



**Composite Pipeline Sleeves Catalog** 

### **Composite Pipeline Sleeves**

### Code Compliant Repairs to Pipeline Assets

# **Expedite Code Compliant Repairs to Pipeline Assets Suffering External Corrosion**

TEAM has the in-house capability to carry out turn-key installation of composite sleeves including surface preparation and inspection. This turn-key approach ensures that projects are executed to the highest safety & quality standards, with zero hand-offs, and utilizing a single PO to expedite projects and maximize efficiencies.

To accelerate the time to repair, TEAM developed standard engineering packages to simplify selection and installation of repairs to wall thinning caused by external corrosion. These packages are built upon the twenty-year successful service history of TEAM's composite pipeline sleeves on buried pipelines designed for high pressure service at temperatures from ambient up to 129°C (264°F).

Designed in accordance with ASME PCC-2, modified-B31G and ISO 24817, TEAM developed standard repair thicknesses to restore the original yield pressure of the pipelines listed in B31G Section 3. The thicknesses and overlap requirements are tabulated to enable immediate installation of code-compliant repairs using materials featured in many of the PRCI-funded test programs. More detailed assessment of repair requirements for wall thinning are completed using a validated spreadsheet.

Tabulated options for TEAM composite pipeline sleeves are provided for the following iterations: (see tables at the back of this catalog)

- + Material grades up to X65
- + Standard diameters up to 42" NPS
- + Original wall thickness up to 17.5mm (0.689")
- + Percentage wall loss of up to 80%
- + Axial defect lengths of up to 610mm (24")
- + Service temperature up to 78°C (172°F)

Repair solutions for pipelines outside this range (and up to 129°C (264°F)), or for less onerous conditions (where the repair thickness required will be lower), are determined using a verified MS Excel sheet.

The materials for the repairs are provided in standard kits containing matched quantities of carbon fiber reinforcement and epoxy resin. The kits also include 500g (1lb) / 0.5L (1pt) of epoxy filler and a small roll of disposable finishing layer. The number of kits

#### **How to Order:**

Please contact TEAM using one of the methods below to enquire about Pipeline Composite Repairs:



If the repair tables are used to select kit requirements, please click on or scan the QR code and enter your requirements to receive a quotation or place an order (for MSA/Contract clients).



If the repair tables are not used or are for custom applications, TEAM is happy to carry out project specific engineering. Please click on or scan the QR code and enter the project technical data to receive a quotation or place an order (for MSA/Contract clients).

For general inquiries or custom solutions, please contact pipelineproducts@teaminc.com

required for each repair are also tabulated, making it simple to determine requirements and cost.

#### **Composite Sleeves for Other Pipeline Defects**

The tabulated repair thicknesses given here are for defects caused by external corrosion only. However, TEAM composite sleeves are also used to restore integrity to lines suffering a wide range of damage mechanisms including:

- + Mechanical damage such as dents
- + Wrinkle bends
- + Cracking
- + Internal corrosion
- + Reinforcement of under-thickness sections

TEAM can provide a quick turnaround for assessments of these defects in accordance with API 579. The repair thickness required to extend the life of the impaired pipeline to meet service expectations can then be determined, taking installation pressure into account. Further, our integrity experts at Quest Integrity can support all applications with more detailed studies, including using FEA where required.

