



SharkBite®

PEX Installation Guide



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The SharkBite® Connection System

Introduction

The purpose of this guide is to familiarize plumbing professionals with the SharkBite connection system and the recommended method of installing SharkBite PEX pipe. SharkBite PEX can be used with other SharkBite products: push-to-connect fittings, barbed fittings, manifolds and valves.

SharkBite PEX is an excellent pipe product for plumbing, radiant and hydronic systems, offering many more advantages than rigid pipe. The combination of SharkBite push-to-connect fittings, manifolds, valves and PEX pipe is the fastest way to plumb any residential or commercial project. If cost of material takes priority, SharkBite barb fittings may be used with clamp or crimp rings. In addition, a variety of valves and manifolds with SharkBite barb connectors are included in the SharkBite connection system line, making it the only total rough-in solution.

SharkBite Features & Benefits

Push-to-Connect Fittings

Instant connection for increased ease of use

- No soldering, clamps, unions or glue required.

Fittings certified to 200 psi and 200° F (93° C)

- Proven durability and quality.

Fits copper pipe, CTS, CPVC and PEX pipe

- Connects all three types in any combination.

Integral pipe liner for PEX installations

- No loose components, ensures secure, reliable connection.

Design certified and agency listed

- Provides peace of mind that it passes inspection.

Compact, robust DZR brass body

- Foundation of a strong, corrosion resistant, durable fitting.

Design certified to NSF/ANSI 61 and ASSE 1061 product standard for use in potable water and hydronic heating water distribution

- Quality engineered and manufactured.

Approved to be used underground and behind walls without access panels. Designed for radiant and hydronic heating as well as potable water distribution.

Barb Fittings

Wide range of line of fittings and manifolds

- A typical barb system offers the lowest material cost.

Valves

Line includes ball, regulator and thermostatic mixing valves

- Push-to-connect (integral & union type) or barb connectors.

PEX Pipe

Flexible

- Easy to install and service.

Quieter

- Minimizes noise caused by water hammer.

Resists corrosion and scale buildup

- Improves the performance of the plumbing system.

Fewer fittings required

- Reduces total installation cost.

Fewer joints

- Reduces the chances of callbacks.

Pressure test immediately

No waiting for glue to dry or joints to cool.

PEX Tools

Clamp Ring Tool (one clamping tool for all size clamp rings)

- Reduces equipment cost and saves installation time.
- One-hand operation (leaves a hand free to position the clamp ring).

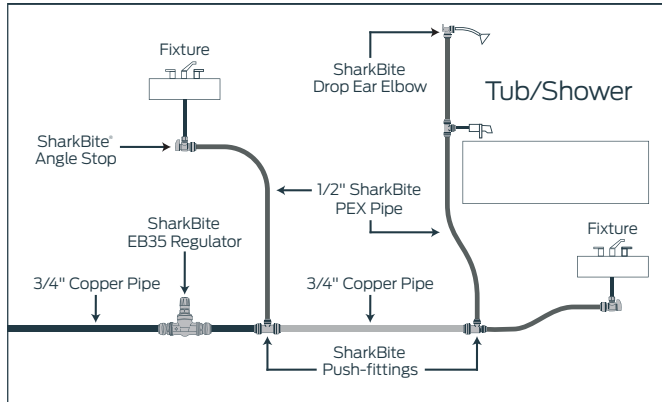
Crimp Ring System (Heavy-duty components with adjustment tools and case)

- Includes 5 interchangeable jaws and go/no-go gauge.

