

Bondstrand® 2000M/7000M Glassfiber Reinforced Epoxy (GRE) pipe systems for marine service with external pressure requirements

Uses and applications

- Ballast
- Chlorination
- Draining
- Cargo line
- Sanitary service & sewage
- Portable discharge line
- Stripping lines
- Tankcleaning (salt water)
- Fire protection mains
- Various other applications

A complete library of Bondstrand pipe and fittings in PDS and PDMS-format is available on CD-ROM. Please contact Ameron for details.

For specific fire protection requirements, an outer layer of passive fire protection is available.

For pipe systems without external pressure requirements, please refer to Bondstrand 3400 product data (FP 835) or contact your Ameron representative.

Approvals

In 1993, IMO (International Maritime Organisation) issued a resolution (A.18/Res. 753) covering acceptance criteria for assuring ship safety. 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..

Characteristics

Maximum operating temperature: up to 121°C.

Pipe diameter: 1-40 inch (25-1000 mm).

Pipe system design for pressure ratings up to 16 bar.

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-11FW for static hydrostatic design basis; MDA cured.

ASTM D-2310 Classification: RTRP-11FX for static hydrostatic design basis; IPD cured.

Complies with ASTM F-1173 Classification.

Bondstrand 7000M

ASTM D-2310 Classification: RTRP-11AW for static hydrostatic design basis; MDA cured.

ASTM D-2310 Classification: RTRP-11AX for static hydrostatic design basis; IPD cured.

Complies with ASTM F-1173 Classification.

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Pipe series

Pipe

Filament-wound Glassfiber Reinforced Epoxy (GRE) pipe for Bondstrand adhesive-bonding systems. MDA (diaminodiphenylmethane) or IPD (isophoronediamine) cured.

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 Ameron representative.

Flanges

Filament-wound Glassfiber Reinforced Epoxy (GRE) heavy-duty flanges, hubbed and stub-end flanges for Quick-Lock adhesive bonding systems. Standard flange drilling patterns as per ANSI B16.5 (150 Lb). 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; IPD or MDA cured.
Standard 0.5 mm internal resin-rich reinforced liner.
Maximum operating temperature: 121°C for MDA cured and 93°C for IPD cured.
Maximum pressure rating: 16 bar.
Minimum pressure: full vacuum.
External Pressure Requirements: In accordance with IMO Regulations.

Bondstrand® 7000M (* conductive)

Glassfiber Reinforced Epoxy (GRE) pipe system; IPD or MDA cured.
Maximum operating temperature: 121°C for MDA cured and 93°C for IPD cured.
Maximum pressure rating: 16 bar.
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	1-40 inch
Joining system	Quick-Lock 1-16 inch Taper/Taper 18-40 inch	Quick-Lock 1-16 inch Taper/Taper 18-40 inch
Liner	*0.5 mm	-
**Temperature	121°C	121°C
Pressure Rating	16 bar	16 bar

* Also available without liner;

** Above 93°C, derate the pressure rating linearly to 50% at 121°C.

Joining system & configuration

Pipe

25-400 mm (1-16 inch):

Quick-Lock (straight/taper) adhesive joint with integral pipe stop in bell end.
End configuration: Integral Quick-Lock bell end x shaved straight spigot.

450-1000 mm (18-40 inch):

Taper/Taper adhesive joint.
End configuration: Integral Taper bell x shaved taper spigot

Fitting

25-400 mm (1-16 inch):

Quick-Lock (straight/ taper) adhesive joint with integral pipe stop in bell end.
End configuration: Integral Quick-Lock bell ends.

450-1000 mm (18-40 inch):

Taper/Taper adhesive joint.
End configuration: Integral Taper bell ends.

Flanges

25-1000 mm (1-40 inch):

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

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

Typical pipe length	Nominal Length*	Pipe Size	Joining	System	Approximate overall Europe
	Plant	Asia Plant			
	[mm]	[inch]		[m]	[m]
	25-40	1-1½	Quick-Lock	5.5	3.0
	50-125	2-5	Quick-Lock	6.15	5.85/9.0
	150	6	Quick-Lock	6.1	5.85/9.0
	200	8	Quick-Lock	6.1/11.8	5.85/9.0
	250	10	Quick-Lock	6.1/11.8	5.85/11.89
	300-400	12-16	Quick-Lock	6.05/11.8	5.85/11.89
	450-1000	18-40	Taper/Taper	11.8	11.89

* Tolerance +/- 50 mm.

Typical physical properties	Pipe property	Units	Value	Method
	Thermal conductivity pipe wall	W(m·K)	.33	Ameron
	Thermal expansivity (linear)	10 ⁻⁶ mm/mm °C	18.0	Ameron
	Flow coefficient	Hazen-Williams	150	—
	Absolute roughness	10 ⁻⁶ m	5.3	—
	Density	kg/m ³	1800	—
	Specific gravity	-	1.8	ASTM D-792

Typical mechanical properties	Pipe property	Units	21°C.	93°C.	Method
	IPD cured				
	Bi-axial				
	Ultimate hoop stress at weeping	N/mm ²	300	—	ASTM D-1599
	Circumferential				
	Hoop tensile strength	N/mm ²	380	—	ASTM D-2290
	Hoop tensile modulus	N/mm ²	23250	18100	ASTM D-2290
	Poisson's ratio axial/hoop	—	0.93	1.04	Ameron
	Longitudinal				
	Axial tensile strength	N/mm ²	65	50	ASTM D-2105
	Axial tensile modulus	N/mm ²	10000	7800	ASTM D-2105
	Poisson's ratio hoop/axial	—	0.40	0.45	ASTM D-2105
	Axial bending strength	—	80	—	Ameron
	Beam				
	Apparent elastic modulus	N/mm ²	9200	7000	ASTM D-2925
	Hydrostatic Design Basis				
	Static	N/mm ²	148*	—	ASTM D-2992 (Proc. B.)
	Pipe property	Units	21°C.	93°C.	Method
	MDA cured				
	Bi-axial				
	Ultimate hoop stress at weeping	N/mm ²	250	—	ASTM D-1599
	Circumferential				
	Hoop tensile strength	N/mm ²	220	—	ASTM D-2290
	Hoop tensile modulus	N/mm ²	25200	—	ASTM D-2290
	Poisson's ratio axial/hoop	—	0.65	0.81	Ameron
	Longitudinal				
	Axial tensile strength	N/mm ²	80	65	ASTM D-2105
	Axial tensile modulus	N/mm ²	12500	9700	ASTM D-2105
	Poisson's ratio hoop/axial	—	0.40	0.44	ASTM D-2105
	Axial bending strength	—	85	—	Ameron
	Beam				
	Apparent elastic modulus	N/mm ²	12500	8000	ASTM D-2925
	Hydrostatic Design Basis				
	Static	N/mm ²	124*	—	ASTM D-2992 (Proc. B.)

* At 65°C.

Typical pipe performance

Bondstrand 2000M (MDA cured) at 21°C.

Nominal Pipe Size		STIS	Stiffness Factor	Pipe Stiffness
[mm]	[inch]	[kN/m ²]	[lb.in]	[psi]
25	1	2079.1	502	16187
40	1½	618.1	502	4812
50	2	350.6	554	2729
80	3	102.2	554	796
100	4	110.8	1281	863
125	5	57.7	1281	449
150	6	33.4	1281	260
200	8	35.5	3092	276
250	10	36.6	6375	285
300	12	35.9	10627	280
350	14	36.8	13548	286
400	16	36.9	20308	287
450	18	36.2	28265	282
500	20	36.3	38976	283
600	24	36.6	67877	285
700	28	36.9	121531	288
750	30	36.8	148680	286
800	32	37.1	182139	289
900	36	36.8	256919	286
1000	40	37.7	361759	294

Bondstrand 2000M (IPD-cured) at 21°C.

Nominal Pipe Size		STIS	Stiffness Factor	Pipe Stiffness
[mm]	[inch]	[kN/m ²]	[lb.in]	[psi]
25	1	2087.4	504	16251
40	1½	620.6	504	4831
50	2	352.0	556	2740
80	3	102.6	556	799
100	4	111.3	1286	866
125	5	57.9	1286	451
150	6	33.5	1286	261
200	8	35.6	3104	277
250	10	36.8	6400	286
300	12	36.1	10669	281
350	14	36.9	13602	287
400	16	37.1	20389	289
450	18	36.3	28378	283
500	20	36.5	39130	284
600	24	36.6	68147	285
700	28	36.9	122013	289
750	30	36.8	149270	288
800	32	37.1	182862	290
900	36	36.8	257939	288
1000	40	37.7	363195	295

Typical pipe performance

Bondstrand 7000M (MDA-cured) at 21°C.

Nominal Pipe Size		STIS	Stiffness Factor	Pipe Stiffness
[mm]	[inch]	[kN/m ²]	[lb.in]	[psi]
25	1	3142.4	797	24464
40	1½	949.6	797	7393
50	2	534.7	867	4162
80	3	157.3	867	1225
100	4	154.4	1809	1202
125	5	80.6	1809	627
150	6	46.7	1809	363
200	8	39.4	3092	276
250	10	38.2	6375	285
300	12	37.2	10627	280
350	14	38.0	13548	286
400	16	37.2	20308	287
450	18	38.0	28265	282
500	20	37.2	38976	283
600	24	36.7	67877	285
700	28	37.1	121531	288
750	30	36.9	148680	286
800	32	37.3	182139	289
900	36	36.9	256919	286
1000	40	37.9	361759	294

Bondstrand 7000M (IPD-cured) at 21°C.

Nominal Pipe Size		STIS	Stiffness Factor	Pipe Stiffness
[mm]	[inch]	[kN/m ²]	[lb.in]	[psi]
25	1	3154.9	800	24561
40	1½	953.3	800	7422
50	2	536.8	871	4179
80	3	157.9	871	1230
100	4	155.0	1816	1207
125	5	80.9	1816	630
150	6	46.9	1816	365
200	8	35.6	3104	277
250	10	36.8	6400	286
300	12	36.1	10669	281
350	14	36.9	13602	287
400	16	37.1	20389	289
450	18	36.3	28378	283
500	20	36.5	39130	284
600	24	36.7	68147	286
700	28	37.1	122013	289
750	30	36.9	149270	288
800	32	37.3	182862	290
900	36	36.9	257939	288
1000	40	37.9	363195	295

Typical pipe dimensions and weights

Bondstrand 2000M.

