WATER SERVICES ASSOCIATION OF AUSTRALIA

WSAA PRODUCT APPRAISAL CERTIFICATE

RTI Asia-Pacific Pty Ltd
Cured-In-Place Pipes (CIPP)
for Renovation of Drinking Water Pipes

This Appraisal is for Class A (fully structural) Nordiflow CIPP liners, Class B (semi structural with inherent ring stiffness) Nordiflow CIPP liners and Class C (semi-structural - relies on adhesion to the host pipe) Tubetex and Tubetex Combiliner CIPP liners.

The CIPP systems are suitable for rehabilitation of water pipeline materials including Ductile Iron, Steel, AC and reinforced concrete at operating pressures up PN16. Installation lengths may be up to 300m, depending on the pipe diameter.

Curing is affected by the application of steam or hot water.

A listing of Quality Certificates and details of products are included in Schedules A and B.

Product Category	CIPP Liners for Drinking Water
PA Number:	PA 2303
Applicant:	RTI Asia-Pacific Pty Ltd
Brand	NordiFlow
Standards	WSA 150:2021 *Industry Standard for Cured-In-Place Pipes (CIPP) used for the Renovation of Drinking Water Pipes*
WSAA Product Specification	WSA PS 450 *Cured-In-Place Pipes (CIPP) used for the Renovation of Drinking Water Pipes*
Other Specifications	
Issue date	16 August 2023
Expiry date	15 August 2028
Recommendations	It is recommended that WSAA members, subject to any specific requirements of the member, consider product acceptance of NordiTube Nordiflow W PE, Tubetex W PE and W TPU and Tubetex Combiliner W PE and W TPU CIPP liners, as detailed in this report, for use in the renovation of drinking water pipes, provided installation is in accordance with WSA 202 *Manual for Selection and Application of Cured-In-Place Pipe (CIPP) and Spray Liners for use in Water Pipes* and the manufacturer's requirements.
Disclaimer	The disclaimer on Page 2 explains a number of very important limits on your ability to rely on the information in this Product Appraisal Certificate and the assessment criteria used to underlay it. Please read it carefully and take it into account when considering the content in this Certificate.

1. Disclaimer

This Product Appraisal Certificate (Certificate) is issued by WSAA on the understanding that:

This Certificate applies to the product(s) as submitted in Schedule A. Any changes to the product(s) either minor or major shall void this Certificate.

To maintain the recommendations of this Certificate any such changes shall be detailed and notified to the Product Appraisal Manager for consideration and review of the Certificate including the product appraisal criteria underlying it and appropriate action. Appraisals and their recommendations will be the subject of continuous review dependent upon the satisfactory performance of products.

WSAA reserves the right to undertake random audits of product manufacture and installation. Where products fail to maintain appraised performance requirements the appraisal and its recommendations may be modified and reissued. Certificates will be reviewed and reissued at regular intervals not exceeding five (5) years.

WSAA reserves the right to withdraw this Certificate at any time in its sole and absolute discretion for any reason.

The following information explains a number of very important limits on your ability to rely on the information in this Certificate. Please read it carefully and take it into account when considering the contents of this Certificate.

Any enquiries regarding this Certificate should be directed to the Product Appraisal Manager Phone: 03 8605 7601 email carl.radford@wsaa.asn.au.

1.1. Issue of Certificate

This Certificate has been published and/or prepared by WSAA and nominated Project Manager and peer group of technical specialists (the Publishers).

The Certificate and the underlying product appraisal criteria have been prepared for use within Australia only by technical specialists that have expertise in the function of products such as those appraised in the Certificate (the Recipients).

By accepting this Certificate, the Recipient acknowledges and represents to the Publisher(s) and each person involved in the preparation of the Certificate and product appraisal criteria underlying it that the Recipient has understood and accepted the terms of this Disclaimer.