Plumbing Systems

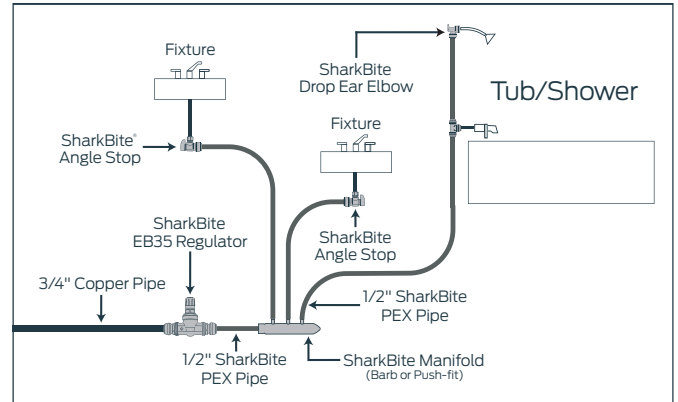
The SharkBite® connection system offers the only total rough-in solution, including a full line of valves, push-to-connect fittings, PEX pipe and traditional PEX components and tools. The SharkBite system offers three options for a PEX pipe installation – Trunk & Branch, Manifold or a Combination system – as described in the diagrams below.

The Trunk and Branch System



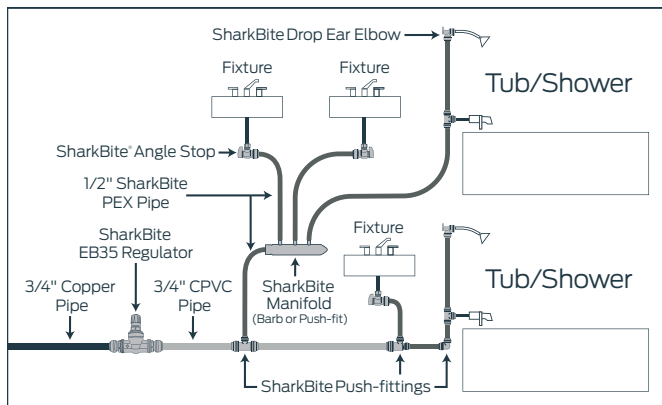
This system uses SharkBite PEX pipe and push-fittings. It offers the absolute fastest and easiest way to get from meter to fixtures.

The Manifold System



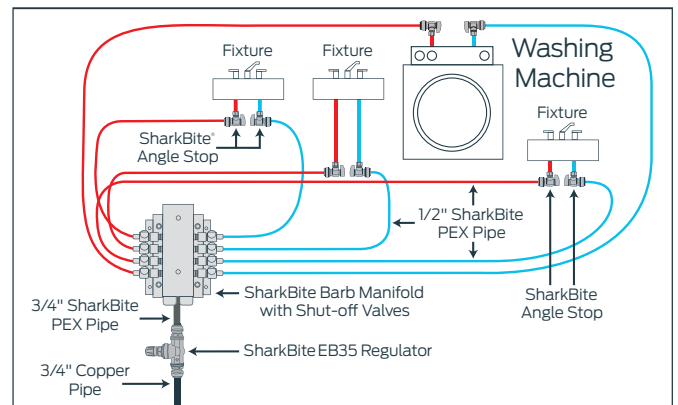
This system uses traditional PEX components (manifolds, barbed fittings, clamp rings, etc.) and offers the total lowest material cost. When you need special configuration fittings, such as drop ear elbows, SharkBite push-fittings offer greater speed and efficiency than traditional barbed fittings while costing about the same.

The Combination System



This system uses SharkBite push-fittings and manifolds offers additional versatility. When you need special-configuration fittings, such as drop ear elbows, SharkBite push-fittings offer greater speed and efficiency than traditional barbed fittings while costing about the same.

The Home-Run System



This system uses a central manifold to distribute water to fixture and appliances. One dedicated plumbing line is run to each fixture/appliance for both hot and cold supply lines.

Making a SharkBite® Connection

The combination of SharkBite push-to-connect fittings and PEX pipe offers the fastest, easiest installation from meter to fixture.



Step 1

Use pipe cutters to cut the pipe between the pointed ends of the repeating 1 inch SharkBite imprint pattern. The pattern provides a visual aid to determine if the pipe has been inserted all the way into the fitting. Ensure the pipe is cut square to allow it to be inserted all the way into the fitting.