Nominal Pipe Size		Pipe Inside Diameter	Minimum Struct. Wall Thickness [t]	Average Pipe Weight	Designation per ASTM D-2966	
[mm]	[inch]	[mm]	[mm]	[kg/m]	MDA	IPD
25	1	27.1	3.0	0.7	RTRP-11 FW1-2112	FX1-3112
40	1½	42.1	3.0	1.3	RTRP-11 FW1-2112	FX1-3112
50	2	53.0	3.1	1.3	RTRP-11FW1-2112	FX1-3112
80	3	81.8	3.1	1.8	RTRP-11FW1-2112	FX1-3112
100	4	105.2	4.1	3.1	RTRP-11FW1-2113	FX1-3113
125	5	131.9	4.1	3.5	RTRP-11FW1-2113	FX1-3113
150	6	159.0	4.1	4.6	RTRP-11FW1-2113	FX1-3113
200	8	208.8	5.5	7.4	RTRP-11FW1-2116	FX1-3116
250	10	262.9	7.0	12	RTRP-11FW1-2116	FX1-3116
300	12	313.7	8.3	17	RTRP-11FW1-2116	FX1-3116
400	14	337.6	9.0	19	RTRP-11FW1-2116	FX1-3116
400	16	385.8	10.3	25	RTRP-11FW1-2116	FX1-3116
450	18	433.8	11.5	32	RTRP-11FW1-2116	FX1-3116
500	20	482.1	12.8	39	RTRP-11FW1-2116	FX1-3116
600	24	578.6	15.4	56	RTRP-11FW1-2116	FX1-3116
700	28	700.0	18.7	75	RTRP-11FW1-2116	FX1-3116
750	30	750.0	20.0	93	RTRP-11FW1-2116	FX1-3116
800	32	800.0	21.4	102	RTRP-11FW1-2116	FX1-3116
900	36	900.0	24.0	132	RTRP-11FW1-2116	FX1-3116
1000	40	1000.0	26.9	165	RTRP-11FW1-2116	FX1-3116

Bondstrand 7000M.

Nominal Pipe Size		Pipe Inside Diameter	Minimum Struct. Wall Thickness [t]	Average Pipe Weight	Designation per ASTM D-2966	
[mm]	[inch]	[mm]	[mm]	[kg/m]	MDA	IPD
25	1	27.1	3.5	0.7	RTRP-11AW1-2112	AX1-3112
40	1½	42.1	3.5	1.3	RTRP-11AW1-2112	AX1-3112
50	2	53.0	3.6	1.3	RTRP-11AW1-2112	AX1-3112
80	3	81.8	3.6	1.8	RTRP-11AW1-2112	AX1-3112
100	4	105.2	4.6	3.1	RTRP-11AW1-2113	AX1-3113
125	5	131.9	4.6	3.5	RTRP-11AW1-2113	AX1-3113
150	6	159.0	4.6	4.6	RTRP-11AW1-2113	AX1-3113
200	8	208.8	5.5	7.4	RTRP-11AW1-2116	AX1-3116
250	10	262.9	7.0	12	RTRP-11AW1-2116	AX1-3116
300	12	313.7	8.3	17	RTRP-11AW1-2116	AX1-3116
350	14	337.6	9.0	19	RTRP-11AW1-2116	AX1-3116
400	16	385.8	10.3	25	RTRP-11AW1-2116	AX1-3116
450	18	433.8	11.5	32	RTRP-11AW1-2116	AX1-3116
500	20	482.1	12.8	39	RTRP-11AW1-2116	AX1-3116
600	24	578.6	15.4	56	RTRP-11AW1-2116	AX1-3116
700	28	700.0	18.7	75	RTRP-11AW1-2116	AX1-3116
750	30	750.0	20.0	93	RTRP-11AW1-2116	AX1-3116
800	32	800.0	21.4	102	RTRP-11AW1-2116	AX1-3116
900	36	900.0	24.0	132	RTRP-11AW1-2116	AX1-3116
1000	40	1000.0	26.9	165	RTRP-11AW1-2116	AX1-3116

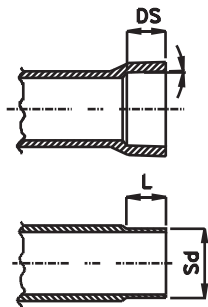
Ultimate collapse pressure

Ultimate collapse pressure (ultimate short term external failure pressure) at 21° C.

Nominal Pipe Size		Internal Pressure static*	2000M	2000M	7000M	7000M
			MDA	IPD	MDA	IPD
[mm]	[inch]	[bar]	[bar]	[bar]	[bar]	[bar]
25	1	16	491	491	714	714
40	1½	16	160	160	239	239
50	2	16	95	95	141	141
80	3	16	29	29	44	44
100	4	16	31	31	43	43
125	5	16	16.5	16.5	23	23
150	6	16	9.7	9.7	13.5	13.5
200	8	16	10.3	10.3	10.3	10.3
250	10	16	10.7	10.7	10.7	10.7
300	12	16	10.5	10.5	10.5	10.5
350	14	16	10.7	10.7	10.7	10.7
400	16	16	10.7	10.7	10.7	10.7
450	18	16	10.5	10.5	10.5	10.5
500	20	16	10.6	10.6	10.6	10.6
600	24	16	10.7	10.7	10.7	10.7
700	28	16	10.8	10.8	10.8	10.8
750	30	16	10.7	10.7	10.7	10.7
800	32	16	10.8	10.8	10.8	10.8
900	36	16	10.7	10.7	10.7	10.7
1000	40	16	11.0	11.0	11.0	11.0

* Up to 93°C.

Quick-Lock® dimensions

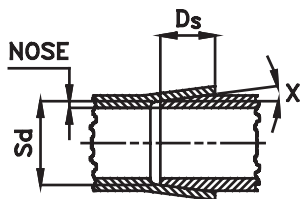


Nominal Length Max. Size	Pipe	Insertion	Depth	Spigot Diameter		Spigot Min.
				Min.	Max.	
		(Ds)	Sd	Sd	L	L
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]
25	1	27	32.6	32.9	28.5	31.0
40	1½	32	47.5	47.8	33.5	36.0
50	2	46	59.2	59.6	49.0	52.0
80	3	46	87.6	88.0	49.0	52.0
100	4	46	112.5	112.9	49.0	52.0
125	5	57	139.5	139.9	58.5	61.5
150	6	57	166.2	166.6	59.0	62.0
200	8	64	217.1	217.5	65.0	68.0
250	10	70	271.3	271.7	71.0	74.0
300	12	76	322.2	322.6	78.0	81.0
350	14	89	353.8	354.2	89.0	93.0
400	16	102	404.1	404.5	103.0	106.0

Dimensions for Quick-Lock Spigots for bonding HD Flanges.

			Dia of Straight Spigot [Sd]
450	18	111	455.8
500	20	111	506.6
600	24	127	608.2
700	28	152	736.3
750	30	165	788.4
800	32	178	840.5
900	36	163	943.4
1000	40	230	1051.4

Taper/Taper dimensions



Dimensions for adhesive Taper spigots for adhesive Taper/Taper joints.

Nominal Pipe Size		Taper Angle X	Insertion Depth Ds	Nominal Spigot Nose Thicken. nose	Dia of Spigot at Nose Sd
[mm]	[inch]	[degrees]	[mm]	[mm]	[mm]
450	18	2.5	114	4.6	443.0
500	20	2.5	127	5.0	492.2
600	24	3.5	178	3.8	586.3
700	28	1.75	178	6.4	712.9
750	30	1.75	178	4.2	758.4
800	32	1.75	178	8.9	817.8
900	36	1.75	203	5.6	911.3
1000	40	1.75	410	8.1	1016.3

Span length

Bondstrand 2000M.

Nominal Pipe Size		Single Span*	MDA Continuous Span*	Single Span*	IPD Continuous Span*
[mm]	[inch]	[m]	[m]	[m]	[m]
25	1	2.6	3.3	2.4	3.0
40	1½	2.9	3.7	2.7	3.4
50	2	3.1	4.0	2.9	3.7
80	3	3.5	4.5	3.3	4.2
100	4	4.0	5.1	3.7	4.7
125	5	4.3	5.4	4.0	5.0
150	6	4.5	5.7	4.2	5.3
200	8	5.1	6.5	4.8	6.1
250	10	5.8	7.3	5.3	6.8
300	12	6.3	8.0	5.8	7.4
350	14	6.5	8.3	6.0	7.7
400	16	7.0	8.8	6.4	8.2
450	18	7.4	9.3	6.8	8.7
500	20	7.7	9.8	7.2	9.1
600	24	8.5	10.8	7.9	10.0
700	28	9.3	11.8	8.6	11.0
750	30	9.6	12.2	8.9	11.3
800	32	10.0	12.7	9.2	11.7
900	36	10.5	13.4	9.8	12.4
1000	40	11.1	14.1	10.3	13.1

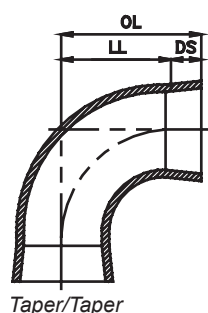
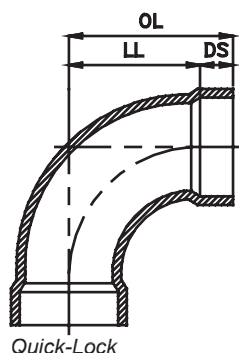
Bondstrand 7000M.

Nominal Pipe Size		Single Span*	MDA Continuous Span*	Single Span*	IPD Continuous Span*
[mm]	[inch]	[m]	[m]	[m]	[m]
25	1	2.5	3.3	2.4	3.0
40	1½	2.9	3.8	2.7	3.4
50	2	3.1	4.1	2.9	3.7
80	3	3.5	4.5	3.3	4.2
100	4	4.0	5.2	3.7	4.7
125	5	4.3	5.6	4.0	5.0
150	6	4.5	5.9	4.2	5.3
200	8	5.0	6.5	4.7	5.9
250	10	5.7	7.3	5.3	6.7
300	12	6.2	8.0	5.7	7.3
350	14	6.4	8.3	6.0	7.6
400	16	6.9	8.8	6.4	8.1
450	18	7.3	9.3	6.7	8.6
500	20	7.7	9.8	7.1	9.0
600	24	8.4	10.8	7.8	9.9
700	28	9.3	11.8	8.6	10.9
750	30	9.6	12.2	8.9	11.3
800	32	9.9	12.7	9.2	11.7
900	36	10.5	13.4	9.7	12.4
1000	40	11.1	14.1	10.3	13.0

* Span recommendations are based on pipes filled with water having a density of 1000 kg/m³ and include no provisions for weights caused by valves, flanges or other heavy objects.

