

WHEN PIPES FAIL ...

We like to think the pipes in our house are good for the life of the house, but experience tells us this is not always the case.

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Water pipes and fittings may fail for various reasons – usually unexpectedly, often at the most inconvenient time. Steel pipes rust. Copper pipes can fail through corrosion or erosion if subject to water of unsuitable chemistry or at excessive local velocity. Plastic pipes can fail if used at temperatures and/or pressures higher than those for which they were designed. Incompatible materials can lead to failure, such as when dissimilar metals are in electrical contact.

Once upon a time galvanised iron pipes with screwed fittings were used for domestic water supply. These were largely supplanted by copper pipes with brazed or silver-soldered joints or with brass fittings. In the 1970s polybutylene pipe systems became available, offering a number of advantages over copper, but also introducing various problems and teaching the industry a number of lessons. Failure of these first-generation polybutylene pipes and fittings is a common occurrence, and raises the question of what response is appropriate.

Failure of first-generation polybutylene pipes and fittings is common.

Homeowners need to talk to their insurance company when a leak occurs. Insurance will usually cover the cost of fixing the water damage, and perhaps the cost of fixing the immediate leak, but rarely does it extend to covering replacement of all the internal piping system. Cover for damage from future leaks may even be declined, especially after more than one claim.



Replace readily accessible pipes

It is not inevitable that old polybutylene systems will fail. The extent of replacement after a failure is a matter of judgement. Prudent advice is to replace everything that is readily accessible, e.g. in the roof space or the sub-floor space. Opening up the walls to replace droppers to fixtures means the room will need substantial redecorating. Perhaps replacement of that piping can wait for a scheduled redecoration.

What to use

What piping system should be used to replace the failed product? A wide range of piping materials can be used in modern plumbing water supply systems. AS/NZS 3500.1: 2003 *Plumbing and drainage – Water services* recognises 14 materials, some of which are more common in industrial applications or in water supply infrastructure. Discuss the options with your plumber.

Copper and polybutylene are the most common materials used in water supply plumbing within houses. Use of cross-linked

polyethylene (PEX) and multilayer pipes (PE-Al-PE or PEX-Al-PEX) is increasing, with a variety of proprietary fittings. Polypropylene pipe and fittings are increasingly used where rigid pipe is appropriate. These are joined by fusion welding using heated tools.

Where proprietary tools are required for correct installation of a product, these *must* be used. There is no short-cut or way to cut costs by not using them.

Nowadays products tend to be introduced to the market under a trade name, sometimes without the generic material being evident. It may be necessary to examine markings on the pipe to check what the material is and to what standard it has been manufactured – assuming the product is compliant with a recognisable standard. If the information is not available, shy away from the product.

Careful selection and installation required

Choose carefully when selecting materials for pipes that will be handling hot water or will be subjected to high temperatures in roof

spaces. Pipes are classified by their pressure rating at 20°C, e.g. PN16 is rated for a pressure of 1600 kPa at 20°C. The allowable working pressure will decrease with increasing temperature and the rate of decrease, and the maximum working pressure will vary with different materials.

Some instances of piping failure have been attributed to changes in pressures in the town water supply system. Pressures may be low during the day when usage is high and then increase at night when usage falls. The performance of compression joints may be affected by these cyclic pressure changes. Get your plumber to install a pressure limiting valve on the main supply to the house. This can help minimise the effect of pressure changes and can have the added bonus of reducing wastefully high water flows obtained with unnecessarily high pressures.

When installing replacement piping, care must be taken to avoid damage to piping, e.g. by being drawn across the point of a nail. This may not result in failure at the time of testing immediately after installation, but can create a point of weakness potentially leading to failure many years later.

Piping needs to be adequately supported, but the support and fixing must allow for expansion and contraction with temperature. If no allowance is made for movement, shrinkage of piping installed on a hot day can put high stresses on joints and fittings. 🍌



Earlier repairs had already been made to these pipes but they failed again



Temporary fix to pipe in ceiling. Leaks caused the ceiling in this room to collapse.