Ensure the pipe has no rough edges, cuts or abrasions, which can damage the o-ring and cause the fitting to leak.



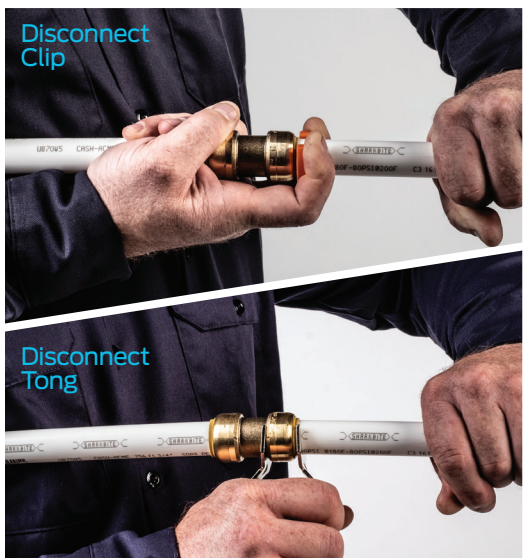
Step 2

Ensure the support liner inside the fitting is in place. The liner reinforces the wall of the PEX pipe to help prevent collapse of the pipe wall.



Step 3

Insert the pipe into the fitting until the pipe reaches the pipe stop. Make sure the pointed end of the SharkBite pattern is even with the end of the release collar. Only when the pipe reaches the pipe stop has a secure joint been created.



Step 4

Place the SharkBite disconnect clip around the pipe with the non-branded face against the release collar. If using the SharkBite disconnect tongs, place the teeth around the fitting assembly. The fork end with the SharkBite brand logo should be positioned around the pipe and the other end around the neck of the fitting.

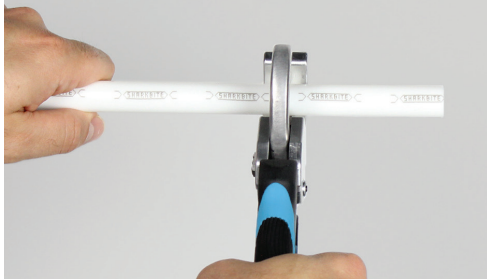
Push the clip against the release collar and pull the pipe with a twisting action to release the pipe. If using the SharkBite disconnect tongs, squeeze the tool with one hand and pull the pipe with a twisting action to release the pipe.

Check the fitting and pipe end for damage. The fitting and pipe should be free of damage, foreign objects and marks on the outside diameter. If the pipe is damaged or marked, then cut and use a new section of pipe.

Note: Install SharkBite fittings at least 1 inch apart to enable disassembly of the joint.

Making a SharkBite® Clamp/Barb Connection

The use of traditional PEX components (manifolds, barbed fittings, clamp or crimp rings, etc.) offers the total lowest material cost.



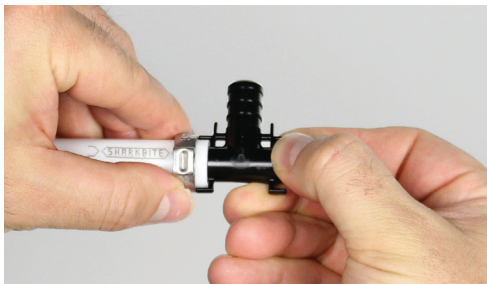
Step 1

Use pipe cutters to make a square cut of the pipe to length. A rough or uneven cut can result in a weakened joint.