#### **Composite Repair Sleeve Part Numbers**

Description	Part Number
Carbon Fiber Repair Sleeve Kit – Standard For installation on lines between 11°C (52°F) and 40°C (104°F) and service at up to 78°C (172°F).	FCR-KIT-ST-L-F
Carbon Fiber Repair Sleeve Kit – Fast For use where faster curing is required. For installation on lines at or below 5°C (41°F) and 25°C (77°F) and service at up to 78°C (172°F).	FCR-KIT-STF-L-F
Carbon Fiber Repair Sleeve Kit – Elevated Temperature For installation on surfaces between 40°C (104°F) and 80°C (176°F) and service at up to 129°C (264°F).	FCR-KIT-HT-L-F
Finishing layer Disposable layer top-layer applied to the repair to protect the sleeve whilst the epoxy hardens (to be removed before coating).	FCR-PLP-200
Additional Filler Kit Fast-curing, metal-filled epoxy putty for filling defects before application of the repairs.	FCR-FIL-002
Installation Tools Consumables required to install the repairs such as rollers and mixing sticks. Sufficient for a crew of two for one shift.	FCR-KIT-TOOLS
PPE Kit (XXL) Consumables that provide the chemical protection specified on the SDS. Sufficient for a crew of two for one shift.	FCR-KIT-PPE- XXL
Coating Kit Epoxy top-coat to provide UV protection or protection for buried pipe. Each kit contains sufficient material to coat 8.5sqft @30mils thickness.	FCR-RES-001

#### **Repair Tables**

For practicality of presentation, tables providing guidance on repair thickness, overlap and material requirements are based on groups of pipeline diameters based on those given in ASME B31G Section 3. The thickness required is derived for the largest diameter and wall thickness within the group, and so can also be used for the smaller diameters and sizes. However, this means that repairs will be thicker than required for some diameters. Where multiple repairs are expected, it is recommended that specific requirements are determined using TEAM's verified MS Excel calculation sheet (this also calculates the number of repair kits required). There is no pressure limit to the repairs - they are applicable to all pipe within the geometry and SMYS limits given for service at up to 78°C (172°F).

There are two tables for each diameter range. The first gives the repair thickness requirements in terms of number of layers and the second gives the distance the repair should overlap either side of the defect and the number of kits that will be required for the repair. The repair materials are supplied in standard widths of 25". The tables show the length of pipe a single coating kit will cover – select sufficient to cover the full 25" repair width (or cut the fabric to the required width).

A separate report is available documenting the calculation method for the composite sleeves, the verification of the MS Excel Calculation Sheet and the information within the tables.



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Pipe Diameter

Range

NPS 2 - 6

NPS >6 - 10

NPS >10 - 16

NPS >16 - 20

NPS >20 - 24

NPS >24 - 30

NPS >30 - 36

Figure 1. Pages from TEAM's verified-MS Excel calculation sheet for repair thickness

#### **Using the Repair Tables**

- Refer to the table for the pipe diameter of interest. They are grouped in the diameter ranges shown on the right.
- From the first table, select the cell for the relevant percentage wall loss and axial defect length to determine the thickness of repair required (in layers).
- 3. Use the second table in the same way to determine the number of repair kits required for the repair. The overlap length is quoted in the header for the second table and

included in the requirements specified.

4. Order tools, PPE, coatings, additional filler and additional finishing layer, if needed.

#### Example:

NPS 24 line with 50% wall loss 100mm (4") in length.

- 1. Refer to the tables for lines in the range 20-24".
- 2. Table 1 gives number of layers required as 2.
- Table 2 gives number of kits required as 1. The overlap is 100mm (3.88"). Order 1 repair kit along with PPE, tools, additional filler and epoxy coating if required.
- 4. A single coating kit will cover at least 400mm (1.3') of pipe length and so two kits are recommended here to cover the 635mm (25") width fabric.

## NPS 2-6 (60-168mm) Diameter Pipe

### **Repair Thickness Requirement**

		NPS 2-6"	NB Pipe (6	60-168mm)	For Grades	up to X65	and Wall T	hickness u	p to 5.5mm	(0.217in)		
					А	xial length						
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
					R	epair Thick	ness, Laye	rs				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	2	0	0	2	2	2	2	2	2
25%	0	2	2	2	0	2	2	2	2	2	2	2
30%	0	2	2	2	2	2	2	2	2	2	2	2
35%	2	2	2	2	2	2	2	2	2	2	2	2
40%	2	2	2	2	2	2	2	2	3	3	3	3
45%	2	2	3	3	2	2	3	3	3	3	3	3
50%	2	3	3	3	2	3	3	3	3	4	4	4
55%	2	3	4	4	3	3	4	4	4	4	4	4
60%	2	4	4	4	3	4	4	4	4	5	5	5
65%	3	4	4	5	4	4	5	5	5	5	5	5
70%	3	5	5	5	4	5	5	5	5	6	6	6
75%	4	5	6	6	5	5	6	6	6	6	6	6
80%	4	6	6	6	5	6	6	6	6	7	7	7