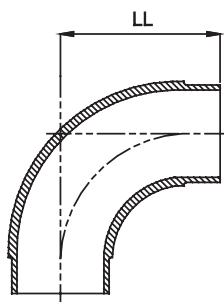
Elbows 90°

Filament-wound 90° elbows with integral Quick-Lock (1-16 inch) or Taper/Taper (18-40 inch) socket ends for adhesive bonding.



Nominal Pipe Size		Laying Length (LL)	Overall Length (OL)	Max. Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[bar]	[kg]
25	1	65	92	20	0.3
40	1½	81	113	20	0.4
50	2	76	122	20	0.5
80	3	114	160	20	1.1
100	4	152	198	20	1.6
125	5	195	252	16	2.7
150	6	229	286	16	3.6
200	8	305	369	16	6.8
250	10	381	451	16	11.0
300	12	457	533	16	18.0
350	14	359	448	16	26.0
400	16	397	499	16	31.0
450	18	458	572	16	53.0
500	20	508	635	16	65.0
600	24	584	762	16	122.0
700	28	711	889	16	205.0
750	30	762	940	16	243.0
800	32	813	991	16	330.0
900	36	915	1118	16	417.0
1000	40	1040	1450	16	489.0

Elbows ANSI 90° short radius



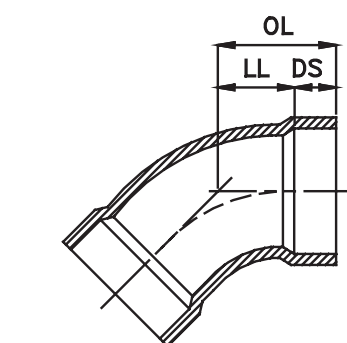
Filament-wound 90° elbows with integral Quick-Lock male ends.*

Nominal Pipe Size		Laying Length (LL)	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[bar]	[kg]
50	2	110	12	0.4
80	3	135	12	0.7
100	4	160	12	1.0
150	6	198	12	2.4
200	8	224	12	3.9
250	10	275	12	6.3
300	12	300	12	13.3

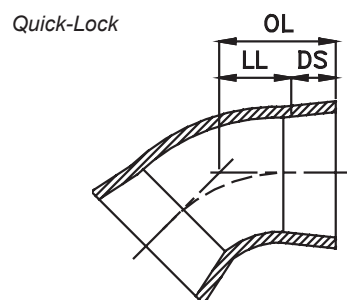
* Also available with flanges.

Elbows 45°

Filament-wound 45° Quick-Lock (1-16 inch) or
Taper/Taper (18-40 inch) socket ends for adhesive bonding.



Quick-Lock

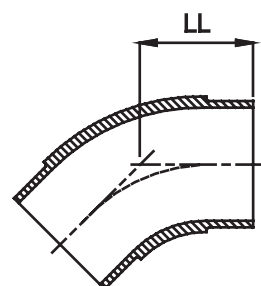


Taper/Taper

Nominal Pipe Size		Laying Length (LL)	Overall Length (OL)	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[bar]	[kg]
25	1	22	49	16	0.2
40	1½	29	61	16	0.3
50	2	35	81	16	0.4
80	3	51	97	16	0.8
100	4	64	110	16	1.1
125	5	84	141	16	1.8
150	6	95	152	16	2.4
200	8	127	191	16	4.3
250	10	159	229	16	7.3
300	12	191	267	16	11.0
350	14	121	210	16	17.0
400	16	137	239	16	20.0
450	18	191	305	16	33.0
500	20	210	337	16	40.0
600	24	252	430	16	82.0
700	28	295	473	16	140.0
750	30	322	500	16	164.0
800	32	337	515	16	283.0
900	36	400	603	16	283.0
1000	40	450	860	16	334.0

Elbows ANSI 45°

Filament-wound 45° elbows with integral Quick-Lock male ends.*

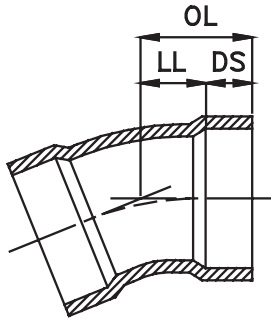


Nominal Pipe Size		Laying Length (LL)	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[bar]	[kg]
50	2	60	12	0.2
80	3	71	12	0.4
100	4	97	12	0.9
150	6	121	12	1.9
200	8	134	12	3.9
250	10	159	12	8.3
300	12	186	12	10.0

* Also available with flanges.

Elbows 22½°

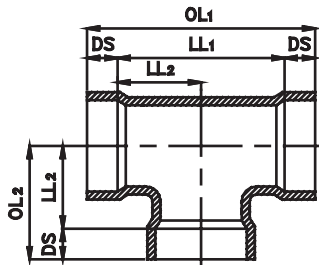
Filament-wound 22½° elbows with integral Quick-Lock socket ends for adhesive bonding.



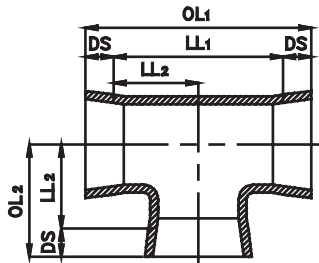
Nominal Pipe Size		Laying Length (LL)	Overall Length (OL)	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[bar]	[kg]
25	1	9	36	16	0.1
40	1½	9	41	16	0.2
50	2	13	59	16	0.5
80	3	21	67	16	0.7
100	4	29	75	16	1.0
125	5	43	100	16	1.4
150	6	43	100	16	1.9
200	8	57	121	16	3.9
250	10	67	137	16	5.9
300	12	76	152	16	10.4
350	14	83	172	16	12.0
400	16	89	191	16	14.0

Equal Tees

Filament-wound equal Tee with integral Quick-Lock (1-16 inch) or Taper/Taper (18-40 inch) socket ends for adhesive bonding.



Quick-Lock

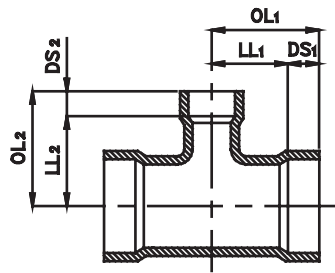


Taper/Taper

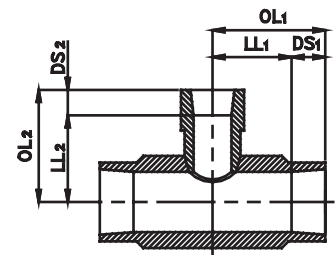
Nominal Pipe Size		Laying Length total run (LL1)	Overall Length total run (OL1)	Laying Length branch (LL2)	Overall Length branch (OL2)	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[bar]	[kg]
25	1	54	108	27	54	16	0.2
40	1½	60	124	30	62	16	0.4
50	2	128	220	64	110	16	1.0
80	3	172	264	86	132	16	1.8
100	4	210	302	105	151	16	2.5
125	5	254	368	127	184	16	5.0
150	6	286	400	143	200	16	6.7
200	8	356	484	178	242	16	10.0
250	10	432	572	216	286	16	18.0
300	12	508	660	254	330	16	29.0
350	14	534	712	267	356	16	37.0
400	16	584	788	292	394	16	56.0
450	18	648	876	324	438	16	69.0
500	20	712	966	356	483	16	92.0
600	24	838	1194	419	597	16	168.0
700	28	964	1320	482	660	16	285.0
750	30	1016	1372	508	686	16	337.0
800	32	1090	1446	545	723	16	459.0
900	36	1220	1626	610	813	16	581.0
1000	40	1416	2236	708	1118	16	686.0

Reducing Tees

Filament-wound standard and fabricated reducing tees with integral Quick-Lock (1-16 inch) socket ends for adhesive bonding.



Standard



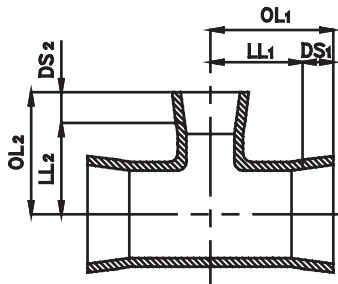
Fabricated

Nominal Pipe Size (runxrunxbranch)		Laying Length (LL1) half run	Overall Length (OL1) half run	Laying Length (LL2) branch	Overall Length (OL2) branch	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[bar]	[kg]
40x40x25	1½x1½x1	30	62	30	57	20	0.6
50x50x25	2x2x1	64	110	57	84	20	0.9
50x50x40	2x2x1½	64	110	57	89	20	1.0
80x80x25	3x3x1	86	132	76	103	20	1.6
80x80x40	3x3x1½	86	132	76	108	20	1.6
80x80x50	3x3x2	86	132	76	122	20	1.7
100x100x25	4x4x1	72	118	194	221	20	7.5
100x100x40	4x4x1½	89	136	194	226	20	9.0
100x100x50	4x4x2	105	151	89	135	20	2.1
100x100x80	4x4x3	105	151	98	144	20	2.3
125x125x50	5x5x2	127	184	102	148	16	3.4
125x125x80	5x5x3	127	184	111	157	16	4.0
125x125x100	5x5x4	127	184	118	164	16	4.6
150x150x25	6x6x1	83	140	221	248	16	11.7
150x150x40	6x6x1½	101	158	221	253	16	13.8
150x50x50	6x6x2	143	200	114	160	16	5.4
150x150x80	6x6x3	143	200	124	170	16	6.0
150x150x100	6x6x4	143	200	130	176	16	6.2
150x150x125	6x6x5	143	200	136	193	16	6.5
200x200x25	8x8x1	84	148	245	272	16	15.0
200x200x40	8x8x1½	101	165	246	278	16	17.5
200x200x50	8x8x2	116	180	246	292	16	19.9
200x200x80	8x8x3	178	242	149	195	16	9.1
200x200x100	8x8x4	178	242	162	208	16	9.7
200x200x125	8x8x5	178	242	168	225	16	10.6
200x200x150	8x8x6	178	242	168	225	16	11.4
250x250x25	10x10x1	83	153	273	300	16	18.1
250x250x40	10x10x1½	100	170	273	305	16	21.0
250x250x50	10x10x2	115	185	273	320	16	24.0
250x250x80	10x10x3	115	185	273	320	16	24.0
250x250x100	10x10x4	216	286	184	230	16	14.8
250x250x125	10x10x5	216	286	194	251	16	15.2
250x250x150	10x10x6	216	286	194	251	16	15.5
250x250x200	10x10x8	216	286	203	267	16	16.5
300x300x25	12x12x1	84	160	298	325	16	21.2
300x300x40	12x12x1½	102	178	298	330	16	25.0
300x300x50	12x12x2	117	193	298	344	16	29.0
300x300x80	12x12x3	117	193	298	344	16	29.0
300x300x100	12x12x4	254	330	206	252	16	21.0
300x300x150	12x12x6	254	330	219	276	16	22.0
300x300x200	12x12x8	254	330	229	293	16	23.0
300x300x250	12x12x10	254	330	241	311	16	24.0
350x350x25	14x14x1	81	170	314	341	16	24.0
350x350x40	14x14x1½	99	188	314	346	16	28.0
350x350x50	14x14x2	114	203	314	361	16	31.0
350x350x80	14x14x3	114	203	314	361	16	31.0
350x350x100	14x14x4	114	203	314	361	16	31.0
350x350x150	14x14x6	267	356	244	301	16	29.0
350x350x200	14x14x8	267	356	254	318	16	30.0
350x350x250	14x14x10	267	356	267	337	16	32.0
350x350x300	14x14x12	267	356	279	355	16	34.0
400x400x25	16x16x1	85	187	338	365	16	29.0
400x400x40	16x16x1½	103	205	338	370	16	33.0
400x400x50	16x16x2	118	220	338	384	16	37.0
400x400x80	16x16x3	118	220	338	384	16	37.0
400x400x100	16x16x4	118	220	338	384	16	37.0
400x400x150	16x16x6	292	394	264	321	16	37.0
400x400x200	16x16x8	292	394	273	337	16	38.0
400x400x250	16x16x10	292	394	283	353	16	41.0
400x400x300	16x16x12	292	394	295	371	16	45.0
400x400x350	16x16x14	292	394	292	381	16	49.0