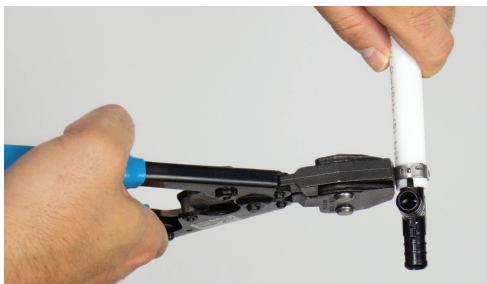
Step 2

Slide the appropriate clamp ring size over the pipe to about 2 inches from the end of the pipe.



Step 3

Push the pipe onto the barbed fitting until it touches the fitting shoulder. Position the clamp ring 1/8 to 1/4 inch from the end of the pipe. This distance ensures that the clamp ring is positioned directly over the barbs on the fitting.



Step 4

Position the open jaws of the clamp tool over the raised tabs of the clamp ring and squeeze.

One clamp tool fits all size clamp rings. It can be operated with one hand, leaving the other hand free to hold the clamp ring in position. The tool cannot be removed until the clamp ring is fully compressed. A properly calibrated clamp tool eliminates the need to check each fitting ring with a go/no-go gauge.



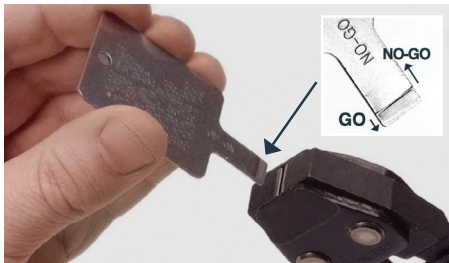
Step 5

Verify the connection is secure by visually checking the clamp tab.

Calibration of the SharkBite Clamp Tool

Check Calibration of the Clamp Tool

Always check the clamp tool with the calibration gauge before you begin installations and after performing the last crimp.



Step 1

Close the clamp tool handles to the stop point and insert gauge into jaw gap.



Step 2

Gauge must stop at the NO-GO line in order to make proper connections.

Calibrating the Clamp Tool

If the gauge goes into the jaws beyond the GO portion, the clamp tool should be recalibrated using the following steps.



Step 1

Place GO portion of gage into jaw gap.



Step 2

Loosen locking nut.



Step 3

Adjust clamp tool jaws by rotating the eccentric stud counter-clockwise until jaws contact gauge. Re-tighten the locking nut.

Warning: Tools out of calibration may not make good long-term connections and can result in leaks developing over time.

Removal of Clamp or Complete Connection

Place a flat-bladed screw driver under the clamp tab and pry up to unlock. Then, using a clamp removal tool or pliers, grab onto the tab and pull free.



Note: The previously clamped section of SharkBite PEX pipe should be cut off before making a new connection.

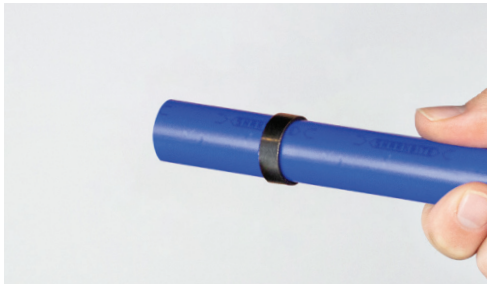
Making a SharkBite® Crimp/Barb Connection

The use of traditional PEX components (manifolds, barbed fittings, clamp or crimp rings, etc.) offers the total lowest material cost.



Step 1

Use pipe cutters to make a square cut of the pipe to length. A rough or uneven cut can result in a weakened joint.



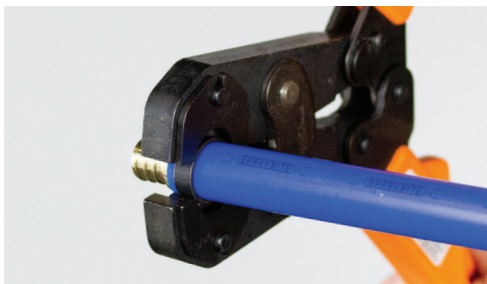
Step 2

Slide the appropriate clamp ring size over the pipe to about 2 inches from the end of the pipe.



