



Installation Guide

BLUE904[®] PEX MUNICIPAL WATER SERVICE TUBING

WATER SERVICE TUBING

BLUE904[®]



IPEX

by aliaxis

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Standard 14 & 61
CSA B137.5
ASTM F876
ASTM F877

BLUE904 PEX TUBING SYSTEMS

Introduction

IPEX's Blue904 PEX Municipal Water service tubing has unique features and performance characteristics as described in this guide that make it the leading alternative to copper tubing. IPEX Blue904 conforms to CTS OD dimensions, allowing common compression fittings to be used.

This booklet provides municipal system installers and inspectors with IPEX recommendations for handling, installing and testing Blue904 PEX. Following the recommendations contained in this booklet will lead to a professional installation and will ensure maximum life for the water system.

PEX Tubing

	AWWA	ASTM	CSA	NSF
PEX Tubing	C904	F876 F877	B137.5	14 & 61

Standards

Certifications & Listings

Canadian Standards Association

- Blue904 PEX tubing carries third party certification to CSA B137.5.

American Water Works Association

- Blue904 meets AWWA C904.

National Sanitation Foundation

- Blue904 PEX tubing is NSF certified to NSF Standards 14 & 61.

American Society for Testing and Materials

- Blue904 PEX tubing carries third party certification to ASTM F876, F877.

Markings

Blue904 PEX tubing is marked at 5 ft. intervals with the following information:

- Blue904
- Made in Canada
- IPEX
- "Nominal pipe size"
- SDR 9
- CTS
- 160 psi @ 23°C / 73.4°F
- 100 psi @ 82°C / 180°F
- Potable Tubing
- AWWA C904, ASTM F876 / F877, CSA B137.5, NSF 14 & 61
- Manufacturing date and machine number
- Footage mark every five feet starting with zero at the beginning of the coil

HANDLING & STORAGE

Blue904 PEX tubing is supplied in convenient lightweight coils inside cardboard boxes. PEX should be stored indoors to keep coils clean prior to installation and to protect product and packaging from the elements.

Blue904 PEX is designed to withstand limited exposure to ultraviolet light but should not be exposed to sunlight for more than 30 days.

Blue904 PEX may be lifted by hand, easily uncoiled and shaped by hand to create changes in direction.

Uncoilers are available to assist in dispensing PEX tubing on the job site.

TRENCHING

Safety

Trenches can be dangerous places. The contractor is responsible for ensuring that all applicable regulations have been observed and that the protection of the workers and the general public is provided.

Excavating and Preparing the Trench

The drawings and bid documents will specify the correct line and grade to be established by the trenching operation. Aside from these engineering considerations, good bedding practices make sense for all types of pipes and tubing.

The width of the top of the trench will be determined by local conditions. But in the pipe zone the trench width should be kept to a practical minimum.

Keep the three basic operations close together: digging, pipe laying and backfilling. The shortest practical stretch of open trench reduces the possibility of problems associated with water, frozen ground, impact damage, flotation, and traffic.

Depth of Trench

For water distribution and transmission lines, pipe should be buried so that the top of the pipe is at least 6 inches (150mm) below the deepest recorded penetration of frost. Where surface loads will be encountered and where frost is not a problem, the minimum height of cover over the crown of the pipe is 12 inches (300mm). Before vehicles pass over the line of the pipe under shallow cover, make sure backfill has been completed and compacted to at least 95% standard proctor density.

The Bottom of the Trench

The objective of bedding is to provide a continuous support for the pipe at the required line and grade. Frozen material should not be used to support or bed the pipe. At least 4 inches (100mm) of Class I or Class II bedding material should be placed under the pipe if rocky conditions exist. The bedding may or may not be compacted, but in any event ensure that the entire pipe is evenly supported by the bedding. Where the trench bottom is unstable (organic material, or "quick" sand or similar material) the trench bottom should be over-excavated and brought back to grade with approved material.

Trench Backfill

When backfilling the trench use Class I or Class II fill for the first 6 inches above the top of the tubing. Ensure there are no large rocks (1-1/2" or larger) against the tubing. Where it is not otherwise specified the initial backfill may consist of the native material in the trench provided it is free from large stones, not frozen, and free of debris or other organic materials. The purpose of the initial backfill is to protect the pipe from the final backfill.

INSTALLATION

Contaminated Soils

Blue904 is not to be installed in soils which may be contaminated with hydro carbons, chemicals, or any other substance which may permeate the pipe and contaminate the water supply.

PEX Tubing Thermal Expansion

The linear expansion rate for PEX tubing is 1.1 inches per 100 feet of pipe per 10°F change in temperature. To accommodate for the expansion/contraction, snake the tubing along the bottom of the trench.