Note: Regular numbers are filament wound tees; Italic numbers are fabricated tees;
Filament-wound standard and fabricated reducing tees with integral.

Reducing Tees

Taper/Taper (18-40 inch) socket ends for adhesive bonding.

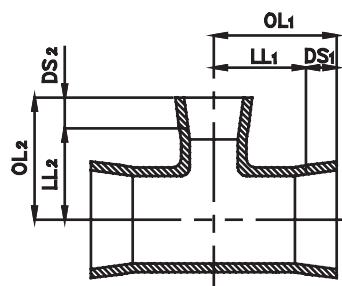


Nominal Pipe Size (runxrunxbranch)		Laying Length (LL1) half run	Overall Length (OL1) half run	Laying Length (LL2) branch	Overall Length (OL2) branch	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[bar]	[kg]
450x450x25	18x18x1	88	202	358	385	16	31.0
450x450x40	18x18x1½	88	202	358	390	16	31.0
450x450x50	18x18x2	88	202	358	404	16	22.0
450x450x80	18x18x3	100	214	358	404	16	35.0
450x450x100	18x18x4	113	227	358	404	16	38.0
450x450x150	18x18x6	138	252	367	424	16	45.0
450x450x200	18x18x8	324	438	306	370	16	53.0
450x450x250	18x18x10	324	438	319	389	16	60.0
450x450x300	18x18x12	324	438	319	395	16	67.0
450x450x350	18x18x14	324	438	317	406	16	66.0
450x450x400	18x18x16	324	438	319	421	16	69.0
500x500x25	20x20x1	88	215	382	409	16	35.0
500x500x40	20x20x1½	88	215	382	414	16	35.0
500x500x50	20x20x2	88	215	382	428	16	36.0
500x500x80	20x20x3	100	227	382	428	16	39.0
500x500x100	20x20x4	113	240	382	428	16	43.0
500x500x150	20x20x6	138	265	391	448	16	50.0
500x500x250	20x20x10	356	483	344	414	16	77.0
500x500x300	20x20x12	356	483	345	421	16	82.0
500x500x350	20x20x14	356	483	343	432	16	85.0
500x500x400	20x20x16	356	483	344	446	16	85.0
500x500x450	20x20x18	356	483	350	464	16	89.0
600x600x25	24x24x1	88	266	430	457	16	51.0
600x600x40	24x24x1½	88	266	430	462	16	51.0
600x600x50	24x24x2	88	266	430	476	16	52.0
600x600x80	24x24x3	100	278	430	476	16	56.0
600x600x100	24x24x4	113	291	430	476	16	61.0
600x600x150	24x24x6	138	316	439	496	16	69.0
600x600x200	24x24x8	419	597	412	476	14	78.0
600x600x250	24x24x10	419	597	386	456	16	85.0
600x600x300	24x24x12	419	597	408	484	16	85.0
600x600x350	24x24x14	419	597	394	483	16	101.0
600x600x400	24x24x16	419	597	395	497	16	123.3
600x600x450	24x24x18	419	597	413	527	16	137.0
600x600x500	24x24x20	419	597	406	533	16	156.0
700x700x25	28x28x1	88	266	491	518	16	59.0
700x700x40	28x28x1½	88	266	491	523	16	59.0
700x700x50	28x28x2	88	266	491	537	16	59.0
700x700x80	28x28x3	100	278	491	537	16	64.0
700x700x100	28x28x4	113	291	491	537	16	70.0
700x700x150	28x28x6	138	316	500	557	16	80.0
700x700x350	28x28x14	482	660	490	579	16	147.0
700x700x400	28x28x16	482	660	500	602	16	166.0
700x700x450	28x28x18	482	660	500	614	16	189.0
700x700x500	28x28x20	482	660	506	633	16	210.0
700x700x600	28x28x24	482	660	506	684	16	252.0
750x750x25	30x30x1	88	266	516	543	16	63.0
750x750x40	30x30x1½	88	266	516	548	16	63.0
750x750x50	30x30x2	88	266	516	562	16	63.0
750x750x80	30x30x3	100	278	516	562	16	69.0
750x750x100	30x30x4	113	291	516	562	16	74.0
750x750x150	30x30x6	138	316	525	582	16	85.0
750x750x300	30x30x12	508	686	756	832	16	118.0
750x750x350	30x30x14	508	686	722	811	16	157.0
750x750x400	30x30x16	508	686	698	800	16	178.0
750x750x450	30x30x18	508	686	488	602	16	202.0
750x750x500	30x30x20	508	686	495	622	16	225.0
750x750x600	30x30x24	508	686	481	659	16	270.0

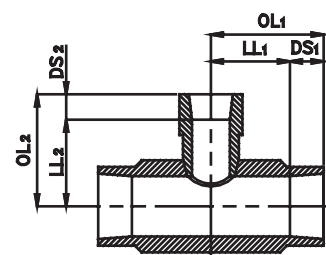
Note: Regular numbers are filament wound tees; Italic numbers are fabricated tees.

Reducing Tees (C'tnd)

Filament-wound standard and fabricated reducing tees with integral Taper/Taper (18-40 inch) socket ends for adhesive bonding.



Standard

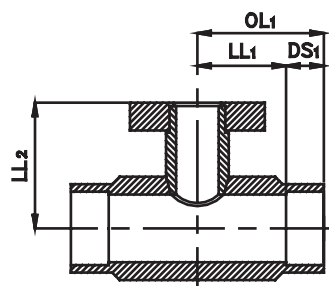


Fabricated

Nominal Pipe Size (runxrunxbranch)		Laying Length (LL1) half run	Overall Length (OL1) half run	Laying Length (LL2) branch	Overall Length (OL2) branch	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[bar]	[kg]
800x800x25	32x32x1	88	266	541	568	16	66.0
800x800x40	32x32x1½	88	266	541	573	16	67.0
800x800x50	32x32x2	88	266	541	587	16	67.0
800x800x80	32x32x3	100	278	541	587	16	73.0
800x800x100	32x32x4	113	291	541	587	16	79.0
800x800x150	32x32x6	138	316	550	607	16	90.0
800x800x500	32x32x20	545	723	523	650	16	257.0
800x800x600	32x32x24	545	723	523	701	16	310.0
800x800x700	32x32x28	545	723	532	710	16	348.0
800x800x750	32x32x30	545	723	534	712	16	387.0
900x900x25	36x36x1	88	291	591	618	16	78.0
900x900x40	36x36x1½	88	291	591	623	16	78.0
900x900x50	36x36x2	88	291	591	637	16	78.0
900x900x80	36x36x3	100	303	591	637	16	85.0
900x900x100	36x36x4	113	316	591	637	16	92.0
900x900x150	36x36x6	138	341	600	657	16	105.0
900x900x400	36x36x16	610	813	563	665	16	270.0
900x900x450	36x36x18	610	813	563	677	16	290.0
900x900x500	36x36x20	610	813	563	690	16	323.0
900x900x600	36x36x24	610	813	541	719	16	387.0
900x900x700	36x36x28	610	813	570	748	16	459.0
900x900x750	36x36x30	610	813	584	762	16	484.0
1000x1000x400	40x40x1	120	530	641	668	16	92.0
1000x1000x450	40x40x1½	120	530	641	673	16	92.0
1000x1000x500	40x40x2	120	530	641	687	16	92.0
1000x1000x600	40x40x3	132	542	641	687	16	100.0
1000x1000x600	40x40x24	708	1118	593	771	16	457.0
1000x1000x700	40x40x28	708	1118	632	810	16	541.0
1000x1000x750	40x40x30	708	1118	633	811	16	571.0
1000x1000x800	40x40x32	708	1118	652	830	16	605.0
1000x1000x900	40x40x36	708	1118	652	855	16	634.0

Note: Regular numbers are filament wound tees; Italic numbers are fabricated tees.

Fabricated Reducing Tees with Flanged Branch



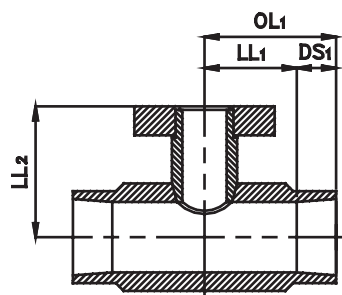
Fabricated Reducing tees with integral Quick-Lock (1-16 inch) socket ends and flanged branch.