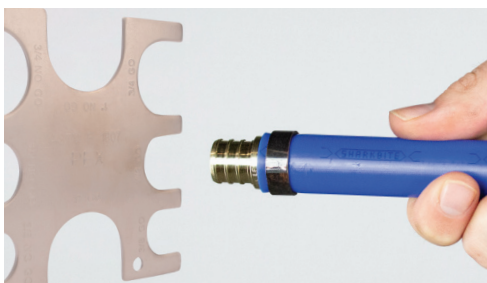
Step 3

Push the pipe onto the barbed fitting until it touches the fitting shoulder. Position the clamp ring 1/8 to 1/4 inch from the end of the pipe. This distance ensures that the clamp ring is positioned directly over the barbs on the fitting.



Step 4

Position the open jaws of the crimp tool over the crimp ring and squeeze. The jaws are interchangeable and include sizes for 3/8-, 1/2-, 5/8-, 3/4- and 1 in. crimp rings.



Step 5

Verify that the connection is secure by using the go/no-go gauge. The gauge slot that corresponds to the crimp ring size should easily slide onto the compressed crimp ring.

SharkBite PEX Pipe Guidelines

For potable water and hydronic distribution

What to do:

- Do install SharkBite PEX pipe to the appropriate plumbing code.
- Do use SharkBite PEX pipe for hot and cold water distribution only.
- Do keep hot and cold lines separate.
- Do use only fittings and accessories that have been tested and approved for the SharkBite PEX connection system.
- Do leave extra pipe at both ends of the run to make connections easier.
- Do ensure the pipe is supported properly to prevent undue stress, strain, thermal expansion and contraction.
- Do protect SharkBite PEX pipe from damage, both before and during the construction process.
- Do use SharkBite pipe liner with SharkBite fittings and SharkBite PEX joint. (exception - 1/4 in. fittings)
- Do use the following types of products when sealing between PEX tubing/fittings and slab penetration protection devices.
 - Latex caulk - Silicone sealant
 - Latex foam - Polyurethane expanding foam

Note: Do Not Use petroleum-based sealants on PEX tubing.

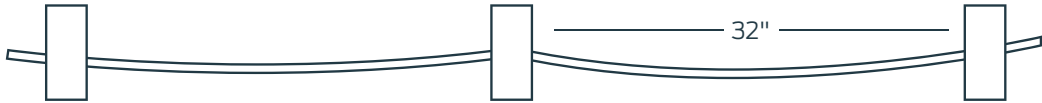
- Do pressure test the system upon completion.

What not to do:

- Do not use sharp instruments to open the SharkBite PEX packaging. You may damage the pipe.
- Do not use with natural gas, propane, fuel oil or any other fluid, chemical or product. SharkBite PEX pipe (non-oxygen barrier) is for use with **potable water only** and is not approved or intended for any other use.
- Do not freeze. SharkBite pipe is freeze resistant, but not freezeproof. Pipe embedded in concrete that is subjected to freezing conditions will likely damage both the concrete and the pipe. Pipe that is frozen and not embedded may damage joints or manifolds. Be sure to carefully pressure test, inspect and repair systems that have been subjected to a freeze before returning them to normal operation.
- Do not pressure test with water in freezing conditions.
- Do not store or install where pipe will be exposed to direct or indirect ultraviolet light (i.e. sunlight).
- Do not expose the pipe to direct flame. Do not install pipe near extreme heat.
- Do not use in excessive operating conditions inconsistent with pressure ratings that appear on pipe and applicable standards.
- Do not subject pipe to prolonged exposure to free chlorine concentrations greater than 4 ppm.
- Do not use in contaminated soils.
- Do not expose to materials that affect the basic properties of cross-linked PEX, brass or copper. Avoid contact with adhesives.
- Do not use with other fitting systems.
- Do not install through metal studs or concrete without using a protective sleeve.
- Do not install pipe that has defects such as: gouges, cuts, deep scratches, kinks, evidence of grease, tar or any chemical, exposure fading or discoloration.
- Do not use SharkBite brass or poly crimp fittings with stainless steel clamps when using PE-RT pipe in ambient temperature conditions of 32F or less. If using SharkBite brass or poly crimp fittings with PE-RT pipe when conditions are 32F or less, copper crimp rings should be used.
- Do not use defective fittings with the pipe.
- Do not use supports that may collapse or cut the pipe. Supports should **not** have sharp edges, which could damage the pipe.
- Do not use metal hangers with sharp or abrasive edges or hangers that may pinch or penetrate the pipe. Proper hangers, clamps and straps are available from your SharkBite supplier.
- Do not pull pipe tight at connections. Prevent unnecessary strain on the pipe, fittings and connections with straps or clamps.
- Do not drag the pipe over rough terrain, rocks or any other surface that could abrade, cut, puncture or damage the pipe wall in any way.
- Do not crush or kink the pipe.
- Do not heat kinked pipe to repair/reform. Inspect all pipe before and after installation. Damaged or kinked sections should be cut out and replaced. Keep the PEX pipe a **minimum** of 12 inches vertically and 6 inches horizontally from sources of high heat such as recessed light fixtures, gas flue vents, heating appliances or electric motors. Forced air heating ducts are not generally considered sources of high heat. These areas of installation should be rechecked after further construction and other mechanical systems have been installed. PEX can be run in return air plenums. Bend pipe 2 inches away from fitting. This prevents the fitting from being used as an anchor point.
- Do not exceed the minimum bend radius of the pipe. (see illustration on p.10)

Proper Support of SharkBite® PEX Pipe

SharkBite PEX must be properly supported to protect against excessive strain. For both vertical and horizontal applications we recommend the pipe be supported every 32 inches between supports, leaving a little slack (1/8-1/4 inch) in the pipe to allow for normal expansion and contraction. Always use approved PEX supports, and never use a support that has sharp edges.



Installing SharkBite PEX Pipe in Concrete

The SharkBite PEX pipe can be submerged in concrete, but we recommend following these guidelines to ensure a long-lasting, maintenance-free installation.

- Protect the pipe with non-metallic sleeves when entering or exiting the concrete slab. A larger diameter piece of SharkBite PEX also works well in this application.
- Do not allow joints within the slab. Use a continuous length of SharkBite PEX within the slab and be sure to check for leaks before pouring concrete.

Cross-Linking Methods

Cross-linking is a process that changes the chemical structure of high density polyethylene used to make PEX pipe so that the polymer chains are connected to each other in a three-dimensional net by chemical bonds. PEX A, B, C and D are terms used to describe the different manufacturing methods used to produce PEX pipe.

Regardless of which manufacturing method is used, all PEX pipe meets the same standards for commercial and residential plumbing applications.

Classification of Cross-linked Polyethylene

	Typology	Method	Symbol
A	Chemical	Peroxide cross linking	PEX-a
B	Chemical	Silane cross linking	PEX-b
C	Physical	Radiation cross linking (beta)	PEX-c
D	Chemical	Azocomponets cross linking	PEX-d

Technical Data for SharkBite PEX

SharkBite PEX Pipe Marking. All SharkBite PEX Pipe is marked with:

Pipe Length	Optional For Oxygen Barrier Pipe Only		Manufacturing Location & Date
Manufacturer	Pipe Size & Identification		
0025 ft	CASH ACME	02 BARRIER 1/2" SDR9 PEX5006 160PSI@73F - 100PSI@180F	C1 WG 6.12.14=16:00
Code Evaluation			
CSA B137.5 ANSI/AWWA C904 ASTM F876/877 (ASTM F1807, ASTM F2098, ASSE1061)			

Technical Data for SharkBite PEX

Certifications

The SharkBite PEX pipe is design certified to ASTM F-876, F-877, CSA B137.5 standards and is listed to the NSF/ANSI 14 and CSA B137.5 standards for use in potable water systems.

