

Introduction

Designers, constructors, and operators of water networks should be alert to all the possible opportunities for contamination to enter supplies, and take all reasonable precautions to minimise the risk. They should equally avoid circumstances where water in the mains can deteriorate through stagnation or long contact with particular materials e.g. cements mortar pipe lining. The design and specification of the network can itself significantly reduce most of these risks.

The Principles of Water Supply Hygiene state the following:

'Where distribution networks are designed and installed by self-lay organisations (SLO's) water undertakers should ensure that these activities are carried out in accordance with the Code of Practice for the self-laying of water mains and services. SLO's should be members of the Water Industry Registration Scheme operated by Lloyds on behalf of Water UK and the Water Industry.'

Laying new mains and services requires personnel to hold registration under the National Water Hygiene Scheme. Ideally, relevant personnel should have current certification to at least NVQ level 2 in Network Construction Operations.

Procedure

As part of the installation process for any new main or service connection, the SLO should adopt the following good practice:

- Pipes and fittings must be transported and carefully stored on site, off the ground, to avoid entry of dirt or vermin. All pipes must be supplied with close-fitting end caps where feasible and these must remain in place until the pipe is laid. All pipes and fittings (and in particular plastic types) must be kept clear of fuel oils, and any materials so contaminated should be discarded.
- All fittings and pipe ends must be sprayed with a solution of 1000mg/l free available chlorine as they are laid.
- Care must be taken to prevent water, subsoil or other material entering a pipeline under construction. It must not be assumed that such material will be flushed out on commissioning. Additional cleaning measures (e.g.: swabbing) and inspection techniques (e.g.: CCTV) must be considered prior to commissioning on larger diameter mains.
- Swabs may be useful for clearing a new main of any dirt or debris that has entered and the use of a chlorinated swab may be appropriate if any form of contamination is suspected. However, a chlorinated swab is only an intermediate measure and is not a substitute for disinfection.

Following installation and prior to any connection into the Yorkshire Water distribution network the SLO should ensure that all new mains are disinfected in accordance with the code of good practice detailed in the Principles of Water Supply Hygiene Technical Guidance Note 2, as follows:

1. After installation and before use, water mains must be flushed until visibly clear. They must be disinfected by charging with water containing sufficient free chlorine to ensure that a concentration of at least 20mg/L has been maintained throughout the entire pipe length over a period of standing for at least 16 hours. The time is important to ensure adequate dispersion and contact of the chlorine with the water and the entire internal surface of the main and fittings. The main must then be flushed and left charged for a minimum of 16 hours, and sampled at appropriate points, including the downstream end. The number and location of samples required must be sufficient to ensure the suitability for supply of the entire length of main.
2. Alternative disinfection methods can be considered that are equivalent to 20mg/L for 16 hours (for example, spraying the full internal length with solution containing 1000 mg/L chlorine).

No new main shall be brought into service until the contents of the main have been tested successfully for bacteriological, chemical, taste, odour and appearance. The SLO should ensure that the appropriate samples are taken and analysed in a suitably accredited analytical laboratory.

The results of samples taken by the SLO must be assessed by Yorkshire Water's Information and Regulation Team. No new main, installed by an SLO, shall be connected to the Yorkshire Water Network until sample results have been passed by the Information and Regulation Team..

The criteria for passing new mains are as follows:

Parameter	Unit	Standard
pH	pH Unit	6.5 - 9.5
Colour	Hazen	10
Turbidity	NTU	2.0
Coliforms	No per 100 ml	0
<i>E. coli</i>	No Per 100 ml	0
NLF's	No per 100 ml	20
Taste	Dilution No,	0
Odour	Dilution No.	0

The party that will undertake the connection must not do so until the SLO has provided proof that the correct disinfection procedure has been followed and satisfactory samples have been taken. Documentation that details the results of samples taken and a formal approval from the Information and Regulation team that confirms that the results or samples meet the acceptance criteria is also required.

If the main is not brought into service within 14 days of a satisfactory sample having been taken, the main should be flushed with mains water and re-sampled. If contamination is suspected, the main should be disinfected and re-sampled.

All new service connections, must as a minimum be pressure tested and flushed with mains water before use.

Service pipes above 50mm diameter require disinfection, although water quality samples will not normally be required. If the disinfected service pipe is not commissioned and brought into supply within 30 days of completing disinfection, the disinfection process should be repeated prior to commissioning if it is considered that deterioration of water quality may have occurred within this period.

Service pipes 63mm and above in diameter should be treated as a new main and as such will require disinfection, and water quality samples, under the arrangements for new mains stated above.