1.2. Limits on Reliance on Information and Recommendations

1.2.1. Disclaimer of liability

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The information and any recommendation contained (expressly or by implication) in this Certificate are provided in good faith (and subject to the limitations noted in this Certificate). However, you should treat the information as indicative only. You should not rely on that information or any such recommendation except to the extent that you reach an agreement to the contrary with the Publisher(s).

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Recipients should seek independent evidence of any matter which is material to their decisions in connection with an assessment of the Product and consult their own advisers for any technical information required. Any decision to use the Product should take into account the reliability of that independent evidence obtained by the Recipient regarding the Product. Recipients should also independently verify and assess the appropriateness of any recommendation in the Certificate, especially given that any recommendation will not take into account a Recipient’s particular needs or circumstances.

WSAA has not evaluated the extent of the product liability and professional indemnify insurance that the provider of the product maintains. Recipients should ensure that they evaluate the allocation of liability for product defects and any professional advice obtained in relation to the product or its specification including the requirements for product liability and professional indemnity insurance.

1.3. No Updating

Neither the Publisher(s) nor any person involved in the preparation of this Certificate or the product appraisal criteria underlying it [has] [have] any obligation to notify you of any change in the information contained in this Certificate or of any new information concerning the Publisher(s) or the Product or any other matter.

1.4. No Warranty

The Publisher(s) do[es] not, in any way, warrant that steps have been taken to verify or audit the accuracy or completeness of the information in this Certificate, or the accuracy, completeness or reasonableness of any recommendation in this Certificate.

QUALITY CERTIFICATIONS

A copy of the following Quality Certificate is available from WSAA.

TABLE A1 NORDITUBE TECHNOLOGIES SE – MANAGEMENT SYSTEMS

Rue Ernest Solvay 181 4000 Liege Belgium	
Quality Systems Standard	ISO 9001:2015
Certification Licence No.	Q10280421/03
Certifying Agency	SystemCert
Current Date of Certification	5 May 2021
Expiry Date of Certification	14 May 2024

PRODUCT LITERATURE

NordiTube

NORDITUBE TECHNOLOGIES
PROVIDING SOLUTIONS

NORDIFLOW W PE

System Data Sheet

General description

NORDIFLOW W PE system consists of a PE coated glass fiber reinforced needled felt hose combined with a modified two-component-epoxy resin system. Designed for the installation with the inversion method and suitable for steam or hot water curing.

System components

Liner	NORDIFLOW W PE
Resin	582-25 OF

Technical system data

Diameter	DN 150 - DN 1200
Coating	Polyethylene [PE]
Coating weight	~700 - 1000 [g/m²]
Carrier material [liner]	Glass fiber reinforced needled felt hose with up to 2 glass layers
Color of the system	Red • Colorless
Curing method	Steam • Hot water
Min. processing time of the mixed components at 23 [°C]	5 [h]
Curing time of the resin at 80 [°C] laminate temperature at the coldest spot	3,5 [h]
Maximum medium temperature [short term]	60 [°C]
Maximum medium temperature [long term]	23 [°C]
Heat deflection temperature according to DIN EN ISO 75-2	59 [°C]

Important notice

For material and safety information, please check the corresponding Material Data Sheets and the Material Safety Data Sheets.

For installation parameter, please check the corresponding Material Data Sheets, Method Statement and Installation Manual.

Mechanical properties

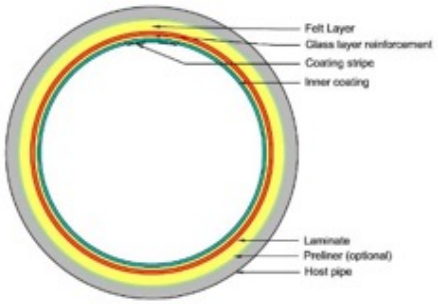
Peripherical E-Modulus (short term) ISO 7685	1	3060 [MPa]
	2	3920 [MPa]
Peripherical E-Modulus (long term) ISO 7685	1	1430 [MPa]
	2	1840 [MPa]
Flxural strength (short term) ISO 178	1	72 [MPa]
	2	142 [MPa]
Flxural strength (long term) ISO 178	1	34 [MPa]
	2	66 [MPa]
Creep reduction factor A1 (10000h)		2,13

