

Bondstrand™ 2000M/7000M for Marine & Offshore

Product Data - 1 to 6 inch (Quick-lock™ joint), 8 to 40 inch (Taper/Taper joint) with external pressure requirements



Applications

- Ballast
- Sanitary service & sewage
- Chlorination
- Drain
- Portable discharge line
- Cargo line
- Stripper lines
- Tank cleaning (salt water)
- Fire protection mains
- Various other applications

Approvals

In 1993, IMO (International Maritime Organization) issued Resolution A.753 (18) covering acceptance criteria for the use of plastic pipe on ships. Major certifying bodies have adopted and implemented these Guidelines in their respective Rules and Regulations for the Classification of Ships.

All Bondstrand pipe series used in the marine industry are designed and type-approved by the below major certifying bodies. (A complete list is available, on request).

- American Bureau of Shipping (ABS), U.S.A.;
- Bureau Veritas, France;
- Det Norske Veritas, Norway;
- Germanischer Lloyd, Germany;
- Lloyd's Register, United Kingdom;
- Nippon Kaiji Kyokai, Japan;
- Registro Italiano Navale (RINA), Italy;
- United States Coast Guard (USCG), U.S.A.

Materials and Characteristics

Maximum operating temperature at design pressure: 93°C. However at lower operating pressures, the operating temperature of this application may be higher. (Consult NOV Fiber Glass Systems for clarifications).

- Pipe diameter: 1 - 40 inch (25-1000 mm).
- Pipe system design for pressure ratings up to: 17.2 bar (250 psi) for 1 - 16 inch and 16.0 bar (232 psi) for 18 - 40 inch, depending type of fittings, see contents for each fitting designated pressure rating.
- ASTM D-2992 Hydrostatic Design Basis (Procedure B - service factor 0.5);
- ASTM D-1599 Safety factor of 4:1. Design criteria for external pressure requirements are in accordance with IMO regulations.

Bondstrand 2000M

ASTM D-2310 Classification: RTRP-11FX for static hydrostatic design basis. Complies with ASTM F-1173 Classification and ASTM D-2996 designation.

Bondstrand 7000M

ASTM D-2310 Classification: RTRP-11AX for static hydrostatic design basis. Complies with ASTM F-1173 Classification and ASTM

Joining System

Quick-Lock™

1-6 inch (25-150 mm)

Straight/taper adhesive joint with integral pipe stop in bell end.

End configuration: Integral Quick-Lock bell end x shaved straight spigot.

Taper/Taper

8-40 inch (200-1000 mm)

Taper/Taper adhesive joint.

End configuration: Integral Taper bell x shaved taper spigot.

Fitting and Flanges

1-6 inch (25-150 mm)

Quick-Lock (straight/ taper) adhesive joint with integral pipe stop in bell end.

End configuration: Integral Quick-Lock bell ends.

8-40 inch (200-1000 mm)

Taper/Taper adhesive joint.

End configuration: Integral Taper bell end.

NOTE: Pipe nipples, saddles and flanged fittings have different end configurations.

Tolerance +/- 50 mm

Thermosetting adhesive for bonded

joints: Both Quick-Lock and Taper/Taper joints use PSX™-60 two-part epoxy adhesive.

View of Joint Illustrations



Quick-Lock



Taper/Taper

Pipe Series

Pipe

Filament-wound Glassfiber Reinforced Epoxy (GRE) pipe for Bondstrand adhesive-bonding systems.

Fittings

A wide range of lined filament-wound Glassfiber Reinforced Epoxy (GRE) fittings for Bondstrand adhesive-bonding systems. For special fittings, not listed in this product guide, please contact your NOV Fiber Glass Systems representative.

Flanges

Filament-wound Glassfiber Reinforced Epoxy (GRE) heavy-duty flanges and stub-end ring flanges for Taper/Taper and Quick-Lock adhesive bonding systems. Standard flange drilling patterns as per ANSI B16.5 (150 lb) for sizes 1" to 24" and ANSI B16.47, Series A (150 lb.) for sizes 26" to 40". Other flange drilling patterns, such as ANSI B16.5 (>150 lb.), DIN, ISO and JIS are also available.

Bondstrand 2000M

Glassfiber Reinforced Epoxy (GRE) pipe system. Standard 0.5 mm internal resin-rich reinforced liner.

- Maximum operating temperature: 93°C (for higher temperature rating, consult NOV Fiber Glass Systems).
- Maximum pressure rating: 17.2 bar (250 psi) for 1 - 16 inch, 16.0 bar (232 psi) for 18 - 40 inch.
- Minimum pressure: full vacuum.
- External Pressure Requirements: In accordance with IMO Regulations.

Bondstrand 7000M (*conductive)

Glassfiber Reinforced Epoxy (GRE) pipe system.

- Maximum operating temperature: 93°C (for higher temperature rating, consult NOV Fiber Glass Systems) with comingled carbon fibers.
- Maximum pressure rating: 17.2 bar (250 psi) for 1 - 16 inch, 16.0 bar (232 psi) for 18 - 40 inch.
- Minimum pressure: full vacuum.
- External Pressure Requirements: In accordance with IMO Regulations.

* **Conductive** - Our conductive pipe systems have been developed to prevent accumulation of potentially dangerous levels of static electrical charges. Pipe, fittings and flanges contain high strength conductive filaments. Together with a conductive adhesive this provides an electrically continuous system.

Description	Bondstrand 2000M	Bondstrand 7000M
Pipe Diameter	1-40 inch (25-1000 mm)	1-40 inch (25-1000 mm)
Joining System	Quick-Lock 1-6 inch Taper/Taper 8-40 inch	Quick-Lock 1-6 inch Taper/Taper 8-40 inch
Liner ⁽¹⁾	0.5 mm	-
Temperature ⁽²⁾	200°F (93°C)	200°F (93°C)
Pressure Rating ⁽³⁾	17.2 bar (1-16 inch) 16.0 bar (18-40 inch)	17.2 bar (1-16 inch) 16.0 bar (18-40 inch)

⁽¹⁾ Available without an internal liner.

⁽²⁾ For temperature above 200°F (93°C), please consult NOV Fiber Glass Systems.

⁽³⁾ See fitting tables for specific pressure rating for individual fittings.

Pipe Length

Nominal Pipe Size		Joining System	Approximate Overall Length	
in	mm		ft	m
1 - 1½	25 - 40	Quick-Lock	10	3.0
2 - 6	50 - 150	Quick-Lock	30	9.0
8-10	200-250	Taper/Taper	40	11.89
12 - 16	300 - 400	Taper/Taper	40	11.89
18-40	450-1000	Taper/Taper	40	11.89

NOTE: Overall length varies from plant to plant. Consult NOV Fiber Glass Systems if exact overall length is required.

Dimensional Data - Bondstrand 2000M

Nominal Pipe Size		Inside Diameter		Min. Structural Wall Thickness		Pipe Weight	
in	mm	in	mm	in	mm	lb/ft	kg/m
1	25	1.1	27.1	0.1	3.0	0.5	0.7
1½	40	1.7	42.1	0.1	3.0	0.9	1.3
2	50	2.1	53.0	0.1	3.1	0.9	1.3
3	80	3.2	81.8	0.1	3.1	1.2	1.8
4	100	4.1	105.2	0.2	4.1	2.1	3.1
5	125	5.2	131.9	0.2	4.1	2.4	3.5
6	150	6.3	159.0	0.2	4.1	3.1	4.6
8	200	8.2	208.8	0.2	5.5	5.0	7.4
10	250	10.4	262.9	0.3	7.0	8.1	12.0
12	300	12.4	313.7	0.3	8.3	11.4	17.0
14	350	13.3	337.6	0.4	9.0	12.8	19.0
16	400	15.2	385.8	0.4	10.3	16.8	25.0
18	450	17.1	433.8	0.5	11.5	21.5	32.0
20	500	19.0	482.1	0.5	12.8	26.2	39.0
22	550	20.9	530.3	0.6	14.1	32.9	49.0
24	600	22.8	578.6	0.6	15.4	37.6	56.0
26	650	25.6	650.0	0.7	17.3	44.3	66.0
28	700	27.6	700.0	0.7	18.7	50.4	75.0
30	750	29.5	750.0	0.8	20.0	62.5	93.0
32	800	31.5	800.0	0.8	21.4	68.5	102.0
36	900	35.4	900.0	0.9	24.1	88.7	132.0
40	1000	39.4	1000.0	1.1	26.9	110.9	165.0

Dimensional Data - Bondstrand 7000M

Nominal Pipe Size		Inside Diameter		Min. Structural Wall Thickness		Pipe Weight	
in	mm	in	mm	in	mm	lb/ft	kg/m
1	25	1.1	27.1	0.1	3.5	0.5	0.7
1½	40	1.7	42.1	0.1	3.5	0.9	1.3
2	50	2.1	53.0	0.1	3.6	0.9	1.3
3	80	3.2	81.8	0.1	3.6	1.2	1.8
4	100	4.1	105.2	0.2	4.6	2.1	3.1
6	150	5.2	131.9	0.2	4.6	2.4	3.5
5	125	6.3	159.0	0.2	4.6	3.1	4.6
8	200	8.2	208.8	0.2	5.5	5.0	7.4
10	250	10.4	262.9	0.3	7.0	8.1	12.0
12	300	12.4	313.7	0.3	8.3	11.4	17.0
14	350	13.3	337.6	0.4	9.0	12.8	19.0
16	400	15.2	385.8	0.4	10.3	16.8	25.0
18	450	17.1	433.8	0.5	11.5	21.5	32.0
20	500	19.0	482.1	0.5	12.8	26.2	39.0
22	550	20.9	530.3	0.6	14.1	32.9	49.0
24	600	22.8	578.6	0.6	15.4	37.6	56.0
26	650	25.6	650.0	0.7	17.3	44.3	66.0
28	700	27.6	700.0	0.7	18.7	50.4	75.0
30	750	29.5	750.0	0.8	20.0	62.5	93.0
32	800	31.5	800.0	0.8	21.4	68.5	102.0
36	900	35.4	900.0	0.9	24.1	88.7	132.0
40	1000	39.4	1000.0	1.1	26.9	110.9	165.0

Ultimate Collapse Pressure*

Nominal Pipe Size		Internal Pressure Static ⁽¹⁾		2000M		7000M	
in	mm	psi	bar	psi	bar	psi	bar
1	25	249.5	17.2	10181.7	702.0	10761.8	742.0
1½	40	249.5	17.2	2770.2	191.0	2871.8	198.0
2	50	249.5	17.2	1522.9	105.0	1566.4	108.0
3	80	249.5	17.2	423.5	29.2	430.8	29.7
4	100	249.5	17.2	462.7	31.9	469.9	32.4
5	125	249.5	17.2	235.0	16.2	237.9	16.4
6	150	249.5	17.2	134.9	9.3	136.3	9.4
8	200	249.5	17.2	143.6	9.9	143.6	9.9
10	250	249.5	17.2	147.9	10.2	147.9	10.2
12	300	249.5	17.2	146.5	10.1	146.5	10.1
14	350	249.5	17.2	149.4	10.3	149.4	10.3
16	400	249.5	17.2	149.4	10.3	149.4	10.3
18	450	232.1	16.0	146.5	10.1	146.5	10.1
20	500	232.1	16.0	147.9	10.2	147.9	10.2
22	550	232.1	16.0	147.9	10.2	147.9	10.2
24	600	232.1	16.0	149.4	10.3	149.4	10.3
26	650	232.1	16.0	149.4	10.3	149.4	10.3
28	700	232.1	16.0	150.8	10.4	150.8	10.4
30	750	232.1	16.0	149.4	10.3	149.4	10.3
32	800	232.1	16.0	150.8	10.4	150.8	10.4
36	900	232.1	16.0	150.8	10.4	150.8	10.5
40	1000	232.1	16.0	153.7	10.6	153.7	10.6

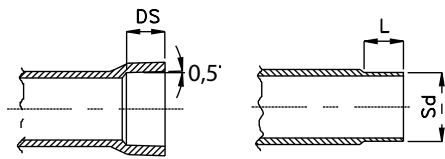
*NOTE: Ultimate short-term external failure pressure at 150°F (65°C)

⁽¹⁾ Up to 200°F (93°C).