### **Number of Repair Kits Required**

			NPS	2-6" NB Pip	e (60-168m	nm) - Overl	ap Require	d: 30mm / ·	1.20in			
					А	xial length						
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
%					R	epair Thick	ness, Laye	rs				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	1	0	0	1	1	1	1	1	1
25%	0	1	1	1	0	1	1	1	1	1	1	1
30%	0	1	1	1	1	1	1	1	1	1	1	1
35%	1	1	1	1	1	1	1	1	1	1	1	1
40%	1	1	1	1	1	1	1	1	1	1	1	1
45%	1	1	1	1	1	1	1	1	1	1	1	1
50%	1	1	1	1	1	1	1	1	1	1	1	1
55%	1	1	1	1	1	1	1	1	1	1	1	1
60%	1	1	1	1	1	1	1	1	1	2	2	2
65%	1	1	1	1	1	1	1	1	1	2	2	2
70%	1	1	1	1	1	1	1	1	1	2	2	2
75%	1	1	1	1	1	1	1	1	1	2	2	2
80%	1	1	1	1	1	1	1	1	1	2	2	2

One coating kit can coat up to 1400mm (4.6') of pipe.

## NPS >6-10 (168-273mm) Diameter Pipe

### **Repair Thickness Requirement**

		NPS 6-10"	NB Pipe (>	168-273mn	n) For Grad	es up to X6	5 and Wall	Thickness	up to 7.9m	m (0.312in)					
		Axial length of corrosion													
Wall						12in	14in				22in	24in			
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm			
					R	epair Thick	ness, Laye	rs							
10%	0	0	0	0	0	0	0	0	0	0	0	0			
15%	0	0	0	0	0	0	0	0	0	0	0	0			
20%	0	0	0	0	2	2	0	0	0	0	2	2			
25%	0	0	2	2	2	2	0	2	2	2	2	2			
30%	0	2	2	2	2	2	2	2	2	2	2	2			
35%	0	2	2	2	2	2	2	2	2	2	2	3			
40%	0	2	2	3	3	3	2	2	3	3	3	3			
45%	0	2	3	3	4	4	2	3	3	4	4	4			
50%	2	3	4	4	4	4	3	3	4	4	4	5			
55%	2	3	4	5	5	5	3	4	5	5	5	5			
60%	2	4	5	5	6	6	4	5	5	6	6	6			
65%	2	5	6	6	6	6	4	5	6	6	6	7			
70%	3	5	6	7	7	7	5	6	7	7	7	7			
75%	3	6	7	8	8	8	6	7	7	8	8	8			
80%	4	7	8	8	9	9	7	8	8	8	9	9			

### **Number of Repair Kits Required**

		NPS 6-10" NB Pipe (>168-273mm) - Overlap Required: 46mm / 1.83in														
		Axial length of corrosion														
Wall						12in	14in				22in	24in				
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm				
%					R	epair Thick	ness, Laye	rs								
10%	0	0	0	0	0	0	0	0	0	0	0	0				
15%	0	0	0	0	0	0	0	0	0	0	0	0				
20%	0	0	0	0	1	1	0	0	0	0	1	1				
25%	0	0	1	1	1	1	0	1	1	1	1	1				
30%	0	1	1	1	1	1	1	1	1	1	1	1				
35%	0	1	1	1	1	1	1	1	1	1	1	2				
40%	0	1	1	1	1	1	1	1	1	2	2	2				
45%	0	1	1	1	1	1	1	1	1	2	2	2				
50%	1	1	1	1	1	1	1	1	1	2	2	2				
55%	1	1	1	1	1	1	1	1	1	2	2	2				
60%	1	1	1	1	2	2	1	1	1	3	3	3				
65%	1	1	2	2	2	2	1	1	3	3	3	3				
70%	1	1	2	2	2	2	1	2	3	3	3	3				
75%	1	2	2	2	2	2	2	2	3	3	3	3				
80%	1	2	2	2	2	2	2	3	3	3	4	4				

One coating kit can coat up to 885mm (2.9') of pipe.