Nominal Pipe Size (runxrunxbranch)		Laying Length (LL1) half run	Overall Length (OL1) half run	Laying Length (LL2) branch	Maximum Working Pressure	Average Weight with flange CL150
[mm]	[inch]	[mm]	[mm]	[mm]	[bar]	[kg]
100x100x25	4x4x1	72	118	225	16	8.0
100x100x40	4x4x1½	89	135	230	16	9.7
150x150x25	6x6x1	83	140	252	16	12.2
150x150x40	6x6x1½	101	158	257	16	14.5
200x200x25	8x8x1	84	148	276	16	15.5
200x200x40	8x8x1½	101	165	281	16	18.2
200x200x50	8x8x2	116	180	295	16	21.4
250x250x25	10x10x1	83	153	303	16	18.6
250x250x40	10x10x1½	100	170	308	16	22.0
250x250x50	10x10x2	115	185	322	16	25.6
250x250x80	10x10x3	115	185	323	16	26.3
300x300x25	12x12x1	84	160	329	16	22.3
300x300x40	12x12x1½	102	178	334	16	26.1
300x300x50	12x12x2	117	193	348	16	30.2
300x300x80	12x12x3	117	193	349	16	30.9
350x350x25	14x14x1	81	170	344	16	24.3
350x350x40	14x14x1½	99	188	349	16	28.4
350x350x50	14x14x2	114	203	363	16	32.7
350x350x80	14x14x3	114	203	369	16	33.4
350x350x100	14x14x4	114	203	364	16	34.2
400x400x25	16x16x1	85	187	369	16	29.1
400x400x40	16x16x1½	103	205	374	16	33.8
400x400x50	16x16x2	118	220	388	16	38.5
400x400x80	16x16x3	118	220	389	16	39.2
400x400x100	16x16x4	118	220	389	16	39.9

Note: Other sizes, or multiple size branched tees available on request. Please contact Ameron.

Fabricated Reducing Tees with Flanged Branch

Fabricated Reducing tees with integral Taper/Taper (18-40 inch) socket ends and flanged branch.

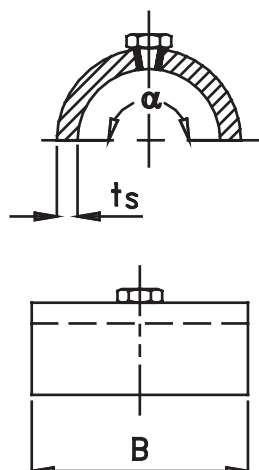


Nominal Pipe Size (runxrunxbranch)		Laying Length (LL1) half run	Overall Length (OL1) half run	Laying Length (LL2) branch	Maximum Working Pressure	Average Weight with flange CL150
[mm]	[inch]	[mm]	[mm]	[mm]	[bar]	[kg]
450x450x25	18x18x1	88	202	388	16	31.7
450x450x40	18x18x1½	88	202	394	16	32.0
450x450x50	18x18x2	88	202	408	16	33.0
450x450x80	18x18x3	100	214	409	16	37.0
450x450x100	18x18x4	113	227	409	16	41.2
450x450x150	18x18x6	138	252	430	16	49.9
500x500x25	20x20x1	88	215	412	16	35.8
500x500x40	20x20x1½	88	215	418	16	36.0
500x500x50	20x20x2	88	215	432	16	37.0
500x500x80	20x20x3	100	227	433	16	41.4
500x500x100	20x20x4	113	240	433	16	45.9
500x500x150	20x20x6	138	265	454	16	54.8
600x600x25	24x24x1	88	266	460	16	51.9
600x600x40	24x24x1½	88	266	467	16	52.0
600x600x50	24x24x2	88	266	480	16	53.0
600x600x80	24x24x3	100	278	481	16	58.2
600x600x100	24x24x4	113	291	481	16	63.4
600x600x150	24x24x6	138	316	502	16	73.7
700x700x25	28x28x1	88	266	521	16	59.3
700x700x40	28x28x1½	88	266	527	16	59.3
700x700x50	28x28x2	88	266	541	16	60.5
700x700x80	28x28x3	100	278	542	16	66.5
700x700x100	28x28x4	113	291	542	16	72.6
700x700x150	28x28x6	138	316	563	16	84.5
750x750x25	30x30x1	88	266	546	16	63.2
750x750x40	30x30x1½	88	266	552	16	63.4
750x750x50	30x30x2	88	266	566	16	64.4
750x750x80	30x30x3	100	278	567	16	70.8
750x750x100	30x30x4	113	291	567	16	77.1
750x750x150	30x30x6	138	316	588	16	89.8
800x800x25	32x32x1	88	266	571	16	66.9
800x800x40	32x32x1½	88	266	576	16	67.2
800x800x50	32x32x2	88	266	590	16	68.1
800x800x80	32x32x3	100	278	590	16	74.9
800x800x100	32x32x4	113	291	590	16	81.6
800x800x150	32x32x6	138	316	610	16	94.9
900x900x25	36x36x1	88	291	621	16	78.3
900x900x40	36x36x1½	88	291	627	16	78.6
900x900x50	36x36x2	88	291	641	16	79.6
900x900x80	36x36x3	100	303	642	16	87.0
900x900x100	36x36x4	113	316	642	16	94.4
900x900x150	36x36x6	138	341	663	16	109.2
1000x1000x25	40x40x1	120	530	672	16	92.3
1000x1000x40	40x40x1½	120	530	677	16	92.6
1000x1000x50	40x40x2	120	530	691	16	93.7
1000x1000x80	40x40x3	132	542	692	16	103.0

Note: Other sizes, or multiple size branched tees available on request. Please contact Ameron.

Bushing Saddles

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

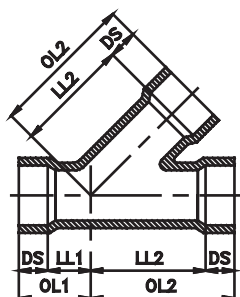


Nominal Pipe Size		Angle	Saddle Length	Saddle Thickn.	Maximum Working Pressure	Average Weight	Required Adhesive Kits	
[mm]	[inch]	[degree]	[mm]	[mm]	[bar]	[kg]	[3 Oz]	[6 Oz]
50	2	180	100	14	16	0.5	1	-
80	3	180	100	14	16	0.6	1	-
100	4	180	100	14	16	0.8	1	-
125	5	180	100	14	16	0.9	-	1
150	6	180	100	14	16	1.0	-	1
200	8	180	100	14	16	1.2	-	1
250	10	180	100	14	16	1.6	1	1
300	12	180	100	14	12	1.9	1	1
350	14	180	100	14	12	2.1	1	1
400	16	180	100	14	12	2.5	-	2
450	18	90	100	14	12	3.3	-	1
500	20	90	100	14	12	3.7	1	1
600	24	90	100	14	12	4.4	-	2

* Consult Ameron for other type material, or other sized bushings.

45° Laterals

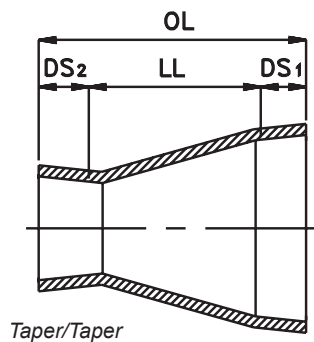
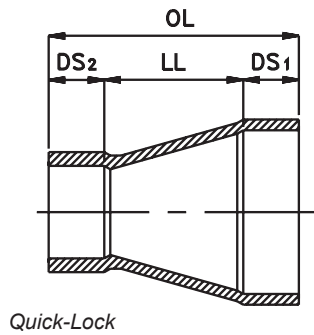
Filament-wound 45° laterals with integral Quick-Lock socking ends.



Nominal Pipe Size		Laying Length (LL1)	Overall Length (OL1)	Laying Length (LL2)	Overall Length (OL2)	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[bar]	[kg]
50	2	64	110	203	249	16	1.6
80	3	76	122	254	300	16	3.0
100	4	76	122	305	351	16	3.9
125	5	89	146	337	394	16	5.8
150	6	89	146	368	425	16	6.8
200	8	114	178	445	509	16	12.0
250	10	127	197	521	591	12	21.0
300	12	140	216	622	698	12	30.0
350	14	140	229	622	711	12	39.0
400	16	140	242	622	724	12	54.0

Concentric Reducers

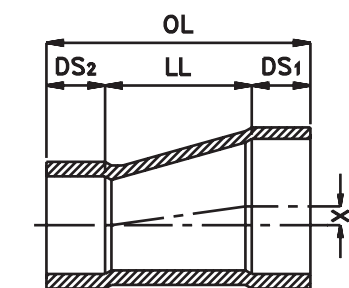
Filament-wound concentric reducers with integral Quick-Lock (1-16 inch) or Taper/Taper (18-40 inch) socket ends.



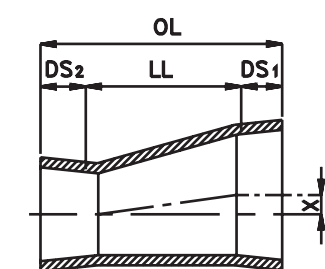
Nominal Pipe Size (runxrun)		Laying Length (LL)	Overall Length (OL)	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[bar]	[kg]
40x25	1½x1	32	91	16	0.2
50x25	2x1	64	137	16	0.3
50x40	2x1½	32	110	16	0.5
80x40	3x1½	76	154	16	0.5
80x50	3x2	54	146	16	0.5
100x50	4x2	76	168	16	1.1
100x80	4x3	73	165	16	0.9
125x80	5x3	74	177	16	1.4
125x100	5x4	74	177	16	1.5
150x80	6x3	97	200	16	1.8
150x100	6x4	94	197	16	1.8
150x125	6x5	110	224	16	1.8
200x100	8x4	138	248	16	2.9
200x125	8x5	126	247	16	2.8
200x150	8x6	98	219	16	2.7
250x150	10x6	117	244	16	3.7
250x200	10x8	105	239	16	3.6
300x200	12x8	149	289	16	5.0
300x250	12x10	137	283	16	4.6
350x250	14x10	184	343	16	7.2
350x300	14x12	178	343	16	7.3
400x300	16x12	165	343	16	8.9
400x350	16x14	152	343	16	9.0
450x400	18x16	103	319	16	12.7
500x400	20x16	225	454	16	22.6
500x450	20x18	123	364	16	18.9
600x400	24x16	453	733	16	48.4
600x450	24x18	353	645	16	44.3
600x500	24x20	230	535	16	38.5
700x400	28x16	765	1045	16	79.0
700x450	28x18	661	953	16	74.0
700x500	28x20	542	847	16	69.0
700x600	28x24	311	667	16	67.3
750x400	30x16	876	1156	16	111.6
750x450	30x18	775	1067	16	106.6
750x500	30x20	653	958	16	99.6
750x600	30x24	422	778	16	87.2
750x700	30x28	111	467	16	57.2
800x400	32x16	1023	1303	16	139.4
800x450	32x18	920	1212	16	125.4
800x500	32x20	798	1103	16	108.8
800x600	32x24	570	926	16	94.3
800x700	32x28	259	615	16	81.8
800x750	32x30	148	504	16	70.9
900x500	36x20	1029	1359	16	210.0
900x600	36x24	799	1180	16	176.1
900x700	36x28	487	868	16	140.2
900x750	36x30	375	756	16	125.9
1000x900	40x36	285	898	16	182.0

Eccentric Reducers

Filament-wound Eccentric Reducers with integral Quick-Lock (1-16 inch) or Taper/Taper (18-40 inch) socket ends.



