

# WHAT IS PEX PIPE AND THE DIFFERENCE BETWEEN A, B & C.

PEX pipe is made from high density polyethylene (HDPE), PEX is the term for the cross-linking process that improves the chemical and temperature performance of the polymer and provides flexibility and additional strength.

PEX pipes are divided into 3 types, A, B and C. These letters are used to identify the manufacturing process and are not grades of PEX and have nothing to do with quality or performance ratings.

All PEX pipe manufactured by reputable manufacturers is made to meet the same pressure and temperature ratings, minimum bend radius, pipe wall thickness and ID/OD dimensions. Whether it is A, B or C all PEX pipes must meet and be certified to the same standard.

**PEX A** pipe is made using peroxide called the Engel method after the inventor Tomas Engel. During the process free radicals are created when the HDPE polymer is melted and cross-links between molecules occur at temperatures that exceed the decomposition temperature of the polymer.

**PEX B** pipe is made using Silane or moisture cure method of cross-linking, the links between the molecules of the HDPE form after the extrusion process using a catalyst and exposing the PEX pipe to hot water.

**PEX C** pipe is made using an electronic irradiation process to cross-link, known as "Cold cross-linking". The cross-linking of the molecules is done after the process of extrusion by exposing the pipe to electron radiation. The radiation emitted breaks the existing links between the molecules of the polymer and initiates cross-linking.

**PEX-AL-PEX** pipe is not pure PEX as it has a thin layer of aluminium sandwiched by layers of PEX. This creates an oxygen barrier and helps retain its shape when bent. Used mainly in under floor heating and radiator systems or gas piping.

## PEX A

PROS	CONS
Highest Flexibility (softness) of all PEX types.	Highest Price
Kinks Can be repaired with a heat gun.	Lower bursting pressure than PEX-B
Highest degree of cross-linking.	Variation in wall thickness.
No coil memory.	

## PEX B

PROS	CONS
Highest chlorine and oxidation resistance.	Stiffer than PEX-A
Highest burst pressure	Lower cross-linking ratio than PEX A
Lowest price versus PEX A & PEX C	Noticeable coil memory
Lowest dimensional tolerances	Kinks can only be repaired with joiners.

## PEX C

PROS	CONS
More environmentally friendly to manufacture.	Prone to development of cracks.
Little or no coil memory	Least uniform cross-linking.
	Least resistance to kinks which can only be repaired using joiners.

## Which Pex Tubing To Choose?

PEX-A is the most flexible of all PEX pipe types, it has little or no coil memory and gives installer the ability to repair kinks with a heat gun. It has been in use for over 50 years which is longer than other types and a lower bending radius in PEX-A (6 times the OD vs. 8 times the OD for PEX-B & C) is helpful.

PEX-B is a clear winner in terms of price compared with both other types. It has been in use for over 40 years and it also has a higher bursting pressure than PEX-A and a similar or better resistance to oxidation.

All PEX types are vulnerable to high chlorine counts and can degrade and become brittle if exposed to high levels of the chemical and exposure to UV light. PEX has an external coating of antioxidant to protect it from UV light which must pass 50-year testing.

The major downside of PEX-B is its' stiffness and coil memory. While there's little difference in smaller sizes such as 1/2", larger pipe diameters, especially 1", can be noticeably harder to bend. Any kinks made during the installation can only be repaired by installing a coupling and cannot be repaired with a heat gun like PEX-A.

PEX A has a requirement for the degree of cross linking to be greater than 70% and PEX B the requirement is greater than 65%. The chemical structure of PEX A has a lower crystallinity due to the manufacturing method and has a lower density and strength hence PEX A needs to have a higher degree of cross linking.

PEX A is more flexible than PEX B but both types must be manufactured to a minimum bending radius. So, at the end of the day both PEX A and B must meet the same minimum performance requirements. PEX-C is the hardest to evaluate, given the lack of testing data and publicly available information. In late 2013, a leading US manufacturer of PEX-C pipe became the subject of a class-action settlement which indicated that its' PEX tubing is prone to development of cracks in the pipe as a result of early oxidation. While PEX-C may be suitable for hydronic and radiant heating use, it offers little practical advantage over the other two types for hot and cold-water plumbing.