## NPS >10-16 (273-406mm) Diameter Pipe

### **Repair Thickness Requirement**

		NPS 10-16	" NB Pipe (	>273-406m	m) For Gra	des up to X	(65 and Wa	II Thicknes	s up to 12.7	7mm (0.5in)		
					А	xial length						
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
					R	epair Thick	ness, Laye	rs				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	2	2	0	0	0
25%	0	0	0	2	2	2	2	2	2	0	0	0
30%	0	0	2	2	2	2	2	2	3	0	2	2
35%	0	0	2	2	3	3	3	3	4	2	2	2
40%	0	2	2	3	4	4	4	4	5	2	2	3
45%	0	2	3	4	5	5	5	6	6	2	3	4
50%	0	2	4	5	6	6	6	7	7	3	4	5
55%	0	3	5	6	7	7	7	8	8	4	5	6
60%	0	4	6	7	8	8	9	9	9	5	6	7
65%	2	5	7	8	9	9	10	10	10	5	7	8
70%	2	6	8	9	10	11	11	11	11	7	8	9
75%	2	7	9	11	11	12	12	12	12	8	9	10
80%	3	8	11	12	13	13	13	14	14	9	11	12

### **Number of Repair Kits Required**

			NPS 10-	-16" NB Pip	e (>273-40	6mm) - Ove	erlap Requi	red: 72mm	/ 2.83in			
					A	xial length						
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
					R	epair Thick	ness, Laye	rs				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	1	1	0	0	0
25%	0	0	0	1	1	1	1	1	1	0	0	0
30%	0	0	1	1	1	1	1	1	2	0	2	2
35%	0	0	1	1	1	1	1	1	3	2	2	2
40%	0	1	1	1	2	2	2	2	3	2	2	2
45%	0	1	1	2	2	2	2	4	4	2	2	3
50%	0	1	2	2	2	2	2	4	4	2	3	3
55%	0	1	2	2	2	2	2	5	5	3	3	4
60%	0	2	2	2	3	3	5	5	5	3	4	4
65%	1	2	2	3	3	3	6	6	6	3	4	5
70%	1	2	3	3	3	7	7	7	7	4	5	5
75%	1	2	3	4	4	7	7	7	7	5	5	6
80%	1	3	4	4	8	8	8	8	8	5	7	7

One coating kit can coat up to 610mm (2.0') of pipe.

## NPS >16-20 (406-508mm) Diameter Pipe

### **Repair Thickness Requirement**

	N	PS >16-20"	NB Pipe (>	-406-508mı	m) For Grad	les up to X	65 and Wal	l Thickness	s up to 15.9	mm (0.626i	in)	
					А	xial length						
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
					R	epair Thick	ness, Laye	rs				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	2	2	2
25%	0	0	0	0	2	2	2	2	2	2	2	2
30%	0	0	0	2	2	2	2	3	3	3	3	3
35%	0	0	2	2	3	3	4	4	4	4	4	4
40%	0	0	2	3	4	4	5	5	5	5	6	6
45%	0	2	3	4	5	6	6	6	7	7	7	7
50%	0	2	4	5	6	7	7	8	8	8	8	8
55%	0	2	5	6	7	8	9	9	9	9	10	10
60%	0	3	6	8	9	9	10	10	11	11	11	11
65%	0	4	7	9	10	11	11	12	12	12	12	13
70%	0	5	8	10	12	12	13	13	14	14	14	14
75%	2	6	10	12	13	14	14	15	15	15	15	16
80%	2	8	11	13	15	15	16	16	17	17	17	17

