

## SECTION 15. SYSTEM OPERATION - DISTRIBUTION

### E. PIPE COMPOSITION

**Nominal diameter** of a distribution pipe is the internal diameter of the pipe.

### F. PRESSURE MANAGEMENT

**Pressure management** is a technique that optimizes pressures in a water distribution system to minimize losses and surge impacts while maintaining adequate water service, including fire-fighting flows.

**District Metered Areas** are created by closing existing or installing additional valves to hydraulically isolate an area. It is a small zone of the distribution system, typically encompassing between 1000 and 3000 customer service connections, with measured supply input flow of sufficiently small volume that individual leakage events can be quantified, thereby guiding leak detection deployment decisions.

**Pressure zones** are sectors in a distribution system that are established to comply with pressure requirements throughout the distribution system efficiently.

**Pressure Managed Areas** are parts of a District Metered Area (DMA) or whole DMAs that are subject to pressure management by installing a pressure-reducing valve at the inlet.

Pressure zones where pressure reduction is being practiced to reduce real loss reduction should be included.

**Real losses** include leakage from mains and service connections and storage tank overflows. It is defined as the physical water loss from the pressurized system and the utility's storage tanks, up to the point of customer consumption, which is the customer meter in those utilities that meter their customers. In unmetered systems, the delineation is the point at which the customer is responsible for customer service connection piping maintenance and repairs.

**Critical pressure points** are locations with lowest pressure in a pressure zone or Pressure Managed Areas of the water distribution system, due to topography and/or hydraulic frictional losses in the system.

### G. Water Loss Control Actions

**Listening devices** are equipment which are used to listen for leaks in the distribution system. These typically include, but are not limited to mechanical and electronic listening sticks or rods which are placed on pipe fittings, hydrants or service connections and mechanical and electronic geophones (ground microphones) that are used to listen to leaks from the ground surface.

**Leak Noise Correlators** detect the leak sound from the water main or pipe through a receiver unit and two sensors equipped with a radio transmitter, and provide information on the location of the leak. These equipment are placed on valves or hydrants on each side of the suspected leak.

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**Leak Noise Loggers** indicate the presence of a leak without providing a location. These sensors are permanently or temporarily installed at fittings in the distribution system and programmed to monitor noise indicating leakage at night. The data can be collected by radio transmission.

**Tracer gas technique:** Gas (not soluble in water, such as hydrogen or helium) is introduced into an isolated segment of a water pipe, and used to detect a leak through which the gas escapes and permeates to the surface of the pipe.

**Ground Penetrating Radars** use radar pulses to find leaks by detecting cavities created around the pipe, leaked water under the surface or disturbed ground.

**Advanced Metering Infrastructure** are metering systems that measure and centrally store detailed information on water consumption at frequent intervals, without the need for dispatching crew to customer meter locations. The metering system typically consists of a meter reading device, control system, communications and data management hardware and software between meters and peripheral devices and the utility's business systems. The nature of this network's installation is permanent.

**Leakage management software:** Software solutions to collect or use distribution system data to process distribution system data to determine water loss levels and possibly provide recommendations to reduce water loss.

**District Metered Areas:** Please refer to Help on subsection 'F. PRESSURE MANAGEMENT'

**Automatic Meter Reading** is where the water consumption is read by handheld devices from meters by personnel in the field or utility vehicles travelling past the customer meters.

**Night Flow Monitoring** is a technique used to quantify leakage in a District Metered Area (see glossary for 'Infrastructure and Pressure Management' for definition) by measuring flows into the area between the hours of 2 am and 4 am, when the consumption is typically the lowest.

**Step Testing** involves isolating sections of main from the zone and the zone meter that is recording the flow or pressure on data loggers. It is performed by gradually closing a valve on the input supply main (the input flow is channeled through only one main) and measuring successive pressure or flow reductions in an isolated zone or District Metered Area of the distribution system.

**Visual surveys** involve inspecting the ground above the distribution pipelines for surfacing leaks (wet spots) or unusual green growth patches, especially in arid regions.

**General surveys** (also known as 'hydrant survey') involve installing leak noise loggers at every hydrant in the distribution system and or main valves if no hydrant is present at the desired intervals.

**Comprehensive surveys** involve installing leak noise loggers at every available fitting on distribution mains and service connections.