Quick-Lock Dimensions

Dimensions for Quick-Lock bell & spigot adhesive bonded joints

Nominal Pipe Size		Insertion Depth (Ds)		Spigot Diameter (Sd)				Spigot Length (L)			
				minimum		maximum		maximum		minimum	
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
1	25	1.1	27.0	1.3	32.6	1.3	32.9	1.1	28.5	1.2	31.0
1½	40	1.3	32.0	1.9	47.5	1.9	47.8	1.3	33.5	1.4	36.0
2	50	1.8	46.0	2.3	59.2	2.3	59.6	1.9	49.0	2.0	52.0
3	80	1.8	46.0	3.4	87.6	3.5	88.0	1.9	49.0	2.0	52.0
4	100	1.8	46.0	4.4	112.5	4.4	112.9	1.9	49.0	2.0	52.0
5	125	2.2	57.0	5.5	139.5	5.5	139.9	2.3	58.5	2.4	61.5
6	150	2.2	57.0	6.5	166.2	6.6	166.6	2.3	59.0	2.4	62.0

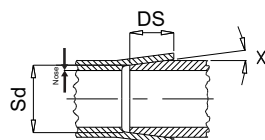


Taper/Taper Dimensions*

Tapered spigot dimensions for adhesive bonded Taper/Taper joints

Nominal Pipe Size		Taper Angle	Insertion Depth		Nominal Spigot Nose Thickness		Diameter of Spigot at Nose	
			X	Ds	Sd	Sd		
in	mm	Degree	in	mm	in	mm	in	mm
8	200	2.5	2.6	65	0.1	3.1	8.5	215.0
10	250	2.5	3.1	80	0.2	4.1	10.7	271.0
12	300	2.5	3.7	95	0.2	4.7	12.7	323.0
14	350	2.5	3.9	100	0.2	5.2	13.7	348.0
16	400	2.5	4.3	110	0.2	6.1	15.7	398.0
18	450	2.5	4.5	114	0.2	4.6	17.4	443.0
20	500	2.5	5.0	127	0.2	5.0	19.4	492.2
22	550	2.5	6.0	152	0.2	4.5	21.2	539.3
24	600	3.5	7.0	178	0.1	3.8	23.1	586.3
26	650	2.5	7.0	178	0.2	5.8	26.1	661.6
28	700	1.8	7.0	178	0.3	6.4	28.1	712.9
30	750	1.8	7.0	178	0.2	4.2	29.9	758.4
32	800	1.8	7.0	178	0.4	8.9	32.2	817.8
36	900	1.8	8.0	203	0.2	5.6	35.9	911.3
40	1000	1.8	12.6	320	0.3	8.1	40.0	1016.3

*Bondstrand 7000M



Span Length

Bondstrand 2000M

Nominal Pipe Size		Single Span ⁽¹⁾		Continuous Span ⁽¹⁾	
		ft	m	ft	m
in	mm	ft	m	ft	m
1	25	8.5	2.6	10.8	3.3
1½	40	9.5	2.9	12.1	3.7
2	50	10.2	3.1	13.1	4.0
3	80	11.5	3.5	14.8	4.5
4	100	13.1	4.0	16.7	5.1
5	125	14.1	4.3	17.7	5.4
6	150	14.8	4.5	18.7	5.7
8	200	16.7	5.1	21.3	6.5
10	250	19.0	5.8	23.9	7.3
12	300	20.7	6.3	26.2	8.0
14	350	21.3	6.5	27.2	8.3
16	400	23.0	7.0	28.9	8.8
18	450	24.3	7.4	30.5	9.3
20	500	25.3	7.7	32.2	9.8
24	600	27.9	8.5	35.4	10.8
28	700	30.5	9.3	38.7	11.8
30	750	31.5	9.6	40.0	12.2
32	800	32.8	10.0	41.7	12.7
36	900	34.4	10.5	44.0	13.4
40	1000	36.4	11.1	46.3	14.1

Bondstrand 7000M

Nominal Pipe Size		Single Span ⁽¹⁾		Continuous Span ⁽¹⁾	
		ft	m	ft	m
in	mm	ft	m	ft	m
1	25	8.5	2.6	10.8	3.3
1½	40	9.5	2.9	12.5	3.8
2	50	10.2	3.1	13.5	4.1
3	80	11.5	3.5	14.8	4.5
4	100	13.1	4.0	17.1	5.2
5	125	14.1	4.3	18.4	5.6
6	150	14.8	4.5	19.4	5.9
8	200	16.4	5.0	21.3	6.5
10	250	18.7	5.7	23.9	7.3
12	300	20.3	6.2	26.2	8.0
14	350	21.0	6.4	27.2	8.3
16	400	22.6	6.9	28.9	8.8
18	450	23.9	7.3	30.5	9.3
20	500	25.3	7.7	32.2	9.8
24	600	27.6	8.4	35.4	10.8
28	700	30.5	9.3	38.7	11.8
30	750	31.5	9.6	40.0	12.2
32	800	32.5	9.9	41.7	12.7
36	900	34.4	10.5	44.0	13.4
40	1000	36.4	11.1	46.3	14.1

⁽¹⁾ Span recommendations are based on pipes filled with water having a density of 1000 kg/m³. No provisions for the weight of valves, flanges or other heavy objects were considered in the calculations.

NOTE: ISO 14692 recommends a maximum support span length of 6.0 m

Elbows 90°

Filament-wound 90° elbows with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends for adhesive bonding

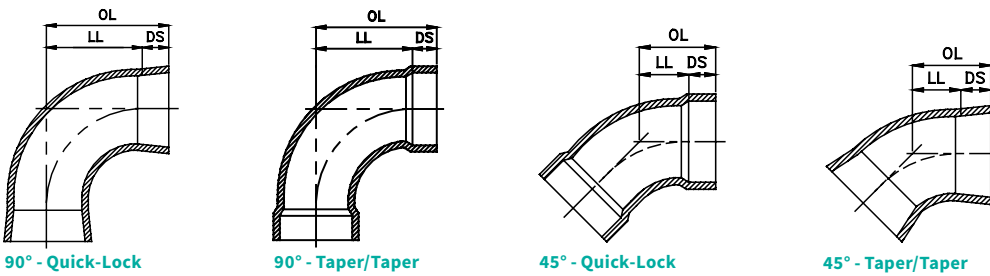
Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	psi	bar	lbs	kg
1	25	2.6	65.0	3.6	92.0	249.5	17.2	0.7	0.3
1½	40	3.2	81.0	4.4	113.0	249.5	17.2	0.9	0.4
2	50	3.0	76.0	4.8	122.0	249.5	17.2	1.1	0.5
3	80	4.5	114.0	6.3	160.0	249.5	17.2	2.4	1.1
4	100	6.0	152.0	7.8	198.0	249.5	17.2	3.5	1.6
5	125	7.7	195.0	9.9	252.0	249.5	17.2	5.9	2.7
6	150	9.0	229.0	11.3	286.0	249.5	17.2	7.9	3.6
8	200	12.4	315.0	15.0	380.0	249.5	17.2	15.0	6.8
10	250	15.4	391.0	18.5	471.0	249.5	17.2	24.2	11.0
12	300	18.6	472.0	22.3	567.0	249.5	17.2	39.6	18.0
14	350	14.3	364.0	18.3	464.0	249.5	17.2	57.3	26.0
16	400	15.8	402.0	20.2	512.0	249.5	17.2	68.3	31.0
18	450	18.0	458.0	22.5	572.0	232.1	16.0	116.7	53.0
20	500	20.0	508.0	25.0	635.0	232.1	16.0	143.2	65.0
22	550	22.0	559.0	28.0	711.0	232.1	16.0	207.0	94.0
24	600	23.0	584.0	30.0	762.0	232.1	16.0	268.7	122.0
26	650	26.0	660.0	33.0	838.0	232.1	16.0	396.5	180.0
28	700	28.0	711.0	35.0	889.0	232.1	16.0	451.5	205.0
30	750	30.0	762.0	37.0	940.0	232.1	16.0	535.2	243.0
32	800	32.0	813.0	39.0	991.0	232.1	16.0	726.9	330.0
36	900	36.0	915.0	44.0	1118.0	232.1	16.0	918.5	417.0
40	1000	41.9	1065.0	54.5	1385.0	232.1	16.0	1077.1	489.0

Elbows 45°

Filament-wound 45° Quick-Lock (1-6 inch) and Taper/Taper (8-40 inch) socket ends for adhesive bonding

Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	psi	bar	lbs	kg
1	25	0.9	22.0	1.9	49.0	249.5	17.2	0.4	0.2
1½	40	1.1	29.0	2.4	61.0	249.5	17.2	0.7	0.3
2	50	1.4	35.0	3.2	81.0	249.5	17.2	0.9	0.4
3	80	2.0	51.0	3.8	97.0	249.5	17.2	1.8	0.8
4	100	2.5	64.0	4.3	110.0	249.5	17.2	2.4	1.1
5	125	3.3	84.0	5.6	141.0	249.5	17.2	4.0	1.8
6	150	3.7	95.0	6.0	152.0	249.5	17.2	5.3	2.4
8	200	5.4	137.0	8.0	202.0	249.5	17.2	9.5	4.3
10	250	6.7	169.0	9.8	249.0	249.5	17.2	16.1	7.3
12	300	8.1	205.0	11.8	300.0	249.5	17.2	24.2	11.0
14	350	4.9	125.0	8.9	225.0	249.5	17.2	37.4	17.0
16	400	5.6	142.0	9.9	252.0	249.5	17.2	44.1	20.0
18	450	7.5	191.0	12.0	305.0	232.1	16.0	72.7	33.0
20	500	8.3	210.0	13.3	337.0	232.1	16.0	88.1	40.0
22	550	9.1	232.0	15.2	384.0	232.1	16.0	138.8	63.0
24	600	9.9	252.0	16.9	430.0	232.1	16.0	180.6	82.0
26	650	10.8	274.0	17.8	452.0	232.0	16.0	273.1	124.0
28	700	11.6	295.0	18.6	473.0	232.1	16.0	308.4	140.0
30	750	12.7	322.0	19.7	500.0	232.1	16.0	361.2	164.0
32	800	13.3	337.0	20.3	515.0	232.1	16.0	493.4	224.0
36	900	15.7	400.0	23.7	603.0	232.1	16.0	623.3	283.0
40	1000	18.7	475.0	31.4	798.0	232.1	16.0	735.7	334.0

View of Fitting Illustrations



Elbows 22½°

Filament-wound 22½° elbows with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends for adhesive bonding

Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	psi	bar	lbs	kg
1	25	0.4	9.0	1.4	36.0	249.5	17.2	0.2	0.1
1½	40	0.4	9.0	1.6	41.0	249.5	17.2	0.4	0.2
2	50	0.5	13.0	2.3	59.0	249.5	17.2	1.1	0.5
3	80	0.8	21.0	2.6	67.0	249.5	17.2	1.5	0.7
4	100	1.1	29.0	3.0	75.0	249.5	17.2	2.2	1.0
5	125	1.7	43.0	3.9	100.0	249.5	17.2	3.1	1.4
6	150	1.7	43.0	3.9	100.0	249.5	17.2	4.2	1.9
8	200	3.0	76.0	5.6	141.0	249.5	17.2	8.6	3.9
10	250	2.7	68.0	5.8	148.0	249.5	17.2	13.0	5.9
12	300	3.4	86.0	7.1	181.0	249.5	17.2	22.9	10.4
14	350	2.8	71.0	6.7	171.0	249.5	17.2	26.4	12.0

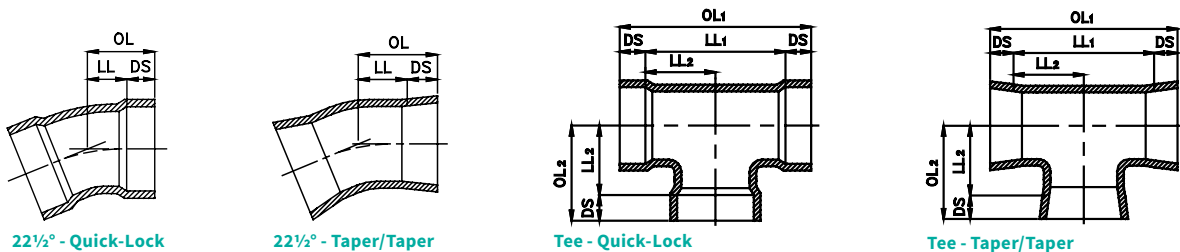
Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	psi	bar	lbs	kg
16	400	3.3	85.0	7.7	195.0	249.5	17.2	30.8	14.0
18	450	4.3	110.0	8.8	224.0	232.1	16.0	50.7	23.0
20	500	4.0	101.0	9.0	228.0	232.1	16.0	61.7	28.0
22	550	4.5	113.0	10.4	265.0	232.0	16.0	94.7	43.0
24	600	4.8	122.0	11.8	300.0	232.1	16.0	125.6	57.0
26	650	5.2	132.0	12.2	310.0	232.1	16.0	191.6	87.0
28	700	5.6	142.0	12.6	320.0	232.1	16.0	215.9	98.0
30	750	6.0	152.0	13.0	330.0	232.1	16.0	253.3	115.0
36	900	7.2	182.0	15.2	385.0	232.1	16.0	436.1	198.0
40	1000	10.2	258.0	22.8	578.0	232.1	16.0	515.4	234.0

Equal Tees

Filament-wound equal Tee Quick-Lock (1-6 inch) and Taper/Taper (8-40 inch) socket ends for adhesive bonding

