
BRAWOLINER® 3D DN 300-400 (12"-16")	approx. 0.1 bar / 1.45 psi	approx. 0.2 bar / 2.9 psi	approx. 0.2 bar / 2.9 psi

*The heating is favorable for the expansion. With light curing possibly a higher curing pressure must be used.

NOTE!

- **The values given in the table are recommended; geometry and routing of the rehabilitation section may possibly require other pressures.**
- **When curing in the largest dimension, especially with BRAWOLINER® 3D, it must be ensured that the liner lies against the pipe wall.**
- **For the curing with water the height differences between start and target point must be taken into account.**

3. Light curing

3.1. Resin type for light curing

The light curable epoxy resin BRAWO® UVPox US is used during rehabilitation in the curing process with the **BRAWOLINER®** light curing system.

3.2. Liner types for light curing

Liner types and field of application												
BRAWOLINER® liner types	**Liner name**	Sealing function	Special static function	Underground pipes	Ø 100 (3,94")	Ø 120 (4,72")	Ø 150 (5,91")	Ø 175 (6,89")	Ø 200 (7,87")	Ø 225 (8,86")	Ø 250 (9,84")	Ø 300 (11,81")
BRAWOLINER®	DN 70/80 (3")	X		X								
	DN 100 (4")	X		X	X**)							
	DN 125 (5")	X		X		X	X					
	DN 150 (6")	X		X			X	X				
	DN 200 (8")	X		X					X	X	X	
XT	DN 100 (4")	X	X	X	X**)	X						
	DN 125 (5")	X	X	X		X	X					
	DN 150 (6")	X	X	X			X	X				
	DN 200 (8")	X	X	X					X*)	X*)	X*)	
3D	DN 70-100 (3"-4")	X		X	X**)							
	DN 100-150 (4"-6")	X		X	X**)	X	X					
	DN 150-225 (6"-9")	X		X			X	X	X	X		
	DN 200-300 (8"-12")	X		X					X*)	X*)	X*)	X*)

*) recommended only when used with LED head_Mega_192
**) recommended only when used with LED head_Nano_96

The following installation and curing pressures are recommended for the various liner types:

Liner type	Inversion pressure	Curing pressure	Curing pressure with calibration CIPP
BRAWOLINER® / XT	approx. 0.2 bar / 2.9 psi	approx. 0.4 – 0.5 bar / 4.35 – 7.25 psi	approx. 0.4 bar / 5.8 psi
BRAWOLINER® 3D	approx. 0.3 bar / 4.35 psi	approx. 0.4 – 0.5 bar / 4.35 – 7.25 psi	approx. 0.4 bar / 5.8 psi

NOTE!

- **The values given in the table are recommended; geometry and routing of the rehabilitation section may possibly require other pressures.**
- **When curing in the largest dimension, especially with BRAWOLINER® 3D, it must be ensured that the liner lies against the pipe wall.**

3.3. BRAWO® Magnavity SX curing speeds

Liner	DN Inch	Retraction speed in m/min and ft/min	
		LED head Nano_96	LED head Mega_192
BRAWOLINER® 3D DN 70-100	70 3"	0.60 m/min 1.97 ft/min	-
BRAWOLINER® 3D DN 70-100	100 4"	0.60 m/min 1.97 ft/min	-
BRAWOLINER® 3D DN 100-150	100 4"	0.60 m/min 1.97 ft/min	-
BRAWOLINER® 3D DN 100-150	125 5"	0.55 m/min 1.80 ft/min	0.70 m/min 2.30 ft/min
BRAWOLINER® 3D DN 100-150	150 6"	0.50 m/min 1.64 ft/min	0.70 m/min 2.30 ft/min
BRAWOLINER® 3D DN 150-225	150 6"	0.45 m/min 1.48 ft/min	0.70 m/min 2.30 ft/min
BRAWOLINER® 3D DN 150-225	200 8"	0.40 m/min 1.31 ft/min	0.70 m/min 2.30 ft/min
BRAWOLINER® 3D DN 150-225	225 9"	0.30 m/min 0.98 ft/min	0.70 m/min 2.30 ft/min
BRAWOLINER® XT DN 200	200 8"	0.30 m/min 0.98 ft/min	0.70 m/min 2.30 ft/min
BRAWOLINER® XT DN 200	225 9"	0.25 m/min 0.82 ft/min	0.60 m/min 1.97 ft/min
BRAWOLINER® XT DN 200	250 10"	0.20 m/min 0.66 ft/min	0.50 m/min 1.64 ft/min
BRAWOLINER® 3D DN 200-300	200 8"	-	0.60 m/min 1.97 ft/min
BRAWOLINER® 3D DN 200-300	225 9"	-	0.50 m/min 1.64 ft/min
BRAWOLINER® 3D DN 200-300	250 10"	-	0.40 m/min 1.31 ft/min
BRAWOLINER® 3D DN 200-300	300 12"	-	0.30 m/min 0.98 ft/min

The operation manual of the BRAWO® Magnavity SX system must be observed.
All data is understood to be approximate and based on experimentally determine values.