Quick-Lock

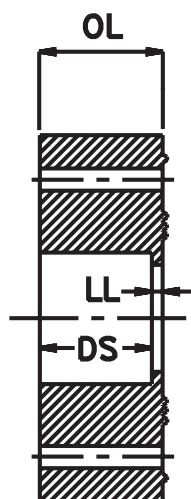


Taper/Taper

Nominal Pipe Size (runxrun)		Laying Length (LL)	Overall Length (OL)	Eccentricity (X)	Maximum Working Pressure	Average Weight
[mm]	[inch]	[mm]	[mm]	[mm]	[bar]	[kg]
40x25	1½x1	56	115	7	16	0.2
50x25	2x1	100	173	13	16	0.3
50x40	2x1½	44	122	6	16	0.5
80x40	3x1½	150	228	20	16	0.5
80x50	3x2	108	200	14	16	0.5
100x50	4x2	200	292	27	16	1.1
100x80	4x3	93	185	12	16	0.9
125x100	5x4	101	204	14	16	1.5
150x80	6x3	293	396	39	16	1.8
150x100	6x4	200	303	27	16	1.8
150x125	6x5	100	214	13	16	1.8
200x100	8x4	390	500	52	16	2.9
200x150	8x6	190	311	25	16	2.7
250x150	10x6	392	519	53	16	3.7
250x200	10x8	202	336	27	16	3.6
300x200	12x8	390	530	53	16	5.0
300x250	12x10	190	336	26	16	4.6
350x250	14x10	308	467	42	16	7.2
350x300	14x12	118	283	16	16	7.3
400x300	16x12	306	484	41	16	8.9
400x350	16x14	188	379	25	16	9.0
450x300	18x12	450	640	63	16	15.6
450x350	18x14	322	525	43	16	14.2
450x400	18x16	197	413	18	16	12.7
500x400	20x16	324	553	39	16	23.0
500x450	20x18	197	438	22	16	18.9
600x400	24x16	580	860	93	16	48.0
600x450	24x18	450	742	73	16	44.0
600x500	24x20	325	630	48	16	39.0
750x400	30x24	451	807	86	16	87.0
900x400	36x24	832	1213	161	16	176.0

Heavy-Duty Flanges

Filament-wound Heavy-Duty flanges with integral Quick-Lock (1-40 inch) socket end.



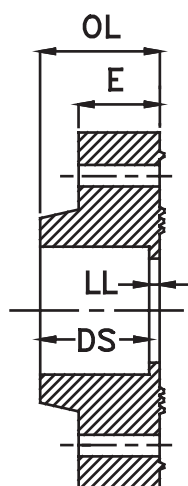
Nominal Pipe Size		Laying Length (LL)	Overall Length (OL)	Maximum Working Pressure	Average weight		DIN 2632	DIN 2633
					ANSI B16.5 CL.150	ANSI B16.5 CL.300		
[mm]	[inch]	[mm]	[mm]	[bar]	[kg]	[kg]	[kg]	[kg]
25	1	3	29	16	0.5	0.6	0.5	0.5
40	1½	3	35	16	1.1	1.1	1.0	1.0
50	2	4	51	16	1.3	1.7	1.8	1.8
80	3	5	51	16	1.8	2.6	2.4	2.4
100	4	5	51	16	2.8	3.8	2.7	2.7
125	5	5	62	16	3.8	5.4	4.0	4.0
150	6	6	63	16	4.5	6.7	4.9	4.9
200	8	6	70	16	5.0	9.9	7.1	6.9
250	10	6	76	16	9.5	13.2	9.1	9.8
300	12	5	81	16	14.5	19.2	11.2	12.7
350	14	8	97	16	20.5	29.8	18.6	20.5
400	16	8	110	16	27.0	40.0	25.0	27.4
450	18	10	114	16	32.0	-	-	-
500	20	10	121	16	40.0	-	-	-
600	24	11	138	16	58.0	-	-	-
700	28	14	165	16	73.0	-	-	-
750	30	14	178	16	88.0	-	-	-
800	32	14	192	16	112.0	-	-	-
900	36	14	178	16	116.0	-	-	-
1000	40	15	245	16	162.0	-	-	-

Note: Other drillings may be possible. Please consult Ameron.

- 1) Full-face elastomeric gaskets may be used suitable for the service pressure, service temperature and fluid. Shore A durometer hardness of 60 +5 is recommended (3 mm thick). Compressed fibre gaskets (3 mm thick), compatible with pressure, temperature and medium may also be used.
Mechanical properties should be in accordance with DIN 3754 (IT 400) or equal.
- 2) For maximum bolt torque refer to the appropriate Bondstrand literature.
A torque-wrench must be used, since excessive torque may result in flange damage.
- 3) Size 18-40 inch can be bonded directly to a fitting by using a Quick-Lock to Taper/Taper transition nipple. For bonding to pipe, a Quick Lock (straight) spigot has to be shaved on the pipe.

Hub Flanges

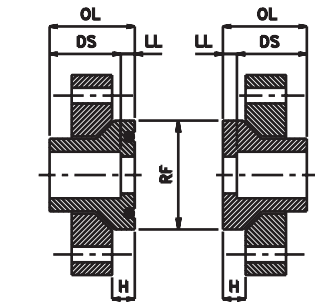
Filament-wound Hubbed flanges with integral Quick-Lock (1-36 inch) socket end.



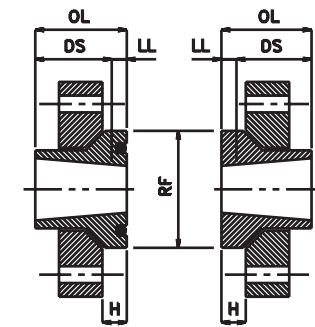
Nominal DIN 2633 Pipe Size		Laying	Overall	Flange	Maximum	Average weight		DIN 2632	
Length		Length	Thickness	Working Pressure	ANSI B16.5 CL.150	ANSI B16.5 CL.300	PN10	PN16	
[mm]	[inch]	(LL) [mm]	(OL) [mm]	(E) [mm]	[bar]	[kg]	[kg]	[kg]	[kg]
50	2	4	51	30	12	0.9	1.1	1.0	1.0
80	3	5	51	30	12	1.5	1.8	1.6	1.1
100	4	5	51	33	12	2.2	2.9	2.1	2.1
125	5	5	62	47	12	3.7	4.9	3.6	3.6
150	6	6	63	47	12	3.7	5.4	3.9	3.9
200	8	6	70	54	12	6.2	8.4	6.0	6.0
250	10	6	76	54	12	8.4	11.1	7.6	8.2
300	12	5	81	56	12	12.3	15.3	9.0	10.2
350	14	8	97	72	12	17.3	22.6	14.1	15.5
400	16	8	110	85	12	26.0	32.9	20.6	22.6
450	18	10	114	89	12	30.0	-	-	-
500	20	10	121	96	12	35.0	-	-	-
600	24	11	138	113	12	48.0	-	-	-
700	28	14	165	114	12	67.0	-	-	-
750	30	14	178	121	12	77.0	-	-	-
800	32	14	192	124	12	85.0	-	-	-
900	36	14	178	140	12	93.0	-	-	-

Stub-end Flanges

Filament-wound O-ring sealed stub-end flanges with integral Quick-Lock (1-16 inch) or Taper/Taper (18-40 inch) socket ends with loose steelrings.



Quick-Lock



Taper/Taper

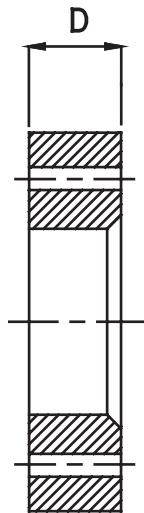
Nominal Pipe Size		Laying Length (LL)	Overall Length (OL)	Face Diameter (RF)	Ring to Face (H)	Maximum Working Pressure	Average Weight Stub-end
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[bar]	[kg]
25	1	10	37	51	10	16	0.1
40	1½	10	42	73	10	16	0.2
50	2	10	56	92	10	16	0.2
80	3	10	56	127	10	16	0.4
100	4	10	56	157	16	16	0.6
125	5	10	67	186	16	16	1.0
150	6	10	67	216	16	16	1.2
200	8	10	74	270	16	16	1.8
250	10	10	80	324	23	16	2.5
300	12	10	86	378	23	16	3.3
350	14	10	98	413	27	16	3.8
400	16	10	112	470	27	16	5.7
450	18	20	134	532	35	16	11.1
500	20	20	147	580	39	16	13.2
600	24	20	198	674	47	16	17.2
700	28	20	198	800	51	16	21.0
750	30	20	198	850	46	16	24.4
800	32	20	198	900	48	16	21.8
900	36	20	223	1000	53	16	30.8
1000	40	20	430	1100	58	16	470

Note: Up to 12 bar flat faced stub-ends suitable for elastomeric gaskets can be used.

From 12 bar and above O-ring sealed stub-ends should be used.

Make sure that when using O-ring sealed stub-end, its counter flange is compatible, e.g. use a flat faced stub-end (without O-ring groove) or another flat surface flange as counter flange.