Nominal Pipe Size		Laying Length Total Run (LL1)		Overall Length Total Run (OL1)		Laying Length Branch (LL2)		Overall Length Branch (OL2)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
1	25	2.1	54.0	4.3	108.0	1.1	27.0	2.1	54.0	249.5	17.2	0.4	0.2
1½	40	2.4	60.0	4.9	124.0	1.2	30.0	2.4	62.0	249.5	17.2	0.9	0.4
2	50	5.0	128.0	8.7	220.0	2.5	64.0	4.3	110.0	249.5	17.2	2.2	1.0
3	80	6.8	172.0	10.4	264.0	3.4	86.0	5.2	132.0	249.5	17.2	4.0	1.8
4	100	8.3	210.0	11.9	302.0	4.1	105.0	5.9	151.0	249.5	17.2	5.5	2.5
5	125	10.0	254.0	14.5	368.0	5.0	127.0	7.2	184.0	249.5	17.2	11.0	5.0
6	150	11.3	286.0	15.7	400.0	5.6	143.0	7.9	200.0	249.5	17.2	14.8	6.7
8	200	14.8	376.0	19.9	506.0	7.4	188.0	10.0	253.0	249.5	17.2	22.0	10.0
10	250	17.8	452.0	24.1	612.0	8.9	226.0	12.0	306.0	249.5	17.2	39.6	18.0
12	300	21.5	546.0	29.0	736.0	10.7	273.0	14.5	368.0	249.5	17.2	63.9	29.0
14	350	21.4	544.0	29.3	744.0	10.7	272.0	14.6	372.0	249.5	17.2	81.5	37.0
16	400	23.2	590.0	31.9	810.0	11.6	295.0	15.9	405.0	249.5	17.2	123.3	56.0
18	450	25.5	648.0	34.5	876.0	12.8	324.0	17.2	438.0	232.1	16.0	152.0	69.0
20	500	28.0	712.0	38.0	966.0	14.0	356.0	19.0	483.0	232.1	16.0	202.6	92.0
22	550	30.6	776.0	42.5	1080.0	13.3	338.0	21.3	540.0	232.1	16.0	286.3	130.0
24	600	33.0	838.0	47.0	1194.0	16.5	419.0	23.5	597.0	232.1	16.0	370.0	168.0
26	650	34.9	886.0	48.9	1242.0	17.4	443.0	24.5	621.0	232.1	16.0	500.0	227.0
28	700	38.0	964.0	52.0	1320.0	19.0	482.0	26.0	660.0	232.1	16.0	627.8	285.0
30	750	40.0	1016.0	54.0	1372.0	20.0	508.0	27.0	686.0	232.1	16.0	742.3	337.0
32	800	42.9	1090.0	56.9	1446.0	21.5	545.0	28.5	723.0	232.1	16.0	1011.0	459.0
36	900	48.0	1220.0	64.0	1626.0	24.0	610.0	32.0	813.0	232.1	16.0	1279.7	581.0
40	1000	57.7	1466.0	82.9	2106.0	28.9	733.0	41.5	1053.0	232.1	16.0	1511.0	686.0

View of Fitting Illustrations



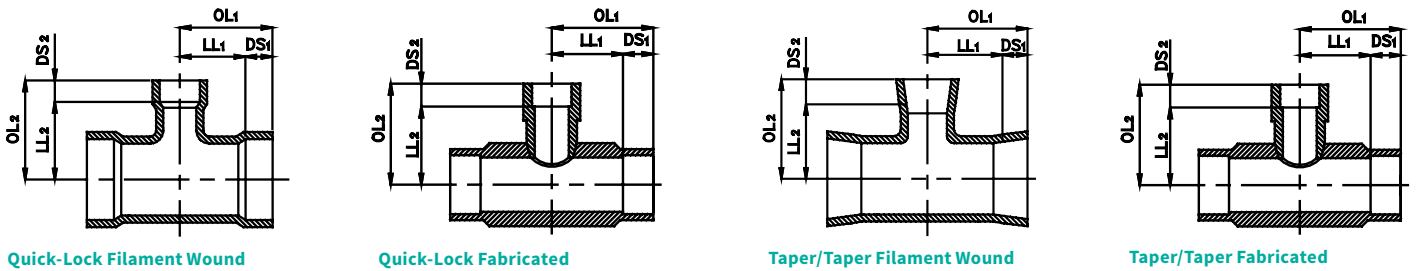
Reducing Tees

Filament-wound standard and fabricated reducing tees with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends for adhesive bonding

Nominal Pipe Size		Laying Length Total Run (LL1)		Overall Length Total Run (OL1)		Laying Length Branch (LL2)		Overall Length Branch (OL2)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
1.5x1	40x25	1.2	30	2.4	62	1.2	30	2.2	57	249.5	17.2	1.3	0.6
2x1	50x25	2.5	64	4.3	110	2.2	57	3.3	84	249.5	17.2	2.0	0.9
2x1.5	50x40	2.5	64	4.3	110	2.2	57	3.5	89	249.5	17.2	2.2	1.0
3x1	80x25	3.4	86	5.2	132	3.0	76	4.1	103	249.5	17.2	3.5	1.6
3x1.5	80x40	3.4	86	5.2	132	3.0	76	4.3	108	249.5	17.2	3.5	1.6
3x2	80x50	3.4	86	5.2	132	3.0	76	4.8	122	249.5	17.2	3.7	1.7
4x1	100x25	2.8	72	4.6	118	7.6	194	8.7	221	249.5	17.2	16.5	7.5
4x1.5	100x40	3.5	89	5.4	136	7.6	194	8.9	226	249.5	17.2	19.8	9.0
4x2	100x50	4.1	105	5.9	151	3.5	89	5.3	135	249.5	17.2	4.6	2.1
4x3	100x80	4.1	105	5.9	151	3.9	98	5.7	144	249.5	17.2	5.1	2.3
5x2	125x50	5.0	127	7.2	184	4.0	102	5.8	148	249.5	17.2	7.5	3.4
5x3	125x80	5.0	127	7.2	184	4.4	111	6.2	157	249.5	17.2	8.8	4.0
5x4	125x100	5.0	127	7.2	184	4.6	118	6.5	164	249.5	17.2	10.1	4.6
6x1	150x25	3.3	83	5.5	140	8.7	221	9.8	248	249.5	17.2	25.8	11.7
6x1.5	150x40	4.0	101	6.2	158	8.7	221	10.0	253	249.5	17.2	30.4	13.8
6x2	150x50	5.6	143	7.9	200	4.5	114	6.3	160	249.5	17.2	13.7	6.2
6x3	150x80	5.6	143	7.9	200	4.9	124	6.7	170	249.5	17.2	12.6	5.7
6x4	150x100	5.6	143	7.9	200	5.1	130	6.9	176	249.5	17.2	13.0	5.9
6x5	150x125	5.6	143	7.9	200	5.4	136	7.6	193	249.5	17.2	13.7	6.2
8x1	200x25	3.5	88	6.0	153	9.6	245	10.7	272	249.5	17.2	33.0	15.0
8x1.5	200x40	3.5	88	6.0	153	9.7	246	10.9	278	249.5	17.2	38.5	17.5
8x2	200x50	3.5	88	6.0	153	9.6	245	11.5	291	249.5	17.2	43.8	19.9
8x3	200x80	7.4	188	10.0	253	5.9	149	7.7	195	249.5	17.2	20.0	9.1
8x4	200x100	7.4	188	10.0	253	6.4	162	8.2	208	249.5	17.2	21.4	9.7
8x6	200x150	7.4	188	10.0	253	6.6	168	8.9	225	249.5	17.2	25.1	11.4
10x1	250x25	3.5	88	6.6	168	10.7	273	11.8	300	249.5	17.2	39.9	18.1
10x1.5	250x40	3.5	88	6.6	168	10.7	273	12.0	305	249.5	17.2	46.3	21.0
10x2	250x50	3.5	88	6.6	168	10.7	273	12.5	318	249.5	17.2	52.9	24.0
10x3	250x80	3.9	100	7.1	180	10.7	273	12.5	318	249.5	17.2	52.9	24.0
10"x4	250x100	8.9	226	12.0	306	7.2	184	9.1	230	249.5	17.2	32.6	14.8
10x6	250x150	8.9	226	12.0	306	7.6	194	9.9	251	249.5	17.2	34.1	15.5
10x8	250x200	8.9	226	12.0	306	8.0	203	10.6	268	249.5	17.2	36.3	16.5
12x1	300x25	3.5	88	7.2	183	11.7	298	12.8	325	249.5	17.2	46.3	21.0
12x1.5	300x40	3.5	88	7.2	183	11.7	298	13.0	330	249.5	17.2	55.1	25.0
12x2	300x50	3.5	88	7.2	183	11.7	298	13.5	344	249.5	17.2	63.9	29.0
12x3	300x80	3.9	100	7.7	195	11.7	298	13.5	344	249.5	17.2	63.9	29.0
12x4	300x100	10.7	273	14.5	368	8.1	206	9.9	252	249.5	17.2	46.3	21.0
12x6	300x150	10.7	273	14.5	368	8.6	219	10.9	276	249.5	17.2	48.5	22.0
12x8	300x200	10.7	273	14.5	368	9.0	229	11.6	294	249.5	17.2	50.7	23.0
12x10	300x250	10.7	273	14.5	368	9.5	241	12.6	321	249.5	17.2	52.9	24.0

NOTE: The regular font style numbers are filament wound tees. The **Bold Italic** numbers are fabricated tees.

View of Fitting Illustrations



Quick-Lock Filament Wound

Quick-Lock Fabricated

Taper/Taper Filament Wound

Taper/Taper Fabricated

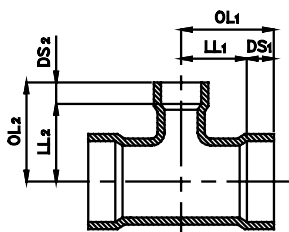
Reducing Tees

Filament-wound standard and fabricated reducing tees with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends for adhesive bonding

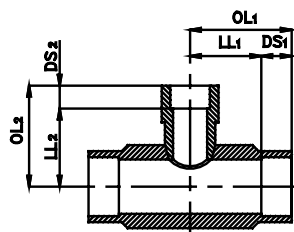
Nominal Pipe Size		Laying Length Total Run (LL1)		Overall Length Total Run (OL1)		Laying Length Branch (LL2)		Overall Length Branch (OL2)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
14x1	350x25	3.5	88	7.4	188	12.3	313	13.4	340	249.5	17.2	52.9	24.0
14x1.5	350x40	3.5	88	7.4	188	12.3	313	13.6	345	249.5	17.2	61.7	28.0
14x2	350x50	3.5	88	7.4	188	12.3	313	14.1	359	249.5	17.2	68.3	31.0
14x3	350x80	3.9	100	7.9	200	12.3	313	14.1	359	249.5	17.2	68.3	31.0
14x4	350x100	4.4	113	8.4	213	12.3	313	14.1	359	249.5	17.2	68.3	31.0
14x6	350x150	10.7	272	14.6	372	9.6	244	11.9	301	249.5	17.2	63.9	29.0
14x8	350x200	10.7	272	14.6	372	10.0	254	12.6	319	249.5	17.2	66.1	30.0
14x10	350x250	10.7	272	14.6	372	10.5	267	13.7	347	249.5	17.2	70.5	32.0
14x12	350x300	10.7	272	14.6	372	11.3	288	15.1	383	249.5	17.2	74.9	34.0
16x1	400x25	3.5	88	7.8	198	13.3	338	14.4	365	249.5	17.2	63.9	29.0
16x1.5	400x40	3.5	88	7.8	198	13.3	338	14.6	370	249.5	17.2	72.7	33.0
16x2	400x50	3.5	88	7.8	198	13.3	338	15.1	384	249.5	17.2	81.5	37.0
16x3	400x80	3.9	100	8.3	210	13.3	338	15.1	384	249.5	17.2	81.5	37.0
16x4	400x100	4.4	113	8.8	223	13.3	338	15.1	384	249.5	17.2	81.5	37.0
16x6	400x150	11.6	295	15.9	405	10.4	264	12.6	321	249.5	17.2	81.5	37.0
16x8	400x200	11.6	295	15.9	405	10.7	273	13.3	338	249.5	17.2	83.7	38.0
16x10	400x250	11.6	295	15.9	405	11.1	283	14.3	363	249.5	17.2	90.3	41.0
16x12	400x300	11.6	295	15.9	405	12.0	304	15.7	399	249.5	17.2	99.1	45.0
16x14	400x350	11.6	295	15.9	405	11.5	292	15.4	392	249.5	17.2	107.9	49.0
18x1	450x25	3.5	88	8.0	202	14.1	358	15.2	385	232.1	16	118.9	54.0
18x1.5	450x40	3.5	88	8.0	202	14.1	358	15.4	390	232.1	16	118.9	54.0
18x2	450x50	3.5	88	8.0	202	14.1	358	15.9	404	232.1	16	118.9	54.0
18x3	450x80	3.9	100	8.4	214	14.1	358	15.9	404	232.1	16	127.8	58.0
18x4	450x100	4.4	113	8.9	227	14.1	358	15.9	404	232.1	16	134.4	61.0
18x6	450x150	5.4	138	9.9	252	14.4	367	16.7	424	232.1	16	147.6	67.0
18x8	450x200	12.8	324	17.2	438	12.0	306	14.6	371	232.1	16	116.7	53.0
18x10	450x250	12.8	324	17.2	438	12.6	319	15.7	399	232.1	16	132.2	60.0
18x12	450x300	12.8	324	17.2	438	12.9	328	16.7	423	232.1	16	147.6	67.0
18x14	450x350	12.8	324	17.2	438	12.5	317	16.4	417	232.1	16	145.4	66.0
18x16	450x400	12.8	324	17.2	438	12.6	319	16.9	429	232.1	16	152.0	69.0
20x1	500x25	3.5	88	8.5	215	15.0	382	16.1	409	232.1	16	130.0	59.0
20x1.5	500x40	3.5	88	8.5	215	15.0	382	16.3	414	232.1	16	132.2	60.0
20x2	500x50	3.5	88	8.5	215	15.0	382	16.9	428	232.1	16	132.2	60.0
20x3	500x80	3.9	100	8.9	227	15.0	382	16.9	428	232.1	16	138.8	63.0
20x4	500x100	4.4	113	9.4	240	15.0	382	16.9	428	232.1	16	147.6	67.0
20x6	500x150	5.4	138	10.4	265	15.4	391	17.6	448	232.1	16	154.2	70.0
20x10	500x250	14.0	356	19.0	483	13.5	344	16.7	424	232.1	16	169.6	77.0
20x12	500x300	14.0	356	19.0	483	13.9	354	17.7	449	232.1	16	180.6	82.0
20x14	500x350	14.0	356	19.0	483	13.5	343	17.4	443	232.1	16	187.2	85.0
20x16	500x400	14.0	356	19.0	483	13.5	344	17.9	454	232.1	16	187.2	85.0
20x18	500x450	14.0	356	19.0	483	13.8	350	18.3	464	232.1	16	196.0	89.0

