

This technical article provides additional guidance on drainage and sanitation. It is important that all workmanship carried out during construction is completed in accordance with the relevant tolerances.

Drainage

In recent years the principle failures for both foul and storm water drainage are inadequate falls in underground pipework.

The main issue appears to be with 100mm polythene pipes. For example, Diagram 9 of Approved Document H supporting the England and Wales Building Regulations, indicates that the minimum permissible fall for 100mm pipework is 1:80, provided that there are adequate flow rates above 6.3 litres/second. This would normally be achieved by at least 1 WC on the system.

In practical terms achieving a constant gradient of 1:80 with 100mm pipes is very difficult. This is not helped by the popularity of using 6m long plastic pipe which, because of its length, can acquire a bend or set during long-term storage either on site or in builders' merchants. It's not uncommon when inspecting 6m long sections of pipework laid to minimum falls to have an acceptable fall at one end of the individual pipe yet a back-fall at the other end.

The introduction of plastic pipe work has inevitably led to a skill set loss of the groundworker. Common indications of likely poorly laid pipework are operatives laying pipes between inspection chamber positions without using a taught line to ensure that the pipes are laid straight and to a constant gradient between inspection chambers.

The invert levels of the inspection chamber should be determined by a setting out engineer or other trained operative using a 'Dumpy' or 'Quickset Level'. These levels are determined by ascertaining the total difference in levels from the highest point of the pipework at the start of the run to the lowest level where the pipe run connects to the public sewer or the main pipe run for the site. This should then be used to calculate the falls between inspection chambers to divide the total available fall to achieve a constant gradient from start to finish.

It is not uncommon to observe some sections of a pipe run between inspections chambers with much greater falls than that achieved between other sections. This inevitably results in some sections toward the end of the run with less than a minimum fall where adequate falls were actually achievable. To put it another way, the available falls have not been divided up evenly between changes of direction or junctions in the pipework.

Recommendations

- Ensure that an engineer has calculated that there is adequate falls available in order that 100mm pipes can be used
- Consider the use of 150mm diameter pipes if falls are suspect (1:150 achievable with 150mm pipes)
- Check falls that appear suspect with a 1200mm spirit level
- Ensure the invert levels of the inspection chambers between runs of pipework have been set by a suitably qualified person on the basis of the falls available
- Ensure pipes used are straight and not bowed excessively (particularly 6m long plastic pipes)
- Ensure that a line or laser is used between inspection chambers to ensure a constant gradient
- Use adequate granular material to bed pipes on so that levels can be adjusted easily

- Ensure suitably trained operatives lay the pipes
- Ensure work is being monitored by technically competent site management

Areas relating to above ground drainage that should also be checked are:

- Poor access to soils stacks for rodding and testing purposes where no access doors have been incorporated to the base of boxing
- Poor sound insulation to boxing for soil and vent pipe through apartments and lower rooms
- Poor insulation of service pipes resulting in excessive heat loss
- Foul odours from above ground plumbing as a result of incorrectly installed pipe runs causing traps to have their seals pulled
- Poor sealing around soil and vent pipes that have not been sealed correctly in compartment floors leading to claims for inadequate fire stopping. This normally manifests itself by cooking smells transferring from one apartment to another

Every care was taken to ensure the information in this article was correct at the time of publication (March 2021). Guidance provided does not replace the reader's professional judgement and any construction project should comply with the relevant Building Regulations or applicable technical standards. For the most up to date Premier Guarantee technical guidance please refer to your Risk Management Surveyor and the latest version of the [Premier Guarantee Technical Manual](#).

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