Bends

PEX tubing may be shaped by hand to a minimum radius of 6 times the outside diameter of the tubing. External bend supports or sleeves may be required to maintain desired position and shape.

Blue904 PEX Tubing

Nominal Size		I.D.		Min. Bend Radius	
in.	mm	in.	mm	in.	mm
3/4	19	0.681	17.3	4.5	114
1	25	0.875	22.2	6.0	152
1-1/2	38	1.241	31.5	9.0	229
2	51	1.625	41.3	12.0	305

Note: When using pipe in coils and bending against the coil direction, the minimum bending radius is 3 times the radius given above. (e.g. 3/4" CTS pipe = 3 x 4.5" = 13.5")

Note: To avoid kinking, care should be taken when bending the tubing in sub zero temperatures. For bending in cold temperatures, use a minimum bend radius of 2 times that listed in the chart.

Damage

Kinked, buckled, gouged or otherwise damaged tubing shall not be used. Remove and replace any damaged sections.

Underground Location

To locate buried Blue904, a tracer wire (or other detection means) must be installed in the trench during installation.

Above Ground Installation

If Blue904 is to be installed above ground, UV protection (i.e. conduit) is required.

Freezing

If Blue904 service pipe freezes, it can be thawed using a hot air gun. Do not use open flame. Do not allow the temperature of the tubing to go above 93°C.

Concrete Slabs

Blue904 PEX tubing can penetrate concrete slabs, though local regulatory bodies may require sleeves at the penetration point. Consult local inspection staff. Tubing subject to mechanical damage must be protected with plastic sleeves complying with local requirements.

Repairs Below Grade

Repairs to PEX tubing below grade may be done using repair couplings. Couplings must then be permanently protected using polyethylene heat shrink sleeves or other approved protective wrap. The sleeve should be a minimum of 2 inches longer than the body of the repair coupling or extend 2 inches beyond the couplings to secure the repair.

Electrical Grounding

PEX water service tubing may not be used to ground an electrical system.

A separate grounding rod or plate should be used – check with the local authority.

Inspection and Testing

PEX water service tubing shall be inspected to confirm compliance with manufacturer's installation instructions and with local code regulations.

Upon installation, the entire water system shall be pressure tested, preferably in sections, to the local requirements to ensure a leak free system.

Flushing

The system must be thoroughly flushed after installation. If the testing is done in subfreezing weather, all of the PEX lines should be drained after the successful completion of the tests, until the construction project has been completed.

CONNECTIONS

Fittings

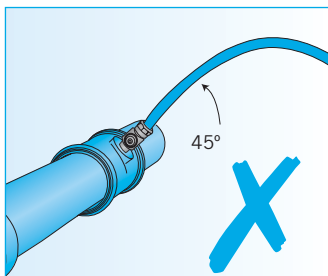
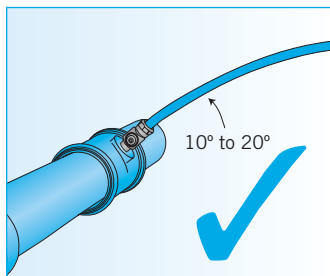
Blue904 is copper tube size SDR 9; this allows standard AWWA C800 compression valves and fittings to be used. An insert/liner is inserted in the end of the tube and then the brass fitting is installed as per the manufacturers' recommended instructions.

Cutting and Joining PEX

1. Cut the pipe square. A plastic pipe cutter should be used. Ensure that the stainless steel cutting blade is sharp and in good condition.
2. Insert the stainless steel PEX liner / insert to the end of the tubing and install standard CTS brass compression valves/fitting as per manufacturers' instructions. (Stainless steel inserts provide PEX with the structural integrity necessary for use with compression fittings).

Gooseneck

At the connection between Blue904 pipe and the water main, Blue904 should leave the main at 10 to 20 degrees above horizontal compared to the traditional 45 degrees required with copper service line. This protects against future settlement around the main which causes stress at the connection.



CTS SDR-9 PEX Tubing

HEAD LOSS (psi/100 ft.) vs. FLOW RATE (U.S. GPM)