Steel Ring Flange for Stub-end

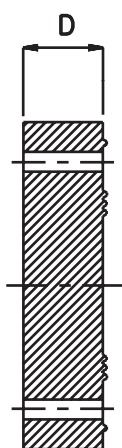


Nominal Pipe Size		ANSI B16.5 CLASS.150 (D)	Average Weight	ANSI B16.5 CLASS.300 (D)	Average Weight	DIN 2632 PN 10 (D)	Average Weight	DIN 2633 PN 16 (D)	Average Weight
[mm]	[inch]	[mm]	[kg]	[mm]	[kg]	[mm]	[kg]	[mm]	[kg]
25	1	14.3	0.8	17.5	1.3	16	1.0	16	1.0
40	1½	17.5	1.2	20.6	2.3	16	1.7	16	1.7
50	2	19.0	1.8	22.2	2.5	18	2.2	18	2.2
80	3	23.8	3.2	28.6	4.8	20	3.0	20	3.0
100	4	23.8	4.2	31.7	7.0	20	3.1	20	3.1
125	5	23.8	4.4	34.9	9.5	22	3.6	23	3.8
150	6	25.5	5.2	36.5	12.2	22	4.9	23	5.1
200	8	28.8	8.5	41.3	18.3	25	7.1	27	7.3
250	10	35.6	13.5	47.6	26.0	28	9.3	32	11.8
300	12	40.0	23.0	50.8	38.7	29	10.7	35	15.4
350	14	41.6	32.0	54.0	56.3	36	21.3	40	26.3
400	16	47.9	42.0	58.2	70.1	40	26.6	44	33.0
450	18	50.2	39.7	63.6	86.5	42	27.2	50	40.9
500	20	52.0	50.6	66.5	104.1	45	34.7	54	59.8
600	24	63.7	86.1	78.4	182.9	52	55.3	63	72.2
700	28	69.0	100.5	95.6	213.4	57	78.8	59	101.9
750	30	71.6	117.0	99.9	229.3	-	-	-	-
800	32	76.9	153.5	106.2	289.0	62	95.3	66	105.7
900	36	85.4	197.2	117.7	424.1	66	111.8	71	125.1
1000	40	93.7	-	102.8	-	74	-	82	-

Note: Other materials and/or drillings are available. Please consult Ameron.

Blind Flanges

Filament-wound blind flanges.

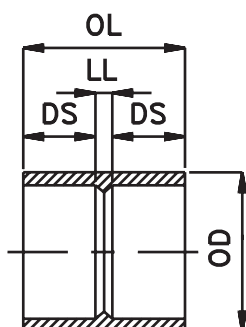


Nominal Pipe Size			Flange Thickness (D)	Maximum Working Pressure	Average weight		Average weight	
	[mm]	[inch]			ANSI B16.5 CLASS 150	ANSI B16.5 CLASS 300	DIN 2632 PN 10	DIN 2633 PN 16
			[mm]	[bar]	[kg]	[kg]	[kg]	[kg]
25		1	25	16	0.4	0.5	0.4	0.5
40		1½	25	16	0.5	0.9	0.7	0.8
50		2	30	16	0.7	1.2	1.1	1.2
80		3	30	16	1.1	1.9	1.6	1.7
100		4	35	16	1.7	3.6	2.6	2.7
125		5	35	16	2.6	3.8	3.0	3.1
150		6	40	16	2.9	5.7	4.4	4.6
200		8	45	16	5.2	9.2	7.1	7.3
250		10	50	16	7.2	13.8	10.6	11.5
300		12	60	16	11.4	23.0	16.3	17.8
350		14	65	16	16.4	31.0	23.0	25.0
400		16	70	16	23.0	41.0	31.0	33.0
450		18	70	16	43.0	52.0	40.0	43.0
500		20	70	16	52.0	63.0	48.0	54.0
600		24	85	16	85.0	106.0	79.0	91.0
700		28	85	16	110.0	136.0	104.0	106.0
750		30	90	16	132.0	160.0	129.0	116.0
800		32	95	16	145.0	184.0	155.0	125.0
900		36	100	16	206.0	239.0	191.0	192.0

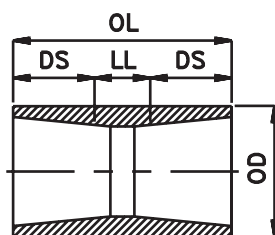
Note: Other drillings are available. Please consult Ameron.

Couplings

Filament-wound couplings with integral Quick-Lock (1-16 inch) or Taper/Taper (18-40 inch) socket ends.



Quick-Lock

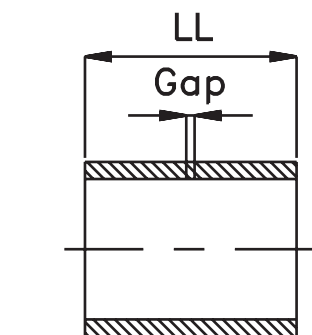


Taper/Taper

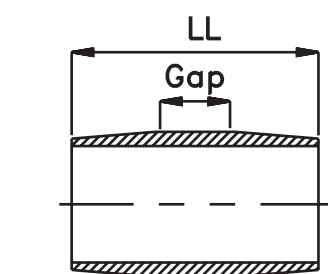
Nominal Pipe Size			Laying Length (LL)	Overall Length (OL)	Outside Diameter (OD)	Maximum Working Pressure	Average Weight
	[mm]	[inch]					
			[mm]	[mm]	[mm]	[bar]	[kg]
25		1	10	64	42	16	0.1
40		1½	10	74	58	16	0.1
50		2	10	102	72	16	0.3
80		3	10	102	100	16	0.4
100		4	10	102	129	16	0.6
125		5	10	124	153	16	0.9
150		6	10	124	183	16	1.1
200		8	10	138	235	16	1.7
250		10	10	150	289	16	2.3
300		12	10	162	340	16	2.8
350		14	19	197	372	16	4.6
400		16	19	223	422	16	7.2
450		18	70	298	460	16	10.7
500		20	70	324	514	16	13.0
600		24	70	426	619	16	18.8
700		28	70	426	742	16	23.5
750		30	70	426	795	16	24.5
800		32	70	426	848	16	27.0
900		36	70	476	950	16	34.5
1000		40	70	890	1057	16	40.7

Nipples

Filament-wound nipples with integral Quick-Lock (1-16 inch) or Taper/Taper (18-40 inch) male ends.



Quick-Lock



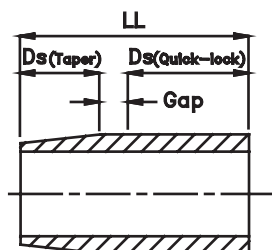
Taper/Taper

Nominal Pipe Size		Laying Length (LL)	Gap*	Maximum Working Pressure	Average Weight
25	1	57	3	16	0.1
40	1½	67	3	16	0.1
50	2	95	3	16	0.1
80	3	95	3	16	0.1
100	4	95	3	16	0.2
125	5	117	3	16	0.3
150	6	118	3	16	0.4
200	8	130	3	16	0.6
250	10	143	3	16	0.9
300	12	156	3	16	1.1
350	14	184	3	16	3.1
400	16	210	3	16	4.4
450	18	278	50	16	5.9
500	20	304	50	16	7.8
600	24	406	50	16	12.0
700	28	406	50	16	21.0
750	30	406	50	16	22.0
800	32	406	50	16	24.0
900	36	456	50	16	36.0
1000	40	870	50	16	51.0

* Remaining gap after bonding.

Transition Nipples

Filament-wound transition nipples with integral Taper/Taper (18-40 inch) male ends.

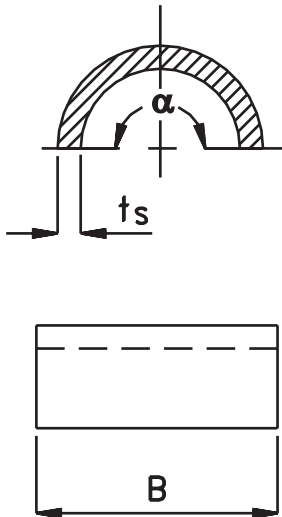


Nominal Pipe Size		Laying Length (LL)	Gap*	Maximum Working Pressure	Average Weight
450	18	238	19	16	6
500	20	263	25	16	7
600	24	338	33	16	9
700	28	374	44	16	15
750	30	386	44	16	22
800	32	400	44	16	30
900	36	410	43	16	40
1000	40	685	45	16	45

* Remaining gap after bonding.

Support Saddles

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



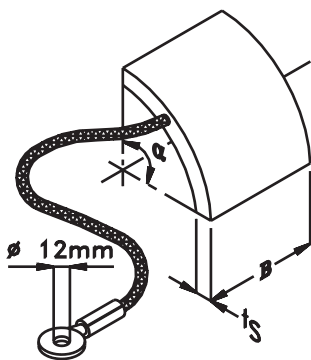
Nominal Pipe Size		Saddle Angle α	Saddle Thckn. t_s	Saddle Weight	Required Adhesive Kits	Saddle Weight	Required Adhesive Kits
[mm]	[inch]	[degree]	[mm]	[kg]	[3 and 6Oz]	B=100mm [kg]	[3 and 6 Oz]
25	1	180	14	0.2	1	0.3	1
40	1½	180	14	0.3	1	0.5	1
50	2	180	14	0.4	1	0.6	1
80	3	180	14	0.5	1	0.8	1
100	4	180	14	0.7	1	1.1	1
125	5	180	14	0.8	1	1.2	1
150	6	180	14	0.9	1	1.4	1
200	8	180	14	1.1	1	1.7	1
250	10	180	14	1.5	1	2.3	2
300	12	180	14	1.8	1	2.7	2
350	14	180	14	2.0	1	3.0	2
400	16	180	14	2.4	2	3.6	3
450	18	180	16	-	-	3.2	2
500	20	180	16	-	-	3.6	2
600	24	180	16	-	-	4.3	2
700	28	180	16	-	-	5.1	3
750	30	180	16	-	-	5.5	3
800	32	180	16	-	-	5.8	3
900	36	180	16	-	-	6.5	4
1000	40	180	16	-	-	8.2	4

Notes:

- 1) 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°. Saddles are supplied in standard lengths of 100 mm and 150 mm.
- 2) For special saddle -lengths, -thickness and/or angles consult Ameron.
- 3) Wear saddles are standard 90°. Weights of 90° degree saddles are 50% of value shown.