NOTE: Tees main-run (18-40 inch) with Quick-Lock socket branch (1-6 inch) are fabricated Tees. The regular font style numbers are filament wound tees. The **Bold Italic** numbers are fabricated tees.

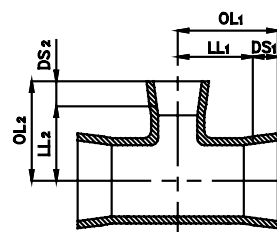
View of Fitting Illustrations



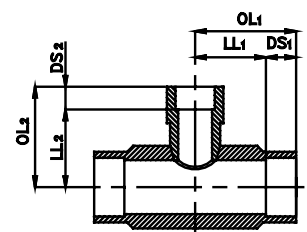
Quick-Lock Filament Wound



Quick-Lock Fabricated



Taper/Taper Filament Wound



Taper/Taper Fabricated

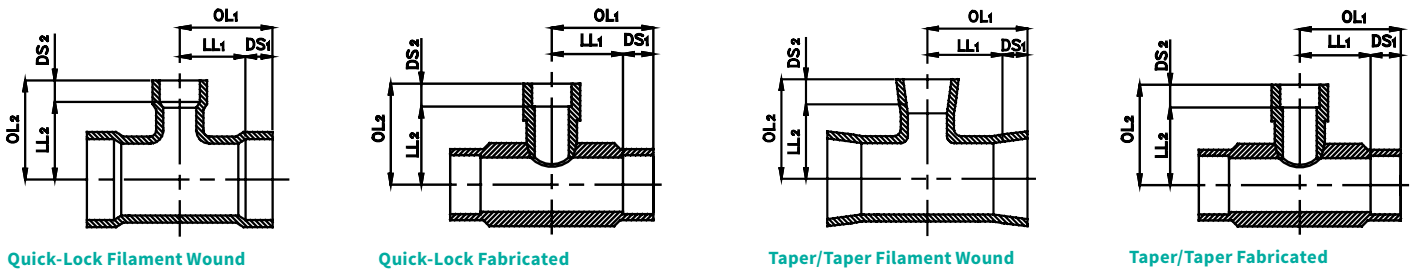
Reducing Tees

Filament-wound standard and fabricated reducing tees with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends for adhesive bonding

Nominal Pipe Size		Laying Length Total Run (LL1)		Overall Length Total Run (OL1)		Laying Length Branch (LL2)		Overall Length Branch (OL2)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
22x8	550x200	15.3	388	21.3	540	14.1	357	16.6	422	232.1	16	176.2	80.0
22x10	550x250	15.3	388	21.3	540	14.6	370	17.7	450	232.1	16	187.2	85.0
22x12	550x300	15.3	388	21.3	540	14.9	379	18.7	474	232.1	16	198.2	90.0
22x14	550x350	15.3	388	21.3	540	14.5	368	18.4	468	232.1	16	207.0	94.0
22x16	550x400	15.3	388	21.3	540	14.6	370	18.9	480	232.1	16	207.0	94.0
22x18	550x450	15.3	388	21.3	540	14.8	375	19.3	489	232.1	16	215.9	98.0
22x20	550x500	15.3	388	21.3	540	15.0	381	20.0	508	232.1	16	224.7	102.0
24x1	600x25	3.5	88	10.5	266	16.9	430	18.0	457	232.1	16	156.4	71.0
24x1.5	600x40	3.5	88	10.5	266	16.9	430	18.2	462	232.1	16	156.4	71.0
24x2	600x50	3.5	88	10.5	266	16.9	430	18.7	476	232.1	16	156.4	71.0
24x3	600x80	3.9	100	10.9	278	16.9	430	18.7	476	232.1	16	165.2	75.0
24x4	600x100	4.4	113	11.5	291	16.9	430	18.7	476	232.1	16	176.2	80.0
24x6	600x150	5.4	138	12.4	316	17.3	439	19.5	496	232.1	16	187.2	85.0
24x8	600x200	16.5	419	23.5	597	16.2	412	18.8	477	232.1	16	193.8	88.0
24x10	600x250	16.5	419	23.5	597	15.2	386	18.3	466	232.1	16	204.8	93.0
24x12	600x300	16.5	419	23.5	597	16.4	417	20.2	512	232.1	16	215.9	98.0
24x14	600x350	16.5	419	23.5	597	15.5	394	19.4	494	232.1	16	226.9	103.0
24x16	600x400	16.5	419	23.5	597	15.6	395	19.9	505	232.1	16	226.9	103.0
24x18	600x450	16.5	419	23.5	597	16.3	413	20.7	527	232.1	16	301.8	137.0
24x20	600x500	16.5	419	23.5	597	16.0	406	21.0	533	232.1	16	343.6	156.0
26x1	650x25	3.5	88	10.5	266	18.3	466	19.4	493	232.1	16	171.8	78.0
26x1.5	650x40	3.5	88	10.5	266	18.3	466	19.6	498	232.1	16	171.8	78.0
26x2	650x50	3.5	88	10.5	266	18.3	466	20.2	512	232.1	16	171.8	78.0
26x3	650x80	3.9	100	10.9	278	18.3	466	20.2	512	232.1	16	182.8	83.0
26x4	650x100	4.4	113	11.5	291	18.3	466	20.2	512	232.1	16	193.8	88.0
26x6	650x150	5.4	138	12.4	316	18.7	475	20.9	532	232.1	16	209.3	95.0
26x18	650x450	17.4	443	24.4	621	17.3	440	21.8	554	232.1	16	354.6	161.0
26x20	650x500	17.4	443	24.4	621	17.3	440	22.3	567	232.1	16	394.3	179.0
26x24	650x600	17.4	443	24.4	621	17.3	440	24.3	618	232.1	16	495.6	225.0
28x1	700x25	3.5	88	10.5	266	19.3	491	20.4	518	232.1	16	213.7	97.0
28x1.5	700x40	3.5	88	10.5	266	19.3	491	20.6	523	232.1	16	213.7	97.0
28x2	700x50	3.5	88	10.5	266	19.3	491	21.1	537	232.1	16	213.7	97.0
28x3	700x80	3.9	100	10.9	278	19.3	491	21.1	537	232.1	16	224.7	102.0
28x4	700x100	4.4	113	11.5	291	19.3	491	21.1	537	232.1	16	235.7	107.0
28x6	700x150	5.4	138	12.4	316	19.7	500	21.9	557	232.1	16	264.3	120.0
28x14	700x350	19.0	482	26.0	660	19.3	490	23.2	590	232.1	16	323.8	147.0
28x16	700x400	19.0	482	26.0	660	19.7	500	24.0	610	232.1	16	365.6	166.0
28x18	700x450	19.0	482	26.0	660	19.7	500	24.2	614	232.1	16	416.3	189.0
28x20	700x500	19.0	482	26.0	660	19.9	506	24.9	633	232.1	16	462.6	210.0
28x24	700x600	19.0	482	26.0	660	19.9	506	26.9	684	232.1	16	555.1	252.0

NOTE: Tees main-run (18-40 inch) with Quick-Lock socket branch (1-6 inch) are fabricated Tees. The regular font style numbers are filament wound tees. The **Bold Italic** numbers are fabricated tees.

View of Fitting Illustrations



Quick-Lock Filament Wound

Quick-Lock Fabricated

Taper/Taper Filament Wound

Taper/Taper Fabricated

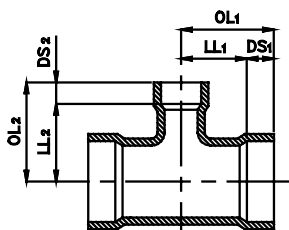
Reducing Tees

Filament-wound standard and fabricated reducing tees with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends for adhesive bonding

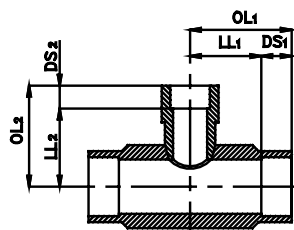
Nominal Pipe Size		Laying Length Total Run (LL1)		Overall Length Total Run (OL1)		Laying Length Branch (LL2)		Overall Length Branch (OL2)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
30x1	750x25	3.5	88	10.5	266	20.3	516	21.4	543	232.1	16	226.9	103.0
30x1.5	750x40	3.5	88	10.5	266	20.3	516	21.6	548	232.1	16	226.9	103.0
30x2	750x50	3.5	88	10.5	266	20.3	516	22.1	562	232.1	16	226.9	103.0
30x3	750x80	3.9	100	10.9	278	20.3	516	22.1	562	232.1	16	240.1	109.0
30x4	750x100	4.4	113	11.5	291	20.3	516	22.1	562	232.1	16	251.1	114.0
30x6	750x150	5.4	138	12.4	316	20.7	525	22.9	582	232.1	16	264.3	120.0
30x12	750x300	20.0	508	27.0	686	30.1	765	33.9	860	232.1	16	259.9	118.0
30x14	750x350	20.0	508	27.0	686	28.4	722	32.4	822	232.1	16	345.8	157.0
30x16	750x400	20.0	508	27.0	686	27.5	698	31.8	808	232.1	16	392.1	178.0
30x18	750x450	20.0	508	27.0	686	19.2	488	23.7	602	232.1	16	444.9	202.0
30x20	750x500	20.0	508	27.0	686	19.5	495	24.5	622	232.1	16	495.6	225.0
30x24	750x600	20.0	508	27.0	686	18.9	481	25.9	659	232.1	16	594.7	270.0
32x1	800x25	3.5	88	10.5	266	21.3	541	22.4	568	232.1	16	273.1	124.0
32x1.5	800x40	3.5	88	10.5	266	21.3	541	22.6	573	232.1	16	273.1	124.0
32x2	800x50	3.5	88	10.5	266	21.3	541	23.1	587	232.1	16	273.1	124.0
32x3	800x80	3.9	100	10.9	278	21.3	541	23.1	587	232.1	16	286.3	130.0
32x4	800x100	4.4	113	11.5	291	21.3	541	23.1	587	232.1	16	299.6	136.0
32x6	800x150	5.4	138	12.4	316	21.7	550	23.9	607	232.1	16	319.4	145.0
32x20	800x500	21.5	545	28.5	723	20.6	523	25.6	650	232.1	16	568.3	258.0
32x24	800x600	21.5	545	28.5	723	20.6	523	27.6	701	232.1	16	682.8	310.0
32x28	800x700	21.5	545	28.5	723	20.9	532	28.0	710	232.1	16	766.5	348.0
32x30	800x750	21.5	545	28.5	723	21.0	534	28.0	712	232.1	16	852.4	387.0
36x1	900x25	3.5	88	11.5	291	23.3	591	24.3	618	232.1	16	341.4	155.0
36x1.5	900x40	3.5	88	11.5	291	23.3	591	24.5	623	232.1	16	341.4	155.0
36x2	900x50	3.5	88	11.5	291	23.3	591	25.1	637	232.1	16	341.4	155.0
36x3	900x80	3.9	100	11.9	303	23.3	591	25.1	637	232.1	16	354.6	161.0
36x4	900x100	4.4	113	12.4	316	23.3	591	25.1	637	232.1	16	370.0	168.0
36x6	900x150	5.4	138	13.4	341	23.6	600	25.9	657	232.1	16	396.5	180.0
36x16	900x400	24.0	610	32.0	813	22.2	563	26.5	673	232.1	16	594.7	270.0
36x18	900x450	24.0	610	32.0	813	22.2	563	26.7	677	232.1	16	638.8	290.0
36"20	900x500	24.0	610	32.0	813	22.2	563	27.2	690	232.1	16	711.5	323.0
36x24	900x600	24.0	610	32.0	813	21.3	541	28.3	719	232.1	16	852.4	387.0
36x28	900x700	24.0	610	32.0	813	22.4	570	29.4	748	232.1	16	1011.0	459.0
36x30	900x750	24.0	610	32.0	813	23.0	584	30.0	762	232.1	16	1066.1	484.0
40x1	1000x25	4.7	120	17.3	440	25.2	641	26.3	668	232.1	16	418.5	190.0
40x1.5	1000x40	4.7	120	17.3	440	25.2	641	26.5	673	232.1	16	418.5	190.0
40x2	1000x50	4.7	120	17.3	440	25.2	641	27.0	687	232.1	16	418.5	190.0
40x3	1000x80	5.2	132	17.8	452	25.2	641	27.0	687	232.1	16	431.7	196.0
40x4	1000x100	5.7	145	18.3	465	25.2	641	27.0	687	232.1	16	447.1	203.0
40x24	1000x600	28.9	733	41.5	1053	23.3	593	30.4	771	232.1	16	1004.4	456.0
40x28	1000x700	28.9	733	41.5	1053	24.9	632	31.9	810	232.1	16	1191.6	541.0
40x30	1000x750	28.9	733	41.5	1053	24.9	633	31.9	811	232.1	16	1257.7	571.0
40x32	1000x800	28.9	733	41.5	1053	25.7	652	32.7	830	232.1	16	1332.6	605.0
40x36	1000x900	28.9	733	41.5	1053	25.7	652	33.7	855	232.1	16	1396.5	634.0