### **Number of Repair Kits Required**

		NPS >16-20" NB Pipe (>406-508mm) - Overlap Required: 90mm / 3.54in													
					A	xial length									
Wall						12in	14in				22in	24in			
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm			
%					R	epair Thick	ness, Laye	rs							
10%	0	0	0	0	0	0	0	0	0	0	0	0			
15%	0	0	0	0	0	0	0	0	0	0	0	0			
20%	0	0	0	0	0	0	0	0	0	2	2	2			
25%	0	0	0	0	1	1	1	1	2	2	2	2			
30%	0	0	0	1	1	1	1	1	2	2	2	2			
35%	0	0	1	1	1	1	2	3	3	3	3	3			
40%	0	0	1	1	2	2	2	4	4	4	4	4			
45%	0	1	1	2	2	2	4	4	5	5	5	5			
50%	0	1	2	2	2	3	5	6	6	6	6	6			
55%	0	1	2	2	3	3	7	7	7	7	7	7			
60%	0	1	2	3	4	7	7	7	8	8	8	8			
65%	0	2	3	4	4	8	8	9	9	9	9	9			
70%	0	2	3	4	9	9	9	9	10	10	10	10			
75%	1	2	4	5	9	10	10	11	11	11	11	11			
80%	1	3	4	5	11	11	11	11	12	12	12	12			

One coating kit can coat up to 485mm (1.6') of pipe.

## NPS >20-24 (506-610mm) Diameter Pipe

### **Repair Thickness Requirement**

	١	NPS 20-24"	NB Pipe (>	508-610mn	n) For Grad	es up to X6	55 and Wall	Thickness	up to 15.9ı	mm (0.626i	n)	
					А	xial length						
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
					R	epair Thick	ness, Laye	rs				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	2	2
25%	0	0	0	0	0	2	2	2	2	2	2	2
30%	0	0	0	2	2	2	2	2	3	3	3	3
35%	0	0	2	2	2	3	3	4	4	4	4	4
40%	0	0	2	3	3	4	5	5	5	5	5	6
45%	0	0	2	4	5	5	6	6	6	7	7	7
50%	0	2	3	5	6	7	7	7	8	8	8	8
55%	0	2	4	6	7	8	8	9	9	9	9	10
60%	0	2	5	7	8	9	10	10	10	11	11	11
65%	0	3	6	8	10	11	11	12	12	12	12	12
70%	0	4	8	10	11	12	13	13	13	14	14	14
75%	0	6	9	11	13	13	14	14	15	15	15	15
80%	2	7	11	13	14	15	16	16	16	17	17	17

### **Number of Repair Kits Required**

		NPS 20-24" NB Pipe (>508-610mm) - Overlap Required: 98mm / 3.88in													
					A	xial length									
Wall						12in	14in				22in	24in			
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm			
%					R	epair Thick	ness, Laye	rs							
10%	0	0	0	0	0	0	0	0	0	0	0	0			
15%	0	0	0	0	0	0	0	0	0	0	0	0			
20%	0	0	0	0	0	0	0	0	0	0	2	2			
25%	0	0	0	0	0	1	1	1	2	2	2	2			
30%	0	0	0	1	1	1	1	1	3	3	3	3			
35%	0	0	1	1	1	2	2	4	4	4	4	4			
40%	0	0	1	2	2	2	2	4	4	4	4	5			
45%	0	0	1	2	2	2	5	5	5	6	6	6			
50%	0	1	2	2	3	3	6	6	7	7	7	7			
55%	0	1	2	3	3	7	7	8	8	8	8	8			
60%	0	1	2	3	4	8	8	8	8	9	9	9			
65%	0	2	3	4	4	9	9	10	10	10	10	10			
70%	0	2	4	4	9	10	11	11	11	12	12	12			
75%	0	3	4	5	11	11	12	12	13	13	13	13			
80%	1	3	5	11	12	13	14	14	14	14	14	14			

One coating kit can coat up to 400mm (1.3') of pipe.