Properties of job site sample

Bending E-Modulus ISO 178	Radial	1	2700 [MPa]
		2	3280 [MPa]
Flexural strength ISO 178	Radial	1	72 [MPa]
		2	142 [MPa]

System design

Pre-Liner	Foil	Outer foil
Laminate	PET fibres and ECR Glass	Felt; Fiber Glass reinforcement and Epoxy resin
Coating	PE	Inner coating



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NordiTube

NORDITUBE TECHNOLOGIES

PROVIDING SOLUTIONS

NORDIFLOW W PE

Method Statement

GENERAL DESCRIPTION

Fully structural cured in place pipe for pressure applications.

SYSTEM APPLICATION CONDITIONS

Explanation

\+ suitable
– not suitable
o suitable under certain conditions

	Kind of pipe
+	Pressure pipe
–	Gravity pipe
	Cross section
+	Round
–	Oval (egg shape)
–	Custom shape
	Installation
+	Bends up to 30° (>3D)
o	Bends from 30° up to 90°
o	Change in Dimension
o	House Connections / Laterals
	Medium
+	Municipal sewage
o	Industrial sewage
+	Process water (industry)
+	Potable water
–	Gas
–	Mineral oil
	Classification according to ISO 11295
+	Class A: Fully structural
o	Class B: Semi structural (inherent ring stiffness)
–	Class C: Semi structural (relies on adhesion)
–	Class D: Non-structural
	Curing method
+	Steam
o	Hot water
Installation method	
-	Pull-In process
+	Inversion process

REQUIRED MATERIAL, EQUIPMENT, STAFF

Materials used

- NORDIFLOW W PE
- 582-25 OF
- Pre-Liner (optional)
- Protection hose
- End sealing sleeves

Required equipment

- CCTV-Inspection
- Cleaning equipment
- Rehabilitation winch
- Vacuum pump
- Mechanical double-mixer or an automatic two component mixing device
- Impregnation unit
- Inversion unit
- Steam or heating unit
- Compressor
- Tools and small equipment
- Telemetric system

Staff

Depending on the equipment, project size and pipe dimensions, we recommend 3 to 6 skilled workers for a lining crew.

NordiTube

NORDITUBE TECHNOLOGIES

PROVIDING SOLUTIONS

TUBETEX W

System Data Sheet

General description

TUBETEX W system consists of a PE coated seamless woven fabric hose combined with a modified two-component-epoxy resin system. Designed for the installation with the inversion method and suitable for steam or hot water curing.

System components

Liner	TUBETEX W
Resin	MK III

Technical system data

Diameter	DN 200 - DN 1000
Coating	Polyethylene [PE]
Coating weight	~ 1200 [g/m²]
Carrier material [liner]	Seamless woven fabric out of PES yarn
Color of the system	Red
Curing method	Steam • Hot water
Processing time of the mixed components at 23 [°C]	8 [h]
Curing time of the resin at 80 [°C] laminate temperature at the coldest spot	3 [h]
Maximum medium temperature [short term]	35 [°C]
Maximum medium temperature [long term]	23 [°C]

Important notice

For material and safety information, please check the corresponding Material Data Sheets and the Material Safety Data Sheets.

For installation parameter, please check the corresponding Material Data Sheets, Method Statement and Installation Manual.