NOTE: Tees main-run (18-40 inch) with Quick-Lock socket branch (1-6 inch) are fabricated Tees. The regular font style numbers are filament wound tees. The **Bold Italic** numbers are fabricated tees.

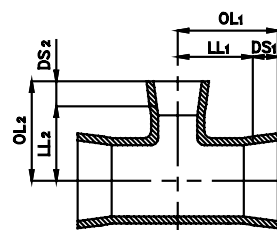
View of Fitting Illustrations



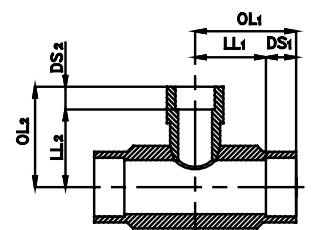
Quick-Lock Filament Wound



Quick-Lock Fabricated



Taper/Taper Filament Wound



Taper/Taper Fabricated

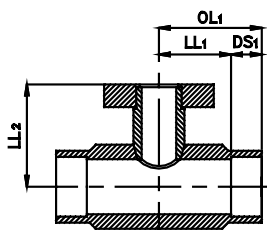
Fabricated Reducing Tees with Flanged Branch

Integral Quick-Lock (4-6 inch) or Taper (8-16 inch) socket ends with flanged branch

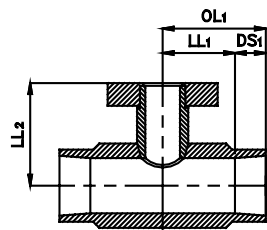
Nominal Pipe Size		Laying Length Half Run (LL1)		Overall Length Half Run (OL1)		Laying Length Branch (LL2)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
4x1	100x25	2.8	72.0	4.6	118	8.8	224.0	249.5	17.2	17.6	8.0
4x1.5	100x40	3.5	89.0	5.3	135	9.0	229.0	249.5	17.2	21.4	9.7
6x1	150x25	3.3	83.0	5.5	140	9.9	251.0	249.5	17.2	26.9	12.2
6x1.5	150x40	4.0	101.0	6.2	158	10.1	256.0	249.5	17.2	31.9	14.5
8x1	200x25	3.5	88.0	6.0	153	10.9	276.0	249.5	17.2	34.1	15.5
8x1.5	200x40	3.5	88.0	6.0	153	11.1	281.0	249.5	17.2	40.1	18.2
8x2	200x50	3.5	88.0	6.0	153	11.6	295.0	249.5	17.2	46.3	21.0
10x1	250x25	3.5	88.0	6.6	168	11.9	303.0	249.5	17.2	41.0	18.6
10x1.5	250x40	3.5	88.0	6.6	168	12.1	308.0	249.5	17.2	48.5	22.0
10x2	250x50	3.5	88.0	6.6	168	12.7	322.0	249.5	17.2	57.3	26.0
10x3	250x80	3.9	100.0	7.1	180	12.7	323.0	249.5	17.2	57.3	26.0
12x1	300x25	3.5	88.0	7.2	183	13.0	329.0	249.5	17.2	48.5	22.0
12x1.5	300x40	3.5	88.0	7.2	183	13.1	334.0	249.5	17.2	57.3	26.0
12x2	300x50	3.5	88.0	7.2	183	13.7	348.0	249.5	17.2	66.1	30.0
12x3	300x80	3.9	100.0	7.7	195	13.7	349.0	249.5	17.2	68.3	31.0
14x1	350x25	3.5	88.0	7.4	188	13.5	344.0	249.5	17.2	52.9	24.0
14x1.5	350x40	3.5	88.0	7.4	188	13.7	349.0	249.5	17.2	61.7	28.0
14x2	350x50	3.5	88.0	7.4	188	14.3	363.0	249.5	17.2	72.7	33.0
14x3	350x80	3.9	100.0	7.9	200	14.3	364.0	249.5	17.2	72.7	33.0
14x4	350x100	4.4	113.0	8.4	213	14.3	364.0	249.5	17.2	74.9	34.0
16x1	400x25	3.3	85.0	7.4	187	14.5	369.0	249.5	17.2	63.9	29.0
16x1.5	400x40	4.1	103.0	8.1	205	14.7	374.0	249.5	17.2	74.9	34.0
16x2	400x50	4.6	118.0	8.7	220	15.3	388.0	249.5	17.2	85.9	39.0
16x3	400x80	4.6	118.0	8.7	220	15.3	389.0	249.5	17.2	85.9	39.0
16x4	400x100	4.6	118.0	8.7	220	15.3	389.0	249.5	17.2	88.1	40.0
18x1	450x25	3.5	88.0	8.0	202	15.3	388.0	232.1	16.0	121.1	55.0
18x1.5	450x40	3.5	88.0	8.0	202	15.5	394.0	232.1	16.0	121.1	55.0
18x2	450x50	3.5	88.0	8.0	202	16.1	408.0	232.1	16.0	123.3	56.0
18x3	450x80	3.9	100.0	8.4	214	16.1	409.0	232.1	16.0	132.2	60.0
18x4	450x100	4.4	113.0	8.9	227	16.1	409.0	232.1	16.0	141.0	64.0
18x6	450x150	5.4	138.0	9.9	252	16.9	430.0	232.1	16.0	319.4	145.0
20x1	500x25	3.5	88.0	8.5	215	16.2	412.0	232.1	16.0	132.2	60.0
20x1.5	500x40	3.5	88.0	8.5	215	16.5	418.0	232.1	16.0	134.4	61.0
20x2	500x50	3.5	88.0	8.5	215	17.0	432.0	232.1	16.0	143.2	65.0
20x3	500x80	3.9	100.0	8.9	227	17.0	433.0	232.1	16.0	154.2	70.0
20x4	500x100	4.4	113.0	9.4	240	17.0	433.0	232.1	16.0	165.2	75.0

NOTE: Other sizes, or multiple size branched tees available on request. Please contact NOV Fiber Glass Systems.

View of Fitting Illustrations



Quick-Lock



Taper/Taper

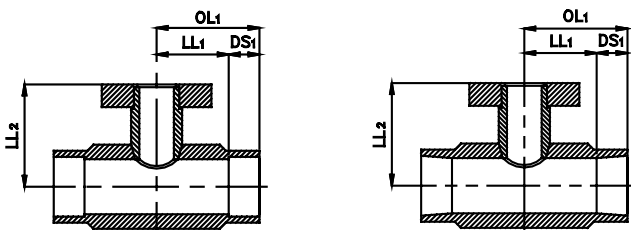
Fabricated Reducing Tees with Flanged Branch

Integral Quick-Lock (4-6 inch) or Taper (8-16 inch) socket ends with flanged branch

Nominal Pipe Size		Laying Length Half Run (LL1)		Overall Length Half Run (OL1)		Laying Length Branch (LL2)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
24x1	600x25	3.5	88.0	10.5	266	18.1	460.0	232.1	16.0	156.4	71.0
24x1.5	600x40	3.5	88.0	10.5	266	18.4	467.0	232.1	16.0	158.6	72.0
24x2	600x50	3.5	88.0	10.5	266	18.9	480.0	232.1	16.0	158.6	72.0
24x3	600x80	3.9	100.0	10.9	278	18.9	481.0	232.1	16.0	169.6	77.0
24x4	600x100	4.4	113.0	11.5	291	18.9	481.0	232.1	16.0	180.6	82.0
26x1	650x25	3.5	88.0	10.5	266	19.6	497.0	232.1	16.0	174.0	79.0
26x1.5	650x40	3.5	88.0	10.5	266	19.8	502.0	232.1	16.0	174.0	79.0
26x2	650x50	3.5	88.0	10.5	266	20.3	516.0	232.1	16.0	176.2	80.0
26x3	650x80	3.9	100.0	10.9	278	20.4	517.0	232.1	16.0	187.2	85.0
26x4	650x100	4.4	113.0	11.5	291	20.4	517.0	232.1	16.0	200.4	91.0
28x1	700x25	3.5	88.0	10.5	266	20.5	521.0	232.1	16.0	213.7	97.0
28x1.5	700x40	3.5	88.0	10.5	266	20.7	527.0	232.1	16.0	215.9	98.0
28x2	700x50	3.5	88.0	10.5	266	21.3	541.0	232.1	16.0	215.9	98.0
28x3	700x80	3.9	100.0	10.9	278	21.3	542.0	232.1	16.0	229.1	104.0
28x4	700x100	4.4	113.0	11.5	291	21.3	542.0	232.1	16.0	242.3	110.0
30x1	750x25	3.5	88.0	10.5	266	21.5	546.0	232.1	16.0	229.1	104.0
30x1.5	750x40	3.5	88.0	10.5	266	21.7	552.0	232.1	16.0	229.1	104.0
30x2	750x50	3.5	88.0	10.5	266	22.3	566.0	232.1	16.0	229.1	104.0
30x3	750x80	3.9	100.0	10.9	278	22.3	567.0	232.1	16.0	244.5	111.0
30x4	750x100	4.4	113.0	11.5	291	22.3	567.0	232.1	16.0	257.7	117.0
32x1	800x25	3.5	88.0	10.5	266	22.5	571.0	232.1	16.0	273.1	124.0
32x1.5	800x40	3.5	88.0	10.5	266	22.7	576.0	232.1	16.0	275.3	125.0
32x2	800x50	3.5	88.0	10.5	266	23.2	590.0	232.1	16.0	275.3	125.0
32x3	800x80	3.9	100.0	10.9	278	23.2	590.0	232.1	16.0	290.7	132.0
32x4	800x100	4.4	113.0	11.5	291	23.2	590.0	232.1	16.0	306.2	139.0
36x1	900x25	3.5	88.0	11.5	291	24.4	621.0	232.1	16.0	341.4	155.0
36x1.5	900x40	3.5	88.0	11.5	291	24.7	627.0	232.1	16.0	343.6	156.0
36x2	900x50	3.5	88.0	11.5	291	25.2	641.0	232.1	16.0	343.6	156.0
36x3	900x80	3.9	100.0	11.9	303	25.3	642.0	232.1	16.0	359.0	163.0
36x4	900x100	4.4	113.0	12.4	316	25.3	642.0	232.1	16.0	376.7	171.0
40x1	1000x25	4.7	120.0	17.3	440	26.5	672.0	232.1	16.0	420.7	191.0
40x1.5	1000x40	4.7	120.0	17.3	440	26.7	677.0	232.1	16.0	420.7	191.0
40x2	1000x50	4.7	120.0	17.3	440	27.2	691.0	232.1	16.0	420.7	191.0
40x3	1000x80	5.2	132.0	17.8	452	27.2	692.0	232.1	16.0	436.1	198.0
40x4	1000x100	5.7	145.0	18.3	465	27.2	692.0	232.1	16.0	453.7	206.0

NOTE: Other sizes, or multiple size branched tees available on request. Please contact NOV Fiber Glass Systems.