# NPS >24-30 (610-762mm) Diameter Pipe

### **Repair Thickness Requirement**

	ı	NPS 24-30"	NB Pipe (>	610-762mn	n) For Grad	es up to X6	55 and Wall	Thickness	up to 15.9	mm (0.626i	n)	
	Axial length of corrosion											
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
					R	epair Thick	kness, Laye	ers				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	2
25%	0	0	0	0	0	2	2	2	2	2	2	2
30%	0	0	0	0	2	2	2	2	2	3	3	3
35%	0	0	0	2	2	3	3	3	4	4	4	4
40%	0	0	2	2	3	4	4	5	5	5	5	5
45%	0	0	2	3	4	5	5	6	6	6	7	7
50%	0	0	3	4	5	6	7	7	7	8	8	8
55%	0	2	3	5	6	7	8	8	9	9	9	9
60%	0	2	5	6	8	9	9	10	10	10	11	11
65%	0	2	6	8	9	10	11	11	12	12	12	12
70%	0	3	7	9	10	11	12	13	13	13	14	14
75%	0	5	8	11	12	13	14	14	15	15	15	15
80%	0	6	10	12	14	15	15	16	16	16	17	17

### **Number of Repair Kits Required**

			NPS 24-	30" NB Pip	e (>610-762	2mm) - Ove	rlap Requi	red: 110mn	n / 4.33in				
		Axial length of corrosion											
Wall						12in	14in				22in	24in	
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm	
%					R	epair Thick	ness, Laye	rs					
10%	0	0	0	0	0	0	0	0	0	0	0	0	
15%	0	0	0	0	0	0	0	0	0	0	0	0	
20%	0	0	0	0	0	0	0	0	0	0	0	2	
25%	0	0	0	0	0	1	1	2	2	2	2	2	
30%	0	0	0	0	1	1	1	2	2	3	3	3	
35%	0	0	0	1	1	2	2	3	4	4	4	4	
40%	0	0	1	1	2	2	4	5	5	5	5	5	
45%	0	0	1	2	2	3	5	6	6	6	7	7	
50%	0	0	2	2	3	3	7	7	7	8	8	8	
55%	0	1	2	3	3	7	8	8	9	9	9	9	
60%	0	1	3	3	4	9	9	10	10	10	11	11	
65%	0	1	3	4	9	10	11	11	12	12	12	12	
70%	0	2	4	5	10	11	12	13	13	13	15	15	
75%	0	3	4	6	12	13	15	15	16	16	16	16	
80%	0	3	5	12	15	16	16	17	17	17	18	18	

One coating kit can coat up to 355mm (1.1') of pipe.

## NPS >30-36 (762-914mm) Diameter Pipe

### **Repair Thickness Requirement**

	1	NPS 30-36"	NB Pipe (>	762-914mn	n) For Grad	es up to X6	55 and Wall	Thickness	up to 17.5r	nm (0.689i	n)		
		Axial length of corrosion											
Wall						12in	14in				22in	24in	
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm	
					R	epair Thick	ness, Laye	rs					
10%	0	0	0	0	0	0	0	0	0	0	0	0	
15%	0	0	0	0	0	0	0	0	0	0	0	0	
20%	0	0	0	0	0	0	0	0	0	0	0	0	
25%	0	0	0	0	0	0	2	2	2	2	2	2	
30%	0	0	0	0	2	2	2	2	2	3	3	3	
35%	0	0	0	2	2	2	3	3	4	4	4	4	
40%	0	0	0	2	3	4	4	5	5	5	5	6	
45%	0	0	2	3	4	5	5	6	6	7	7	7	
50%	0	0	2	4	5	6	7	7	8	8	8	9	
55%	0	0	3	5	6	7	8	9	9	9	10	10	
60%	0	2	4	6	8	9	10	10	11	11	11	12	
65%	0	2	5	7	9	10	11	12	12	13	13	13	
70%	0	2	6	9	11	12	13	13	14	14	14	15	
75%	0	4	8	10	12	13	14	15	15	16	16	16	
80%	0	5	9	12	14	15	16	17	17	18	18	18	