Maximum Working Pressure

160 psi @ 73.4°F (23°C)

100 psi @ 180°F (80°C)

80 psi @ 200°F (93°C)

Thermal Expansion

Since SharkBite PEX pipe will expand and contract during temperature changes, please allow slack when running the pipe through the building. SharkBite PEX will expand and contract at a rate of approximately 1 inch per 100 feet of pipe for each 10°F change in temperature (see equation below). We recommend that offsets and expansion loops be used as ways to compensate for expansion and contraction. The change of pipe length due to temperature increase can be calculated as follows:

$$\Delta L = \alpha(L \cdot \Delta T)$$

where: ΔL = change of length (inches)

ΔT = change of temperature (°F)

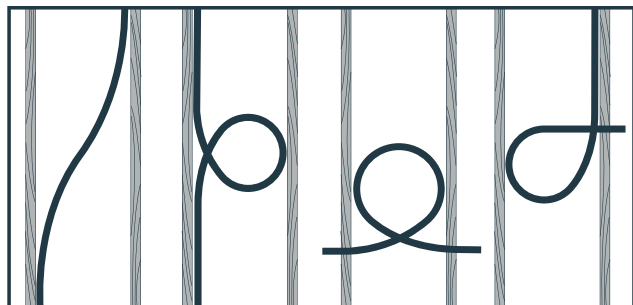
L = original pipe length (feet)

α = coefficient of linear expansion = $(8 \times 10^{-5} \text{ @ } 68^\circ\text{F})$

Example:

$\Delta T = 10^\circ\text{F}$ L = 100' $\Delta L = 0.08''$

Expansion/Contraction Loop Methods



SharkBite PEX Pipe Dimensions, Bend Radius and Fluid Capacity

Nominal Diameter	OD inches	ID inches	Bend Radius	Fluid Cap 100'/Gals
3/8"	0.5	0.35	4"	0.53
1/2"	0.625	0.475	5"	0.96
3/4"	0.875	0.671	7"	1.9
1"	1.125	0.885	10"	3.1

Pressure Loss Data

Flow Rate GPM	Pressure Loss psi/100 ft of pipe			
	3/8"	1/2"	3/4"	1"
0.2	0.427	0.099	0.019	0.006
0.3	0.880	0.204	0.039	0.012
0.4	1.470	0.341	0.065	0.019
0.5	2.189	0.508	0.097	0.029
0.6	3.032	0.703	0.135	0.040
0.7	3.993	0.926	0.177	0.053
0.8	5.069	1.175	0.225	0.067
0.9	6.258	1.450	0.278	0.082
1	7.555	1.751	0.335	0.099
1.1	8.960	2.076	0.397	0.118
1.2	10.470	2.425	0.464	0.138
1.3	12.080	2.799	0.535	0.159
1.4	13.800	3.195	0.611	0.181
1.5	15.610	3.615	0.691	0.205
1.6	17.520	4.058	0.776	0.230
1.7	19.530	4.523	0.865	0.256
1.8	21.640	5.010	0.958	0.284
1.9	23.840	5.519	1.055	0.313
2	26.140	6.050	1.157	0.343
2.5	39.000	9.024	1.724	0.511
3	54.100	12.510	2.390	0.708
3.5	71.360	16.500	3.150	0.933
4		20.970	4.002	1.185
4.5		25.900	4.943	1.463
5		31.300	5.972	1.768
6		43.440	8.284	2.451
7			10.930	3.232
8			13.890	4.108
9			17.170	5.076
10			20.750	6.134
11			24.630	7.281
12			28.810	8.514
13				9.832
14				11.240
15				12.720



For more information, visit
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Certifications

The most up-to-date certifications can be found at sharkbite.com.

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