Mechanical properties

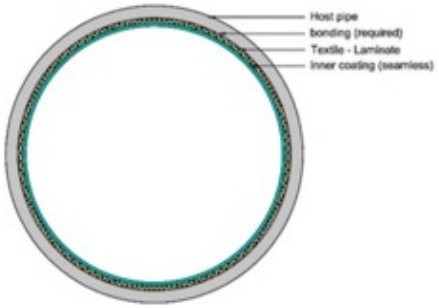
Peel off strength on metallic surfaces	> 30 [N/cm]

Test standard

DVGW GW 327, W330

System design

Laminate	PET fibres and ECR Glass	Felt; Fiber Glass reinforcement and Epoxy resin
Coating	PE	Inner coating



NordiTube

NORDITUBE TECHNOLOGIES

PROVIDING SOLUTIONS

TUBETEX W TPU

System Data Sheet

General description

TUBETEX W TPU system consists of a TPU coated seamless woven fabric hose combined with a modified two-component-epoxy resin system. Designed for the installation with the inversion method and suitable for steam or hot water curing.

System components

Liner	TUBETEX W TPU
Resin	MK III

Technical system data

Diameter	DN 80 - DN 1200
Coating	Thermoplastic Polyurethane [TPU]
Coating weight	~500 - 1500 [g/m²]
Carrier material [liner]	Seamless woven fabric out of PES yarn
Color of the system	Red
Curing method	Steam • Hot water
Processing time of the mixed components at 23 [°C]	8 [h]
Curing time of the resin at 80 [°C] laminate temperature at the coldest spot	3 [h]
Maximum medium temperature [short term]	35 [°C]
Maximum medium temperature [long term]	23 [°C]

Important notice

For material and safety information, please check the corresponding Material Data Sheets and the Material Safety Data Sheets.

For installation parameter, please check the corresponding Material Data Sheets, Method Statement and Installation Manual.

Mechanical properties

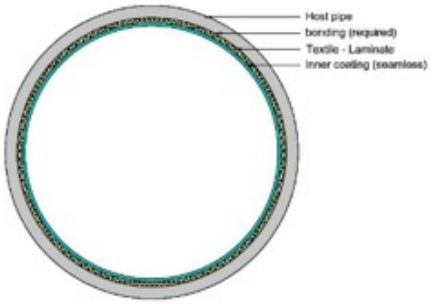
Peel off strength on metallic surfaces	> 30 [N/cm]

Test standard

DVGW GW 327, W 330

System design

Laminate	PES fabric hose	With epoxy resin
Coating	TPU	Inner coating



NordiTube

NORDITUBE
TECHNOLOGIES
PROVIDING SOLUTIONS

TUBETEX W
Method Statement

GENERAL DESCRIPTION

Non-structural cured in place pipe for pressure applications.

SYSTEM APPLICATION CONDITIONS

Explanation

+ suitable
– not suitable
o suitable under certain conditions

	Kind of pipe
+	Pressure pipe
–	Gravity pipe
	Cross section
+	Round
–	Oval (egg shape)
–	Custom shape
	Installation
+	Bends up to 30° (>3D)
o	Bends from 30° up to 90°
o	Change in Dimension
o	House Connections / Laterals
	Medium
+	Municipal sewage
o	Industrial sewage
+	Process water (industry)
+	Potable water
–	Gas
–	Mineral oil
	Classification according to ISO 11295
–	Class A: Fully structural
–	Class B: Semi structural (inherent ring stiffness)
+	Class C: Semi structural (relies on adhesion)
–	Class D: Non-structural
	Curing method
+	Steam
o	Hot water
	Installation method
-	Pull-In process
+	Inversion process

REQUIRED MATERIAL, EQUIPMENT, STAFF

Materials used

- TUBETEX W
- MK III
- Protection hose (optional)
- End sealing sleeves (optional)

Required equipment

- CCTV-Inspection
- Cleaning equipment
- Mechanical double-mixer or an automatic two component mixing device
- Impregnation unit
- Inversion unit
- Steam or heating unit
- Compressor
- Tools and small equipment
- Telemetric system

Staff

Depending on the equipment, project size and pipe dimensions, we recommend 3 to 6 skilled workers for a lining crew.

SUPPLIER CONTACTS

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