### **Number of Repair Kits Required**

			NPS 30-	36" NB Pip	e (>762-914	lmm) - Ove	rlap Requir	red: 126mn	n / 4.98in			
	Axial length of corrosion											
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
					R	epair Thick	ness, Laye	rs				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
25%	0	0	0	0	0	0	2	3	3	3	3	3
30%	0	0	0	0	2	2	2	3	3	4	4	4
35%	0	0	0	2	2	2	4	4	5	5	5	5
40%	0	0	0	2	2	3	5	6	6	6	6	8
45%	0	0	2	2	3	6	6	8	8	9	9	9
50%	0	0	2	3	3	8	9	9	10	10	10	11
55%	0	0	2	3	4	9	10	11	11	11	12	12
60%	0	2	3	4	10	11	12	12	14	14	14	15
65%	0	2	3	5	11	12	14	15	15	16	16	16
70%	0	2	4	6	14	15	16	16	17	17	17	18
75%	0	3	5	12	15	16	17	18	18	20	20	20
80%	0	3	6	15	17	18	20	21	21	22	22	22

One coating kit can coat up to 275mm (0.9') of pipe.

## NPS >36-42 (914-1066mm) Diameter Pipe

### **Repair Thickness Requirement**

	N	PS 36-42"	NB Pipe (>9	914-1066mı	n) For Grac	des up to X	65 and Wal	l Thickness	s up to 17.5	mm (0.689i	n)		
		Axial length of corrosion											
Wall						12in	14in				22in	24in	
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm	
					R	epair Thick	ness, Laye	rs					
10%	0	0	0	0	0	0	0	0	0	0	0	0	
15%	0	0	0	0	0	0	0	0	0	0	0	0	
20%	0	0	0	0	0	0	0	0	0	0	0	0	
25%	0	0	0	0	0	0	0	2	2	2	2	2	
30%	0	0	0	0	0	2	2	2	2	2	3	3	
35%	0	0	0	0	2	2	3	3	3	4	4	4	
40%	0	0	0	2	2	3	4	4	5	5	5	6	
45%	0	0	2	2	3	4	5	6	6	6	7	7	
50%	0	0	2	3	5	6	6	7	7	8	8	8	
55%	0	0	2	4	6	7	8	8	9	9	10	10	
60%	0	0	3	5	7	8	9	10	10	11	11	11	
65%	0	2	4	7	9	10	11	11	12	12	13	13	
70%	0	2	6	8	10	11	12	13	13	14	14	14	
75%	0	3	7	10	12	13	14	15	15	16	16	16	
80%	0	4	8	11	13	15	16	16	17	17	18	18	

### **Number of Repair Kits Required**

			NPS 36-4	42" NB Pipe	e (>914-106	6mm) - Ove	erlap Requi	ired: 137mr	n / 5.38in			
	Axial length of corrosion											
Wall						12in	14in				22in	24in
Loss	51mm	102mm	153mm	204mm		306mm	357mm	408mm		510mm	561mm	610mm
%					R	epair Thick	ness, Laye	rs				
10%	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
25%	0	0	0	0	0	0	0	3	3	3	3	3
30%	0	0	0	0	0	2	3	3	3	3	5	5
35%	0	0	0	0	2	2	5	5	5	6	6	6
40%	0	0	0	2	2	3	6	6	7	7	7	9
45%	0	0	2	2	3	6	7	9	9	9	10	10
50%	0	0	2	3	4	9	9	10	10	11	11	11
55%	0	0	2	3	5	10	11	11	13	13	14	14
60%	0	0	3	4	10	11	13	14	14	16	16	16
65%	0	2	3	5	13	14	16	16	17	17	18	18
70%	0	2	5	6	14	16	17	18	18	20	20	20
75%	0	3	5	14	17	18	20	21	21	23	23	23
80%	0	3	6	16	18	21	23	23	24	24	26	26

One coating kit can coat up to 245mm (0.8') of pipe.