Grounding Saddles

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



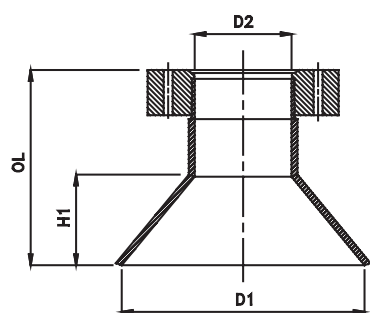
Nominal Pipe Size		Saddle Angle α	Saddle Length B	Saddle Thickness t_s	Average Saddle Weight	Required Adhesive Kits
[mm]	[inch]	[degree]	[mm]	[mm]	[kg]	[3Oz]
25	1	90	76	14	0.1	1
40	1½	90	76	14	0.1	1
50	2	90	76	14	0.1	1
80	3	90	76	14	0.1	1
100	4	90	76	14	0.2	1
125	5	90	76	14	0.3	1
150	6	90	76	14	0.3	1
200	8	45	76	14	0.2	1
250	10	45	76	14	0.2	1
300	12	45	76	14	0.2	1
350	14	45	76	14	0.3	1
400	16	45	76	14	0.3	1
450	18	22½	76	16	0.2	1
500	20	22½	76	16	0.2	1
600	24	22½	76	16	0.3	1
700	28	22½	76	16	0.3	2
750	30	22½	76	16	0.4	2
800	32	22½	76	16	0.4	3
900	36	22½	76	16	0.4	3
1000	40	22½	76	16	0.5	3

Notes:

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

Bell Mouths

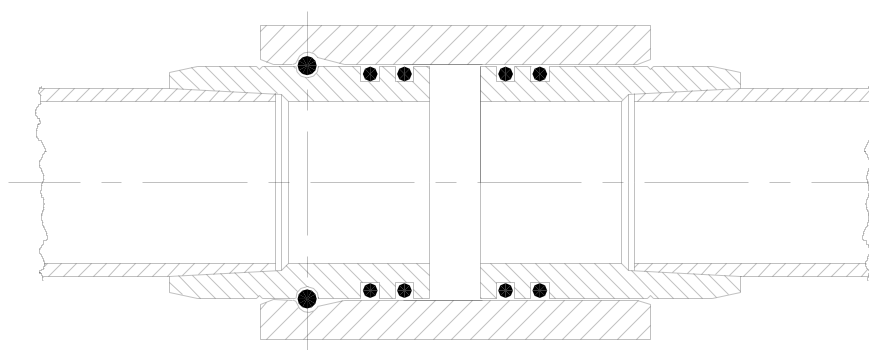
Filament-wound bell mouths with adhesive-bonded HD-flange.



Nominal Pipe Size		Overall Length (OL)	Length of Bell Mouth (H1)	Internal Diameter (D1)	Internal Diameter (D2)	Average Weight*
[mm]	[inch]	[mm]		[mm]	[mm]	[kg]
50	2	269	115	110	110	3.1
80	3	274	120	220	220	5.0
100	4	289	135	275	275	8.4
125	5	323	158	400	400	12.7
150	6	324	158	450	450	14.7
200	8	533	340	750	418	26.0
250	10	594	395	850	518	39.0
300	12	569	365	850	510	51.0
350	14	605	375	850	510	60.0
400	16	588	345	850	510	67.0
450	18	627	360	900	548	90.0
500	20	724	450	1100	548	119.0
600	24	831	540	1300	648	171.0

* Weights provided are for bell mouth with CL150 flange.

Assembly of double O-ring expansion joint



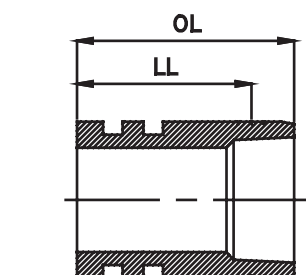
Expansion Coupling

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.

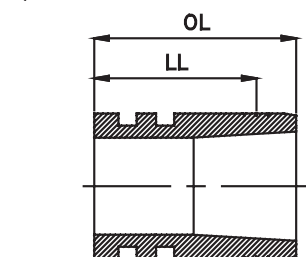
Nominal Pipe Size		Laying Length (LL)	Overall Length (OL)	O-ring Size	Key Size	Average Weight
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[kg]
50	2	50	222	7 x 59.7	6 x 305	1.3
80	3	50	222	7 x 88.3	6 x 400	1.7
100	4	50	222	7 x 113.7	6 x 483	3.5
125	5	50	264	9 x 135	8 x 580	4.6
150	6	50	270	10 x 161.3	8 x 660	6.6
200	8	50	337	10 x 225.5	10 x 840	15.4
250	10	50	356	12.5 x 302	12 x 1270	19.9
300	12	50	410	12.5 x 342.3	15 x 1270	21.0
350	14	50	430	12.5 x 342.3	15 x 1360	25.0
400	16	50	450	12.5 x 393.1	18 x 1585	32.0
450	18	50	416	15.0 x 445.0	15x1750	27.0
500	20	50	433	15.0 x 490.0	15x1930	32.0
600	24	50	479	18.0 x 580.0	18x2240	52.0
700	28	50	560	20.0 x 685.0	20x2700	99

Key-Lock Adapter for Expansion Coupling

Filament-wound double O-ring male Key-Lock adapter with integral Quick-Lock (2-16 inch) or Taper/Taper (18-40 inch) socket end.



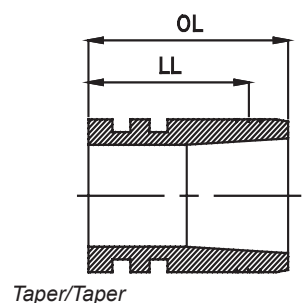
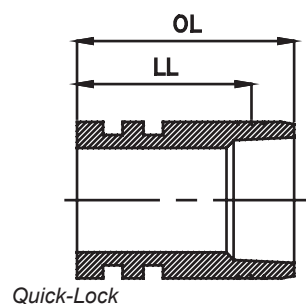
Quick-Lock



Taper/Taper

Nominal Pipe Size		Laying Length (LL)	Overall Length (OL)	Pressure	Weight
[mm]	[inch]	[mm]	[mm]	[bar]	[kg]
50	2	85	131	16	0.4
80	3	85	131	16	0.6
100	4	85	131	16	0.9
125	5	102	159	16	1.6
150	6	105	162	16	1.8
200	8	138	202	16	5.1
250	10	148	218	16	11.8
300	12	175	251	16	14.6
350	14	185	274	16	10.7
400	16	195	297	16	15.9
450	18	193	307	16	19.5
500	20	201	328	16	23.5
600	24	224	402	16	25.0
700	28	265	443	16	29.0
750	30	272	450	16	34.0
800	32	307	485	16	42.0
900	36	362	465	16	50.0
1000	40	355	765	16	64.0

Double O-ring Adapter for Expansion Coupling



Filament-wound double O-ring male adapter with integral Quick-Lock (1-16 inch) or Taper/Taper (18-40 inch) socket end.

Nominal Pipe Size		Laying Length (LL)	Overall Length (OL)	Average Weight
[mm]	[inch]	[mm]	[mm]	[kg]
50	2	85	131	0.4
80	3	85	131	0.7
100	4	85	131	0.9
125	5	102	159	1.6
150	6	105	162	1.8
200	8	138	202	5.1
250	10	148	218	11.8
300	12	175	251	14.6
350	14	185	274	10.7
400	16	195	297	15.9
450	18	193	307	19.5
500	20	201	328	23.5
600	24	224	402	25.0
700	28	265	443	29.0
750	30	272	450	34.0
800	32	307	485	42.0
900	36	362	465	50.0
1000	40	355	765	64.0

Adhesive

Number of Adhesive Kits per joint.

Nominal Pipe Size			Required Adhesive Kit Size	Minimum number of Adhesive Kits required per joint
[mm]	[inch]	[cm ³]	[Oz]	nr.
25	1	88.7	3	1/5
40	1½	88.7	3	1/5
50	2	88.7	3	1/4
80	3	88.7	3	1/3
100	4	88.7	3	1/2
125	5	88.7	3	1
150	6	88.7	3	1
200	8	88.7	3	1
250	10	177.4	6	1
300	12	177.4	6	1
350	14	177.4	6	2
400	16	177.4	6	2
450	18	177.4	6	2
500	20	177.4	6	3
600	24	177.4	6	4
700	28	177.4	6	4
750	30	177.4	6	5
800	32	177.4	6	5
900	36	177.4	6	6
1000	40	177.4	6	6

Notes:

- 1) Adhesive Kits should never be split. If remainder is not used for other joints made at the same time, the 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.

Engineering design & installation

Consult the following literature for recommendations pertaining design, installation and use of Bondstrand pipe, fittings and flanges:

Assembly Instructions for Quick-Lock adhesive-bonded joints	FP 170
Assembly Instructions for Taper/Taper adhesive-bonded joints	FP 564
Assembly Instructions for Bondstrand fiberglass flanges	FP 196
Bondstrand Corrosion Guide for fiberglass pipe and tubing	FP 132
Bondstrand Pipe Shaver Overview	FP 599
Bondstrand Marine Design Manual	FP 707

Please consult Ameron for the latest version of the above mentioned literature.

Specials

Note: Elbows with non-standard angles, non-standard drilled flanges, multi branch tees and special spools are available on request, please consult Ameron.

Field testing

Pipe system is designed for hydrostatic testing with water at 150% of rated pressure.

Surge pressure

Maximum allowable surge pressure is max. 150% of rated pressure.

Conversions

1 psi	= 6895 Pa	= 0.07031 kg/cm ²	
1 bar	= 10 ⁵ Pa	= 14.5 psi	= 1.02 kg/cm ²
1 MPa	= 1 N/mm ²	= 145 psi	= 10.2 kg/cm ²
1 inch		= 25.4 mm	
1 Btu.in/ft ² h°F		= 0.1442 W/mK	
°C		= 5/9 (°F-32)	

Important notice

This product literature and the recommendations for usage it contains are based on test data reasonably believed to be reliable. It is intended that this literature be used by personnel having specialised training in accordance with currently acceptable industry practice and normal operating conditions. Variation in environment, changes in operating procedures, or extrapolation of data may cause unsatisfactory results. We recommend that your engineers verify the suitability of this product for your intended application. Since we have no control over the conditions of service, we expressly disclaim responsibility for the results obtained or for any consequential or incidental damages of any kind incurred.



Group Headquarters

Ameron International Corporation - Fiberglass-Composite Pipe Division
9720 Cypresswood Drive, Suite 325 - Houston, Texas 77070 - U.S.A.
Phone: +1 832 912 8282 - Fax: +1 832 912 9393
E-mail: marcom@ameronfpd.com

Website: <http://www.ameron-fpg.com>

U.S.A.

Ameron International Corporation
1004 Ameron Road
P.O. Box 878
Burkburnett, Texas 76364
U.S.A.
Phone: +1 940 569 1471
Fax: +1 940 569 2764

U.S.A.

Centron International, Inc.
P.O. Box 490
600 FM 1195 South
Mineral Wells - Texas 76068
U.S.A.
Phone: +1 940 325 1341
Fax: +1 940 325 9681
E-mail: info@centrongre.com

Europe

Ameron B.V.
Fiberglass-Composite Pipe
P.O. Box 6
4190 CA Geldermalsen
The Netherlands
Phone: +31 345 587 587
Fax: +31 345 587 561
E-mail: info@ameron-fpg.nl

Asia

Ameron (Pte) Ltd.
No. 7A, Tuas Avenue 3
Jurong
Singapore 639407
Phone: +65 6861 6118
Fax: +65 6862 1302/6861 7834
E-mail: info@ameron.com.sg