View of Fitting Illustrations



Quick-Lock

Taper/Taper

Bushing Saddle

Filament-wound pipe saddles with stainless steel, 1/2 inch and 3/4 inch threaded bushings.⁽¹⁾

Nominal Pipe Size		Angle (a)	Saddle Length (B)		Saddle Thickness (ts)		Maximum Working Pressure		Average Weight		Required Adhesive Kit	
in	mm	degree	in	mm	in	mm	psi	bar	lb	kg	3 oz.	6 oz
2	50	180	6.0	152.0	0.9	22	249.5	17.2	1.1	0.5	1	-
3	80	180	6.0	152.0	0.9	22	249.5	17.2	1.3	0.6	1	-
4	100	180	6.0	152.0	0.9	22	249.5	17.2	1.8	0.8	1	-
5	125	180	6.0	152.0	0.9	22	249.5	17.2	2.0	0.9	-	1
6	150	180	6.0	152.0	0.9	22	249.5	17.2	2.2	1.0	-	1
8	200	180	6.0	152.0	0.9	22	249.5	17.2	2.6	1.2	-	1
10	250	180	6.0	152.0	0.9	22	249.5	17.2	3.5	1.6	1	1
12	300	180	6.0	152.0	0.9	22	174.0	12.0	4.2	1.9	1	1
14	350	180	6.0	152.0	0.9	22	174.0	12.0	4.6	2.1	1	1
16	400	180	6.0	152.0	0.9	22	174.0	12.0	5.5	2.5	-	2
18	450	90	6.0	152.0	0.9	22	174.0	12.0	7.3	3.3	-	1
20	500	90	6.0	152.0	0.9	22	174.0	12.0	8.1	3.7	1	1
22	550	90	6.0	152.0	0.9	22						
24	600	90	6.0	152.0	0.9	22	174.0	12.0	9.7	4.4	-	2
26	650	90	6.0	152.0	0.9	22						
28	700	90	6.0	152.0	0.9	22						
30	750	90	6.0	152.0	0.9	22						
32	800	90	6.0	152.0	0.9	22						
36	900	90	6.0	152.0	0.9	22						
40	1000	90	6.0	152.0	0.9	22						

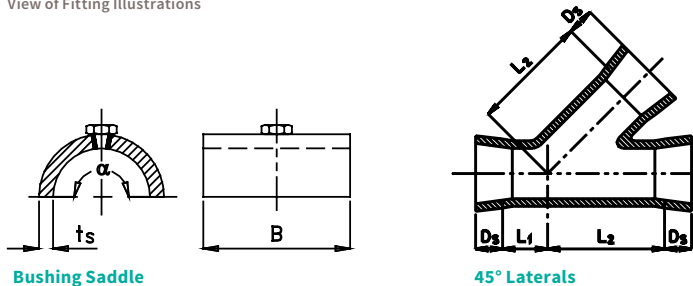
⁽¹⁾ Consult NOV Fiber Glass Systems for other material types or other sized bushings. For higher pressures, above 16.0/12 bar, contact NOV Fiber Glass Systems.

45° Laterals

Filament-wound 45° laterals with integral Quick-Lock (2-6 inch) or Taper/Taper (8-16 inch) socket ends, for adhesive bonding.

Nominal Pipe Size		Laying Length (LL1)		Overall Length (OL1)		Laying Length (LL2)		Overall Length (OL2)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	psi	bar	lb	kg
2	50	2.5	64.0	4.3	110.0	8.0	203.0	9.8	249.0	249.5	17.2	3.5	1.6
3	80	3.0	76.0	4.8	122.0	10.0	254.0	11.8	300.0	249.5	17.2	6.6	3.0
4	100	3.0	76.0	4.8	122.0	12.0	305.0	13.8	351.0	249.5	17.2	8.6	3.9
5	125	3.5	89.0	5.7	146.0	13.3	337.0	15.5	394.0	249.5	17.2	12.8	5.8
6	150	3.5	89.0	5.7	146.0	14.5	368.0	16.7	425.0	249.5	17.2	15.0	6.8
8	200	4.9	124.0	7.4	189.0	17.9	455.0	20.5	520.0	249.5	17.2	26.4	12.0
10	250	5.4	137.0	8.5	217.0	20.9	531.0	24.1	611.0	174.0	12.0	46.3	21.0
12	300	6.3	159.0	10.0	254.0	25.2	641.0	29.0	736.0	174.0	12.0	66.1	30.0
14	350	5.9	150.0	9.8	250.0	24.9	632.0	28.8	732.0	174.0	12.0	85.9	39.0
16	400	5.9	150.0	10.2	260.0	24.9	632.0	29.2	742.0	174.0	12.0	118.9	54.0

View of Fitting Illustrations



Bushing Saddle

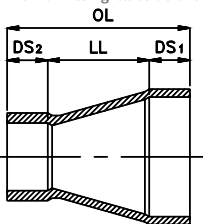
45° Laterals

Concentric Reducers

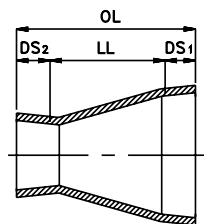
Filament-wound concentric reducers with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends, for adhesive bonding.

Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	psi	bar	lbs	kg
1.5x1	40x25	1.3	32	3.6	91	249.5	17.2	0.4	0.2
2x1	50x25	2.5	64	5.4	137	249.5	17.2	0.7	0.3
2x1.5	50x40	1.3	32	4.3	110	249.5	17.2	1.1	0.5
3x1.5	80x40	3.0	76	6.1	154	249.5	17.2	1.1	0.5
3x2	80x50	2.1	54	5.7	146	249.5	17.2	1.1	0.5
4x2	100x50	3.0	76	6.6	168	249.5	17.2	2.4	1.1
4x3	100x80	2.9	73	6.5	165	249.5	17.2	2.0	0.9
5x3	125x80	2.9	74	7.0	177	249.5	17.2	3.1	1.4
5x4	125x100	2.9	74	7.0	177	249.5	17.2	3.3	1.5
6x3	150x80	3.8	97	7.9	200	249.5	17.2	4.0	1.8
6x4	150x100	3.7	94	7.8	197	249.5	17.2	4.0	1.8
6x5	150x125	4.3	110	8.8	224	249.5	17.2	4.0	1.8
8x4	200x100	6.0	153	10.4	264	249.5	17.2	6.4	2.9
8x6	200x150	4.7	119	9.5	241	249.5	17.2	5.9	2.7
10x6	250x150	5.4	138	10.8	275	249.5	17.2	8.1	3.7
10x8	250x200	5.3	135	11.0	280	249.5	17.2	7.9	3.6
12x8	300x200	7.4	189	13.7	349	249.5	17.2	11.0	5.0
12x10	300x250	6.9	176	13.8	351	249.5	17.2	10.1	4.6
14x10	350x250	8.4	214	15.5	394	249.5	17.2	15.9	7.2
14x12	350x300	8.5	217	16.2	412	249.5	17.2	16.1	7.3
16x12	400x300	8.0	204	16.1	409	249.5	17.2	19.6	8.9
16x14	400x350	7.2	183	15.5	393	249.5	17.2	19.8	9.0
18x16	450x400	4.4	113	13.3	337	232.1	16.0	28.0	12.7
20x16	500x400	9.3	235	18.6	472	232.1	16.0	50.7	23.0
20x18	500x450	4.8	123	14.3	364	232.1	16.0	41.6	18.9
22x16	550x400	13.4	340	23.7	602	232.1	16.0	79.3	36.0
22x18	550x450	9.0	228	19.4	494	232.1	16.0	70.5	32.0
22x20	550x500	4.2	106	15.2	385	232.1	16.0	63.9	29.0
24x16	600x400	18.2	463	29.6	751	232.1	16.0	105.7	48.0
24x18	600x450	13.9	353	25.4	645	232.1	16.0	96.9	44.0
24x20	600x500	9.1	230	21.1	535	232.1	16.0	85.9	39.0
24x22	600x550	5.0	126	18.0	456	232.1	16.0	79.3	36.0
26x18	650x450	20.9	532	32.4	824	232.1	16.0	165.2	75.0
26x20	650x500	16.3	413	28.3	718	232.1	16.0	149.8	68.0
26x22	650x550	12.1	307	25.1	637	232.1	16.0	138.8	63.0
26x24	650x600	7.2	182	21.2	538	232.1	16.0	121.1	55.0
28x16	700x400	30.5	775	41.9	1063	232.1	16.0	174.0	79.0
28x18	700x450	26.0	661	37.5	953	232.1	16.0	163.0	74.0
28x20	700x500	21.3	542	33.3	847	232.1	16.0	152.0	69.0
28x24	700x600	12.2	311	26.3	667	232.1	16.0	147.6	67.0

View of Fitting Illustrations



Concentric Reducer Quick-Lock



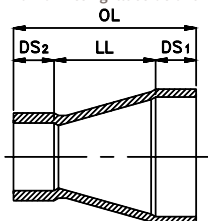
Concentric Reducer Taper/Taper

Concentric Reducers

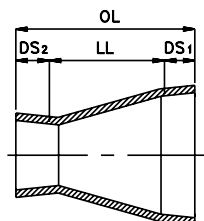
Filament-wound concentric reducers with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends, for adhesive bonding.

Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	psi	bar	lbs	kg
30x16	750x400	34.9	886	46.2	1174	232.1	16.0	246.7	112.0
30x18	750x450	30.5	775	42.0	1067	232.1	16.0	235.7	107.0
30x20	750x500	25.7	653	37.7	958	232.1	16.0	220.3	100.0
30x24	750x600	16.6	422	30.6	778	232.1	16.0	191.6	87.0
30x26	750x650	9.4	240	23.5	596	232.1	16.0	158.6	72.0
30x28	750x700	4.4	111	18.4	467	232.1	16.0	125.6	57.0
32x18	800x450	36.2	920	47.7	1212	232.1	16.0	275.3	125.0
32x20	800x500	31.4	798	43.4	1103	232.1	16.0	240.1	109.0
32x24	800x600	22.4	570	36.5	926	232.1	16.0	207.0	94.0
32x28	800x700	10.2	259	24.2	615	232.1	16.0	180.6	82.0
32x30	800x750	5.8	148	19.8	504	232.1	16.0	156.4	71.0
36x20	900x500	40.5	1029	53.5	1359	232.1	16.0	462.6	210.0
36x24	900x600	31.5	799	46.5	1180	232.1	16.0	387.7	176.0
36x28	900x700	19.2	487	34.2	868	232.1	16.0	308.4	140.0
36x30	900x750	14.8	375	29.8	756	232.1	16.0	277.5	126.0
40x36	1000x900	12.2	310	32.8	833	232.1	16.0	400.9	182.0

View of Fitting Illustrations



Concentric Reducer
Quick-Lock



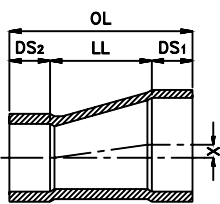
Concentric Reducer
Taper/Taper

Eccentric Reducers

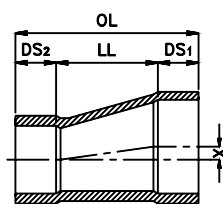
Filament-wound concentric reducers with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends, for adhesive bonding.

Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Eccentricity (X)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
1.5x1	40x25	2.2	56	4.5	115	0.3	7	249.5	17.2	0.4	0.2
2x1	50x25	3.9	100	6.8	173	0.5	13	249.5	17.2	0.7	0.3
2x1.5	50x40	1.7	44	4.8	122	0.2	6	249.5	17.2	1.1	0.5
3x1.5	80x40	5.9	150	9.0	228	0.8	20	249.5	17.2	1.1	0.5
3x2	80x50	4.3	108	7.9	200	0.6	14	249.5	17.2	1.1	0.5
4x2	100x50	7.9	200	11.5	292	1.1	27	249.5	17.2	2.4	1.1
4x3	100x80	3.7	93	7.3	185	0.5	12	249.5	17.2	2.0	0.9
5x4	125x100	4.0	101	8.0	204	0.6	14	249.5	17.2	3.3	1.5
6x3	150x80	11.5	293	15.6	396	1.5	39	249.5	17.2	4.0	1.8
6x4	150x100	7.9	200	11.9	303	1.1	27	249.5	17.2	4.0	1.8
6x5	150x125	3.9	100	8.4	214	0.5	13	249.5	17.2	4.0	1.8
8x4	200x100	15.9	405	20.3	516	2.0	52	249.5	17.2	6.4	2.9
8x6	200x150	8.1	205	12.9	327	1.0	25	249.5	17.2	5.9	2.7
10x6	250x150	16.1	410	21.5	547	2.1	53	249.5	17.2	8.1	3.7
10x8	250x200	9.3	235	15.0	380	1.1	27	249.5	17.2	7.9	3.6
12x8	300x200	16.9	429	23.2	589	2.1	53	249.5	17.2	11.0	5.0
12x10	300x250	9.0	229	15.9	404	1.0	26	249.5	17.2	10.1	4.6
14x10	350x250	13.4	340	20.5	520	1.7	42	249.5	17.2	15.9	7.2
14x12	350x300	6.3	159	13.9	354	0.6	16	249.5	17.2	16.1	7.3
16x12	400x300	13.5	344	21.6	549	1.6	41	249.5	17.2	19.6	8.9
16x14	400x350	8.5	215	16.7	425	1.0	25	249.5	17.2	19.8	9.0
18x12	450x300	17.7	450	25.2	640	2.5	63	232.1	16.0	34.4	15.6
18x14	450x350	12.7	322	20.7	525	1.7	43	232.1	16.0	31.3	14.2
18x16	450x400	7.8	197	16.3	413	0.7	18	232.1	16.0	28.0	12.7
20x16	500x400	12.8	324	21.8	553	1.5	39	232.1	16.0	50.7	23.0
20x18	500x450	7.8	197	17.2	438	0.9	22	232.1	16.0	41.6	18.9
24x16	600x400	22.8	580	33.9	860	3.7	93	232.1	16.0	105.7	48.0
24x18	600x450	17.7	450	29.2	742	2.9	73	232.1	16.0	96.9	44.0
24x20	600x500	12.8	325	24.8	630	1.9	48	232.1	16.0	85.9	39.0
30x24	750x400	17.8	451	31.8	807	3.4	86	232.1	16.0	191.6	87.0
36x24	900x400	32.8	832	47.8	1213	6.3	161	232.1	16.0	387.7	176.0
40x32	1000x800	29.1	739	48.7	1237	3.9	100	232.1	16.0	400.9	182.0
40x36	1000x900	16.5	419	37.1	942	2.0	52	232.1	16.0	422.9	192.0

View of Fitting Illustrations



Eccentric Quick-Lock



Eccentric Taper/Taper

Couplings

Filament-wound couplings with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) socket ends, for adhesive bonding.

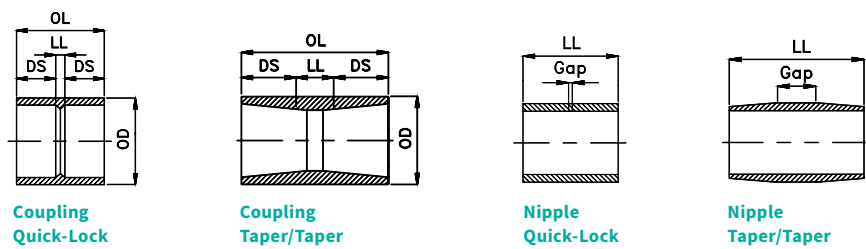
Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Outside Diameter (OD)		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	in	mm	psi	bar	lbs	kg
1	25	0.4	9	2.5	63	1.7	42	249.5	17.2	0.2	0.1
1.5	40	0.4	9	2.9	73	2.3	58	249.5	17.2	0.2	0.1
2	50	0.4	9	4.0	101	3.1	79	249.5	17.2	0.7	0.3
3	80	0.4	9	4.0	101	4.3	108	249.5	17.2	0.9	0.4
4	100	0.4	9	4.0	101	5.2	133	249.5	17.2	1.3	0.6
5	125	0.4	9	4.8	123	6.0	153	249.5	17.2	2.0	0.9
6	150	0.4	9	4.8	123	7.2	183	249.5	17.2	2.4	1.1
8	200	2.8	70	7.9	200	9.1	230	249.5	17.2	3.7	1.7
10	250	2.8	70	9.1	230	11.4	289	249.5	17.2	5.1	2.3
12	300	2.8	70	10.2	260	13.8	350	249.5	17.2	6.2	2.8
14	350	2.8	70	10.6	270	14.8	377	249.5	17.2	10.1	4.6
16	400	2.8	70	11.4	290	16.9	430	249.5	17.2	15.9	7.2
18	450	2.8	70	11.7	298	18.2	463	232.1	16.0	23.6	10.7
20	500	2.8	70	12.8	324	20.2	514	232.1	16.0	28.6	13.0
22	550	2.8	70	14.7	374			232.1	16.0	34.4	15.6
24	600	2.8	70	16.8	426	24.3	618	232.1	16.0	41.4	18.8
26	650	2.8	70	16.8	426			232.1	16.0	46.3	21.0
28	700	2.8	70	16.8	426	29.2	742	232.1	16.0	52.9	24.0
30	750	2.8	70	16.8	426	31.3	795	232.1	16.0	55.1	25.0
32	800	2.8	70	16.8	426	33.4	848	232.1	16.0	59.5	27.0
36	900	2.8	70	18.7	476	37.4	950	232.1	16.0	77.1	35.0
40	1000	2.8	70	28.0	710	41.6	1057	232.1	16.0	90.3	41.0

Nipples

Filament-wound nipples with integral Quick-Lock (1-6 inch) or Taper/Taper (8-40 inch) male ends, for adhesive bonding.

Nominal Pipe Size		Laying Length (LL)		Gap ⁽¹⁾		Maximum Working Pressure		Average Weight	
in	mm	in	mm	in	mm	psi	bar	lbs	kg
1	25	2.2	57	0.1	3	249.5	17.2	0.2	0.1
1.5	40	2.6	67	0.1	3	249.5	17.2	0.2	0.1
2	50	3.7	95	0.1	3	249.5	17.2	0.2	0.1
3	80	3.7	95	0.1	3	249.5	17.2	0.2	0.1
4	100	3.7	95	0.1	3	249.5	17.2	0.4	0.2
5	125	4.6	117	0.1	3	249.5	17.2	0.7	0.3
6	150	4.6	117	0.1	3	249.5	17.2	0.9	0.4
8	200	6.3	160	1.2	30	249.5	17.2	1.3	0.6
10	250	7.5	190	1.2	30	249.5	17.2	2.0	0.9
12	300	9.1	230	1.6	40	249.5	17.2	2.4	1.1
14	350	9.4	240	1.6	40	249.5	17.2	6.8	3.1
16	400	10.2	260	1.6	40	249.5	17.2	9.7	4.4
18	450	10.9	278	2.0	50	232.1	16.0	13.0	5.9
20	500	12.0	304	2.0	50	232.1	16.0	17.2	7.8
22	550	13.9	354	2.0	50	232.1	16.0	21.6	9.8
24	600	16.0	406	2.0	50	232.1	16.0	26.4	12.0
26	650	16.0	406	2.0	50	232.1	16.0	41.6	18.9
28	700	16.0	406	2.0	50	232.1	16.0	46.3	21.0
30	750	16.0	406	2.0	50	232.1	16.0	48.5	22.0
32	800	16.0	406	2.0	50	232.1	16.0	52.9	24.0
36	900	18.0	456	2.0	50	232.1	16.0	79.3	36.0
40	1000	27.2	690	2.0	50	232.1	16.0	112.3	51.0

View of Fitting Illustrations



Support Saddles

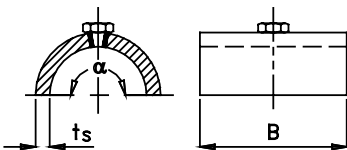
Filament-wound pipe saddles for wear, support and anchor.

Nominal Pipe Size		Saddles Angle (a)	Saddle Thickness (t _s)		Saddle Weight (B=100 mm)		Required Adhesive Kits		Saddle Weight (B=150 mm)		Required Adhesive Kits	
in	mm	angle	in	mm	lb	kg	3 oz	6 oz	lb	kg	3 oz	6 oz
1	25	180	0.6	14	0.4	0.2	1	-	0.7	0.3	1	-
1½	40	180	0.6	14	0.7	0.3	1	-	1.1	0.5	1	-
2	50	180	0.6	14	0.9	0.4	1	-	1.3	0.6	1	-
3	80	180	0.6	14	1.1	0.5	1	-	1.8	0.8	-	1
4	100	180	0.6	14	1.5	0.7	1	-	2.4	1.1	-	1
5	125	180	0.6	14	1.8	0.8	-	1	2.6	1.2	-	1
6	150	180	0.6	14	2.0	0.9	-	1	3.1	1.4	-	2
8	200	180	0.6	14	2.4	1.1	-	1	3.7	1.7	-	2
10	250	180	0.6	14	3.3	1.5	-	2	5.1	2.3	-	2
12	300	180	0.6	14	4.0	1.8	-	2	5.9	2.7	-	3
14	350	180	0.6	14	4.4	2.0	-	2	6.6	3.0	-	3
16	400	180	0.6	14	5.3	2.4	-	2	7.9	3.6	-	3
18	450	180	0.6	16	-	-	-	-	7.0	3.2	-	2
20	500	180	0.6	16	-	-	-	-	7.9	3.6	-	2
22	550	180	0.6	16	-	-	-	-	9.0	4.1	-	-
24	600	180	0.6	16	-	-	-	-	9.5	4.3	-	2
26	650	180	0.6	16	-	-	-	-	10.6	4.8	-	-
28	700	180	0.6	16	-	-	-	-	11.2	5.1	-	3
30	750	180	0.6	16	-	-	-	-	12.1	5.5	-	3
32	800	180	0.6	16	-	-	-	-	12.8	5.8	-	3
36	900	180	0.6	16	-	-	-	-	14.3	6.5	-	4
40	1000	180	0.6	16	-	-	-	-	18.1	8.2	-	4

NOTES:

- Filament-wound support saddles are intended for protection of pipe at supports and clamps, as well as for anchoring purposes. Support and anchor saddles are standard 180° sweeps. Saddles are supplied in standard lengths of 100 mm and 150 mm.
- For special saddle lengths, thickness and/or sweep angles contact NOV Fiber Glass Systems.
- Wear saddles are standard 90°. Weights of 90° sweep saddles are 50% of value shown.

View of Fitting Illustrations



Support Saddles

Grounding Saddles

Filament-wound pipe saddles for grounding in conductive piping systems.

Nominal Pipe Size		Saddles Angle (a)	Saddle Length (B)		Saddle Thickness (t _s)		Average Saddle Weight		Adhesive Kits
in	mm		in	mm	in	mm	lb	kg	
1	25	90	3.0	76	0.6	14	0.2	0.1	1
1.5	40	90	3.0	76	0.6	14	0.2	0.1	1
2	50	90	3.0	76	0.6	14	0.2	0.1	1
3	80	90	3.0	76	0.6	14	0.2	0.1	1
4	100	90	3.0	76	0.6	14	0.4	0.2	1
5	125	90	3.0	76	0.6	14	0.7	0.3	1
6	150	90	3.0	76	0.6	14	0.7	0.3	1
8	200	45	3.0	76	0.6	14	0.4	0.2	1
10	250	45	3.0	76	0.6	14	0.4	0.2	1
12	300	45	3.0	76	0.6	14	0.4	0.2	1
14	350	45	3.0	76	0.6	14	0.7	0.3	1
16	400	45	3.0	76	0.6	14	0.7	0.3	1
18	450	22.5	3.0	76	0.6	16	0.4	0.2	1
20	500	22.5	3.0	76	0.6	16	0.4	0.2	1
22	550	22.5	3.0	76	0.6	16	0.7	0.3	1
24	600	22.5	3.0	76	0.6	16	0.7	0.3	1
26	650	22.5	3.0	76	0.6	16	0.7	0.3	1
28	700	22.5	3.0	76	0.6	16	0.7	0.3	2
30	750	22.5	3.0	76	0.6	16	0.9	0.4	2
32	800	22.5	3.0	76	0.6	16	0.9	0.4	3
36	900	22.5	3.0	76	0.6	16	0.9	0.4	3
40	1000	22.5	3.0	76	0.6	16	1.1	0.5	3

NOTES:

1. Bondstrand conductive adhesive should be used for mounting onto pipe.
2. Saddles are supplied with a 600 mm length of stainless steel cable.

Bell Mouths⁽¹⁾

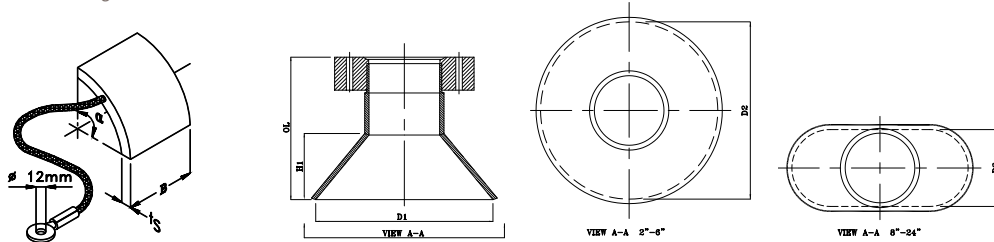
Filament-wound bell mouths with adhesive-bonded HD-flange.