Flow Rate US GPM	3/4"		1"		1-1/4"		1-1/2"		2"	
	Head Loss psi/c.ft.	Velocity Ft./s	Head Loss psi/c.ft.	Velocity Ft./s	Head Loss psi/c.ft.	Velocity Ft./s	Head Loss psi/c.ft.	Velocity Ft./s	Head Loss psi/c.ft.	Velocity Ft./s
0.1	0.01	0.09	0.00	0.05	0.00	0.04	0.00	0.03	0.00	0.02
0.2	0.02	0.18	0.01	0.11	0.00	0.07	0.00	0.05	0.00	0.03
0.3	0.03	0.26	0.01	0.16	0.00	0.11	0.00	0.08	0.00	0.05
0.4	0.04	0.35	0.02	0.21	0.01	0.15	0.00	0.11	0.00	0.06
0.5	0.05	0.44	0.02	0.27	0.01	0.18	0.00	0.13	0.00	0.08
0.6	0.14	0.53	0.02	0.32	0.01	0.22	0.01	0.16	0.00	0.09
0.7	0.18	0.62	0.03	0.37	0.02	0.26	0.01	0.19	0.00	0.11
0.8	0.23	0.70	0.07	0.43	0.02	0.29	0.01	0.21	0.00	0.12
0.9	0.28	0.79	0.09	0.48	0.03	0.33	0.01	0.24	0.00	0.14
1.0	0.34	0.88	0.10	0.53	0.03	0.37	0.02	0.27	0.00	0.16
2.0	1.02	1.76	0.35	1.07	0.12	0.74	0.05	0.53	0.01	0.31
3.0	2.10	2.60	0.63	1.60	0.25	1.10	0.11	0.80	0.03	0.46
4.0	3.53	3.50	1.06	2.10	0.43	1.47	0.19	1.06	0.05	0.62
5.0	5.26	4.40	1.58	2.70	0.65	1.84	0.29	1.33	0.08	0.77
6.0	7.30	5.30	2.19	3.20	0.91	2.21	0.41	1.59	0.11	0.93
7.0	9.63	6.20	2.89	3.70	1.21	2.57	0.55	1.86	0.15	1.08
8.0	12.30	7.05	3.68	4.30	1.55	2.94	0.70	2.12	0.19	1.24
9.0	15.10	7.93	4.55	4.80	1.93	3.31	0.87	2.39	0.24	1.39
10.0	18.30	8.81	5.50	5.30	2.34	3.68	1.06	2.65	0.29	1.55
11.0	21.70	9.69	6.52	5.90	2.79	4.04	1.26	2.92	0.34	1.70
12.0	25.40	10.60	7.63	6.40	3.28	4.41	1.48	3.18	0.40	1.86
13.0	-	-	8.81	6.90	3.80	4.78	1.72	3.45	0.46	2.01
14.0	-	-	10.10	7.50	4.36	5.15	1.97	3.71	0.53	2.17
15.0	-	-	11.40	8.00	4.96	5.51	2.24	3.98	0.61	2.32
16.0	-	-	12.80	8.50	5.59	5.88	2.53	4.24	0.68	2.48
17.0	-	-	14.30	9.10	6.25	6.25	2.83	4.51	0.76	2.63
18.0	-	-	15.80	9.60	6.95	6.62	3.14	4.77	0.85	2.79
19.0	-	-	17.50	10.10	7.68	6.98	3.47	5.04	0.94	2.94
20.0	-	-	-	-	8.45	7.35	3.82	5.30	1.03	3.10
21.0	-	-	-	-	9.25	7.72	4.18	5.57	1.13	3.25
22.0	-	-	-	-	10.08	8.09	4.55	5.83	1.23	3.41
23.0	-	-	-	-	10.94	8.45	4.95	6.10	1.34	3.56
24.0	-	-	-	-	11.84	8.82	5.35	6.36	1.44	3.71
25.0	-	-	-	-	12.77	9.19	5.77	6.63	1.56	3.87
30.0	-	-	-	-	-	-	5.77	6.63	2.18	4.64
35.0	-	-	-	-	-	-	8.09	7.95	2.91	5.42
40.0	-	-	-	-	-	-	10.76	9.28	3.72	6.19
45.0	-	-	-	-	-	-	13.78	10.61	4.63	6.96
50.0	-	-	-	-	-	-	17.14	11.93	5.62	7.74
55.0	-	-	-	-	-	-	-	-	6.71	8.51
60.0	-	-	-	-	-	-	-	-	7.88	9.29
65.0	-	-	-	-	-	-	-	-	9.14	10.06
70.0	-	-	-	-	-	-	-	-	10.49	10.83
75.0	-	-	-	-	-	-	-	-	11.92	11.61
80.0	-	-	-	-	-	-	-	-	13.43	12.38
85.0	-	-	-	-	-	-	-	-	15.02	13.15

CTS SDR-9 PEX Tubing

HEAD LOSS (kPa/100m) vs. FLOW RATE (L/min.)

