

Research Contract DWI 70/2/150

Review of the Benefits and Disbenefits for Drinking Water Storage within Premises

Executive Summary

Background

In Southern England it has been common practice to provide drinking water directly from the supply main at the kitchen sink only. All other taps, both hot and cold, are supplied from storage within the premises. The practice in Northern England is different where all water comes directly from the supply mains.

The Water Supply (Water Quality) Regulations will require that drinking water taps in domestic premises and public buildings deliver water that is wholesome. The regulations include detailed standards for the definition of wholesome water.

Storage within premises represents a risk of potential deterioration in bacterial quality. Since it is not feasible for a householder to implement a monitoring and maintenance regime similar to that carried out by water companies for their service reservoirs, compliance with quality standards cannot be reliably maintained if water is stored within consumer's premises.

The review

Since the mid 1990s the majority of new domestic premises either have unvented installations, where both the hot and cold water supplies are drawn directly from the mains, or all the cold water supplies are taken from the mains and only the hot water system is supplied from storage. Although consumers may draw supplies for drinking or cooking from the hot water system, the practice is contrary to advice and is considered a misuse of the supply. This review considers the potential for eliminating from older premises cold water storage from which water for drinking and cooking purposes may be drawn.

Storage within premises buffers the effects of a short term s interruption to the supply, smoothes and reduces internal pressures, can help to reduce short term peak demands in localized areas of the distribution system and can reduce internal plumbing installation costs. The disbenefits of storage are potential water quality deterioration through contamination, stagnation and high temperatures, the risk of pipework freezing in roof spaces during cold weather and the costs associated with regular maintenance of the storage facilities. Storage may be necessary for some types of buildings to ensure continuity of supply for legal, commercial or other obligations in the event of a supply interruption.

For older low rise domestic premises, the internal plumbing could be modified so that all cold water supplies are drawn direct from the mains and cold water storage is retained only to supply the hot water system. The estimated cost for the modifications is £240 per premises. When all the cold water supplies are drawn from the mains, there will be a greater instantaneous demand on the system. Where the condition of the communication and service pipe constrains the flow

into some of these premises, the pipe may require replacement in order to restore the previous levels of service.

The review examined the impact on distribution performance from higher instantaneous demands that would arise from switching all cold water supplies directly onto the mains whilst retaining cold water storage to supply the hot water system. Although the instantaneous demand from individual properties would be higher, the duration over which supplies are taken would be shorter and the review concluded that where the number of properties exceeded 15, there would be very little impact on the distribution system. Any distribution system deficiencies would therefore tend to be localised.

In high rise domestic and non-domestic premises, water often has to be pumped to roof tank or intermediate storage for distribution to individual premises within the building. The pipework for new buildings could be designed to provide all drinking water supplies direct either from the mains or from the pumped system riser pipe. The impact on the distribution network is unlikely to be significantly greater than where cold drinking water storage is currently provided.

A variety of supply arrangements exist in high rise buildings and many could be modified to supply all cold water directly from the mains or existing pumped riser pipes. The modifications are generally straightforward and could be carried out as part of periodic refurbishment of the structure. The impact on the distribution system of supplying cold water directly from the mains is likely to be minimal due both to the collective effect of groups of premises and to ground storage where provided as part of the buildings pumped system.

Prohibiting cold drinking water storage would create health benefits and cost savings through the omission of tank maintenance and elimination of burst pipes in roof spaces during cold weather. However valuing these benefits has been problematic. Although there are documented risks associated with bacteriological deterioration of stored water, records are not kept of consequential illness. Similarly there are no records of the costs related to cold weather leaks. However in order to meet the expectations of the Drinking Water Directive, a robust storage tank maintenance regime is required in public and other buildings to demonstrate due diligence. The annual maintenance cost for a single tank installation is likely to be between £2,600 and £3,000.

Recommendations

Because of the risk of deterioration in drinking water quality from storage within premises, it is recommended that all supplies to the cold water taps and other cold water services in domestic premises normally used for drinking or cooking purposes should be supplied directly from the water company distribution network or from a rising main pumped either directly or indirectly from the distribution network. Where ground level storage is deemed necessary, it should be designed, sized and maintained to ensure that any stored drinking water remains wholesome at all times.

Where the plumbing arrangements in existing domestic premises are renovated, the premises owner should be encouraged to design the plumbing arrangements so that all cold water supplies used for drinking or cooking purposes are connected directly to the incoming main.