Nominal Pipe Size		Overall Length (OL)		Length of Bell Mouth (H1)		Internal Diameter (D1)		Internal Diameter (D2)		Average Weight ⁽¹⁾	
in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2	50	10.6	269	4.5	115	4.3	110	4.3	110	6.8	3.1
3	80	10.8	274	4.7	120	8.7	220	8.7	220	11.0	5.0
4	100	11.4	289	5.3	135	10.8	275	10.8	275	18.5	8.4
5	125	12.7	323	6.2	158	15.7	400	15.7	400	28.0	12.7
6	150	12.8	324	6.2	158	17.7	450	17.7	450	32.4	14.7
8	200	21.0	534	13.4	340	29.5	750	17.7	450	57.3	26.0
10	250	23.8	604	15.6	395	33.5	850	21.7	550	85.9	39.0
12	300	23.1	588	14.4	365	33.5	850	21.7	550	112.3	51.0
14	350	24.3	616	14.8	375	33.5	850	21.7	550	132.2	60.0
16	400	23.5	596	13.6	345	33.5	850	21.7	550	147.6	67.0
18	450	25.0	635	14.2	360	35.4	900	23.6	600	198.2	90.0
20	500	29.1	738	17.7	450	43.3	1100	23.6	600	262.1	119.0
24	600	34.6	879	21.3	540	51.2	1300	27.6	700	376.7	171.0

NOTES:

1. For special shape or dimension bell mouths, contact NOV Fiber Glass Systems.
2. Weights provided are for bell mouth with CL150 flange.

View of Fitting Illustrations



Grounding Saddle

Bell Mouth

Expansion Coupling

Filament-wound Key-Lock expansion coupling with integral double O-ring Key-Lock female end one side and double O-ring female end on other side

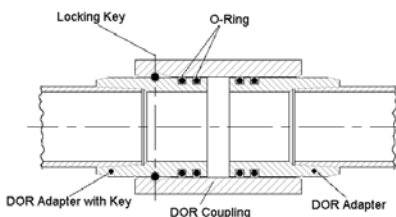
Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		O-ring Size		Key Size		Average Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2	50	2.0	50	8.7	222	0.3 x 2.4	7 x 59.7	0.2 x 12.0	6 x 305	2.9	1.3
3	80	2.0	50	8.7	222	0.3 x 3.5	7 x 88.3	0.2 x 15.7	6 x 400	3.7	1.7
4	100	2.0	50	8.7	222	0.3 x 4.5	7 x 113.7	0.2 x 19.0	6 x 483	7.7	3.5
5	125	2.0	50	10.4	264	0.4 x 5.3	9 x 135.0	0.3 x 22.8	8 x 580	10.1	4.6
6	150	2.0	50	10.6	270	0.4 x 6.4	10 x 161.3	0.3 x 26.0	8 x 660	14.5	6.6
8	200	2.0	50	13.3	339	0.4 x 8.9	10 x 225.5	0.4 x 33.1	10 x 840	33.9	15.4
10	250	2.0	50	14.8	376	0.5 x 11.9	12.5 x 302	0.5 x 50.0	12 x 1270	43.8	19.9
12	300	2.0	50	18.8	478	0.5 x 13.5	12.5 x 342.3	0.6 x 50.0	15 x 1270	46.3	21.0
14	350	2.0	50	17.8	452	0.5 x 13.5	12.5 x 342.3	0.6 x 53.5	15 x 1360	55.1	25.0
16	400	2.0	50	19.5	496	0.5 x 15.5	12.5 x 393.1	0.7 x 62.4	18 x 1585	70.5	32.0
18	450	2.0	50	16.4	416	0.6 x 17.5	15.0 x 445.0	0.6 x 68.9	15 x 1750	59.5	27.0
20	500	2.0	50	17.0	433	0.6 x 19.3	15.0 x 490.0	0.6 x 76.0	15 x 1930	70.5	32.0
22	550	2.0	50	18.9	480	0.7 x 21.9	18.0 x 556.0	0.7 x 82.7	18 x 2100	114.5	52.0
24	600	2.0	50	18.9	479	0.7 x 22.8	18.0 x 580.0	0.7 x 88.2	18 x 2240	114.5	52.0
26	650	2.0	50	21.8	554	0.7 x 24.5	18.0 x 622.3	0.7 x 98.8	18 x 2510	152.0	69.0
28	700	2.0	50	22.0	560	0.8 x 27.0	20.0 x 685.0	0.8 x 106.3	20 x 2700	169.6	77.0
30	750	2.0	50	22.6	574	0.8 x 29.1	20.0 x 740.0	0.8 x 106.3	20 x 2700	198.2	90.0
32	800	2.0	50	25.4	644	0.8 x 31.1	20.0 x 790.0	0.8 x 120.7	20 x 3065	253.3	115.0
36	900	2.0	50	29.7	754	1.0 x 35.0	25.0 x 890.0	1.0 x 125.0	25 x 3175	374.4	170.0
40	1000	2.0	50	29.1	740	1.0 x 38.9	26.0 x 987.0	0.8 x 137.8	20 x 3500	458.1	208.0

Key-Lock Adapter for Expansion Coupling

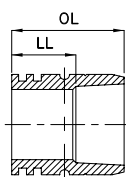
Filament-wound double O-ring male Key-Lock adapter with integral Quick-Lock (2-6 inch) or Taper/Taper (8-40 inch) socket end, for adhesive bonding

Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Average Weight	
in	mm	in	mm	in	mm	lb	kg
2	50	3.3	85	5.2	131	0.9	0.4
3	80	3.3	85	5.2	131	1.3	0.6
4	100	3.3	85	5.2	131	2.0	0.9
5	125	4.0	102	6.3	159	3.5	1.6
6	150	4.1	105	6.4	162	4.0	1.8
8	200	5.4	138	8.0	203	11.2	5.1
10	250	5.8	148	9.0	228	26.0	11.8
12	300	7.5	190	11.2	285	32.2	14.6
14	350	7.3	185	11.2	285	23.6	10.7
16	400	8.3	210	12.6	320	35.0	15.9
18	450	7.6	193	12.1	307	43.0	19.5
20	500	7.9	201	12.9	328	52.9	24.0
22	550	8.9	225	13.3	377	54.0	24.5
24	600	8.8	224	15.8	402	55.1	25.0
26	650	10.3	262	17.3	440	59.5	27.0
28	700	10.4	265	17.4	443	63.9	29.0
30	750	10.7	272	17.7	450	74.9	34.0
32	800	12.1	307	19.1	485	92.5	42.0
36	900	14.3	362	22.2	565	110.1	50.0
40	1000	14.0	355	30.1	765	141.0	64.0

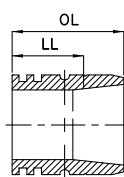
View of Fitting Illustrations



Double O-ring Expansion Joint



Key-Lock for Expansion Coupling Quick-Lock



Key-Lock for Expansion Coupling Taper/Taper

Double O-ring Adapter for Expansion Coupling

Filament-wound double O-ring adapter with integral Quick-Lock (1-6 inch) and Taper (8-40 inch) socket end, for adhesive bonding

Nominal Pipe Size		Laying Length (LL)		Overall Length (OL)		Average Weight	
in	mm	in	mm	in	mm	lb	kg
2	50	3.3	85	5.2	131	0.9	0.4
3	80	3.3	85	5.2	131	1.5	0.7
4	100	3.3	85	5.2	131	2.0	0.9
5	125	4.0	102	6.3	159	3.5	1.6
6	150	4.1	105	6.4	162	4.0	1.8
8	200	5.4	138	8.0	203	11.2	5.1
10	250	5.8	148	9.0	228	26.0	11.8
12	300	7.5	190	11.2	285	32.2	14.6
14	350	7.3	185	11.2	285	23.6	10.7
16	400	8.3	210	12.6	320	35.0	15.9
18	450	7.6	193	12.1	307	43.0	19.5
20	500	7.9	201	12.9	328	52.9	24.0
22	550	8.9	225	13.3	377	54.0	24.5
24	600	8.8	224	15.8	402	55.1	25.0
26	650	10.3	262	17.3	440	59.5	27.0
28	700	10.4	265	17.4	443	63.9	29.0
30	750	10.7	272	17.7	450	74.9	34.0
32	800	12.1	307	19.1	485	92.5	42.0
36	900	14.3	362	22.2	565	110.1	50.0
40	1000	14.0	355	30.1	765	141.0	64.0

Adhesive

Number of Adhesive Kits per joint

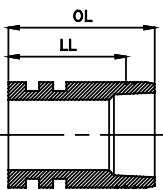
Nominal Pipe Size		Adhesive Volume	Required Adhesive Kits	Minimum # of Adhesive Kits required per Joint
in	mm	cm ³	oz	number
1	25	88.7	3	1/5
1½	40	88.7	3	1/5
2	50	88.7	3	1/4
3	80	88.7	3	1/3
4	100	88.7	3	1/2
5	125	88.7	3	1
6	150	88.7	3	1
8	200	88.7	3	1
10	250	177.4	6	1
12	300	177.4	6	1
14	350	177.4	6	2
16	400	177.4	6	2

Nominal Pipe Size		Adhesive Volume	Required Adhesive Kits	Minimum # of Adhesive Kits required per Joint
in	mm	cm ³	oz	number
18	450	177.4	6	2
20	500	177.4	6	3
22	550	177.4	6	4
24	600	177.4	6	4
26	650	177.4	6	4
28	700	177.4	6	4
30	750	177.4	6	5
32	800	177.4	6	5
34	850	177.4	6	6
36	900	177.4	6	6
40	1000	177.4	6	7

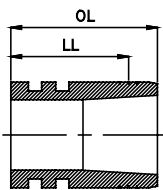
NOTES:

1. Adhesive Kits should never be split. If remainder is not used for other joints made at the same time then surplus must be discarded.
2. Required adhesive for saddles is shown in the dimension table of the respective saddles.
3. For type of adhesive to be used, please refer to the Bondstrand Corrosion Guide.

View of Fitting Illustrations



Double O-ring Adapter
Quick-Lock



Double O-ring Adapter
Taper/Taper

Typical Mechanical Properties

Pipe Properties	Units	70°F	21°C	200°F	93°C	Method
Hydrostatic Design Basis	N/mm2	23,351	161 ⁽¹⁾	17,549	121	ASTM D2992, Proc. B (20 yrs)
Ultimate Hoop Stress at Weeping	N/mm2	40,610	280	48,442	334	ASTM D1599
Circumferential						
Hoop tensile strength	N/mm2	55,114	380	-	-	ASTM D2290
Hoop tensile modulus	N/mm2	3.87 x 10 ⁶	26,700	2.36 x 10 ⁶	16,300	ASTM D2290
Poisson's Ratio ν_{ha} ⁽²⁾	-	0.61		0.80		NOV FGS
Longitudinal						
Axial tensile strength	N/mm2	11,603	80	9,427	65	ASTM D2105
Axial strength modulus	N/mm2	2.24 x 10 ⁶	15,500	1.24 x 10 ⁶	8,550	ASTM D2105
Poisson's Ratio ν_{ha} ⁽³⁾	-	0.35		0.42		ASTM D2105
Axial bending strength	N/mm2	12,328	85	-	-	NOV FGS
Axial bending modulus	N/mm2	2.24 x 10 ⁶	15,500	1.43 x 10 ⁶	9,900	ASTM D2925
Shear Modulus	N/mm2	1.75 x 10 ⁶	12,100	1.66 x 10 ⁶	11,500	NOV FGS

Typical Physical Properties

Pipe Properties	Units	Value	Method
Thermal Conductivity Pipe Wall	W/m°C	0.33	NOV FGS
Thermal Expansion @ 21°C	mm/mm °C	18 x 10 ⁻⁶	ASTM D696
Thermal Expansion @ 93°C	mm/mm °C	24 x 10 ⁻⁶	ASTM D696
Flow Efficient, Hazen-Williams	-	150	-
Absolute Roughness⁽⁴⁾	m	5.3 x 10 ⁻⁶	-
Density	kg/m ³	1,800	-
Specific Gravity	-	1.8	ASTM D792
Specific Heat	J/kg °C	910	-
Grounding Resistance @ 500 volts - pipe	Ohm/m	<1 x 10 ⁻⁶	ASTM D257
Grounding Resistance @ 500 volts - fitting	Ohm/pc	<1 x 10 ⁻⁶	ASTM D257
Shielding Capacity	Volt	100	-

⁽¹⁾ Value obtained at 65°C

⁽²⁾ ν_{ha} = The ratio of axial strain to hoop strain resulting from stress in the hoop direction.

⁽³⁾ ν_{ah} = The ratio of hoop strain to axial strain resulting from stress in the axial direction.

⁽⁴⁾ Although friction loss is lower, maximum velocity is recommended no more than 4.6 m/s (1.5 ft/s) to avoid excess axial load on pipe support.

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Fiber Glass Systems

17115 San Pedro Avenue, Ste 200
San Antonio, Texas 78232 USA
Phone: 210 477 7500
Fax: 210 477 7560

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