Flow Rate	20mm		25mm		32mm		36mm		51mm	
	Head Loss	Velocity	Head Loss	Velocity	Head Loss	Velocity	Head Loss	Velocity	Head Loss	Velocity
l/m	kPa/100m	m/s	kPa/100m	m/s	kPa/100m	m/s	kPa/100m	m/s	kPa/100m	m/s
0.39	0.23	0.03	0.00	0.02	0.01	0.01	0.00	0.01	0.00	0.00
0.78	0.45	0.05	0.23	0.03	0.04	0.02	0.02	0.02	0.00	0.01
1.17	0.68	0.08	0.23	0.05	0.80	0.03	0.05	0.02	0.00	0.01
1.56	0.91		0.45	0.06	0.14	0.05	0.07	0.03	0.02	0.02
1.95	1.13	0.13	0.45	0.08	0.21	0.06	0.09	0.04	0.02	0.02
2.33	3.17	0.16	0.45	0.10	0.29	0.07	0.14	0.05	0.05	0.03
2.72	4.08	0.19	0.68	0.11	0.39	0.08	0.18	0.06	0.05	0.03
3.11	5.21	0.21	1.58	0.13	0.49	0.09	0.23	0.06	0.07	0.04
3.50	6.34	0.24	2.04	0.15	0.61	0.10	0.27	0.07	0.07	0.04
3.89	7.70	0.27	2.26	0.16	0.75	0.11	0.34	0.08	0.09	0.05
7.78	23.10	0.54	7.92	0.33	2.69	0.22	1.22	0.16	0.32	0.09
11.70	47.50	0.79	14.30	0.49	5.70	0.34	2.58	0.24	0.70	0.14
15.60	79.90	1.07	24.00	0.64	9.71	0.45	4.39	0.32	1.18	0.19
19.50	119.00	1.34	35.80	0.82	14.68	0.56	6.64	0.40	1.79	0.24
23.30	165.00	1.62	49.60	0.98	20.58	0.67	9.31	0.48	2.51	0.28
27.20	218.00	1.89	65.40	1.13	27.38	0.78	12.37	0.57	3.33	0.33
31.10	278.00	2.15	83.30	1.31	35.06	0.90	15.83	0.65	4.28	0.38
35.00	343.00	2.42	103.00	1.46	43.61	1.01	19.70	0.73	5.32	0.42
38.90	414.00	2.69	125.00	1.62	53.00	1.12	23.94	0.81	6.46	0.47
42.80	491.00	2.95	148.00	1.80	63.23	1.23	28.58	0.89	7.72	0.52
46.70	575.00	3.23	173.00	1.95	74.29	1.34	33.57	0.97	9.06	0.57
50.60	-	-	199.00	2.10	86.16	1.46	38.93	1.05	10.51	0.61
54.50	-	-	229.00	2.29	98.84	1.57	44.66	1.13	12.05	0.66
58.40	-	-	258.00	2.44	112.31	1.68	50.76	1.21	13.70	0.71
62.60	-	-	290.00	2.59	126.57	1.79	57.19	1.29	15.45	0.75
66.10	-	-	324.00	2.77	141.61	1.90	63.98	1.37	17.28	0.80
70.00	-	-	359.00	2.93	157.42	2.02	71.12	1.45	19.21	0.85
73.90	-	-	396.00	3.08	174.00	2.13	78.62	1.53	21.22	0.90
77.80	-	-	-	-	191.34	2.24	86.45	1.62	23.33	0.94
81.70	-	-	-	-	209.43	2.35	94.63	1.70	25.55	0.99
85.60	-	-	-	-	228.28	2.46	103.05	1.78	27.84	1.04
89.50	-	-	-	-	247.86	2.58	112.00	1.86	30.24	1.08
93.40	-	-	-	-	268.19	2.69	121.17	1.94	32.71	1.13
97.30	-	-	-	-	289.25	2.80	130.69	2.02	35.29	1.18
116.8	-	-	-	-	-	-	183.19	2.42	49.44	1.41
136.2	-	-	-	-	-	-	243.73	2.83	65.80	1.65
155.7	-	-	-	-	-	-	312.11	3.23	84.23	1.89
175.2	-	-	-	-	-	-	388.19	3.64	104.78	2.12
194.6	-	-	-	-	-	-	471.83	4.04	127.36	2.36
214.1	-	-	-	-	-	-	-	-	151.93	2.59
233.6	-	-	-	-	-	-	-	-	178.50	2.83
253.0	-	-	-	-	-	-	-	-	207.04	3.06
272.5	-	-	-	-	-	-	-	-	237.48	3.30
291.9	-	-	-	-	-	-	-	-	269.87	3.54
311.4	-	-	-	-	-	-	-	-	304.11	3.77
330.9	-	-	-	-	-	-	-	-	340.26	4.01

NOTES

CUSTOMER SERVICE CENTER



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About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the world's largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have earned a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, PVDF, PE, ABS, and PEX pipe and fittings
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

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