

Pressure Management

The Foundation for Effective Water Loss Control

Introduction

The main causes of water loss in a pipeline network are: leakage, bursts, and over-flow. The need to reduce these losses to as close as possible to the Unavoidable Annual Real Losses (UARL) is a commercial as well as environmental must. The IWA/WLTF is promoting the “4 Component” concept of managing Real Losses. This includes active unreported leakage Detection, speed and quality of repairs of reported bursts and leaks, pipeline and assets management, and the use of **Pressure Management**.

Based on years of research and field experience, the concept of **Pressure Management** has been established as the foundation for effective water loss control. It is the most efficient and cost effective tool in water loss reduction.

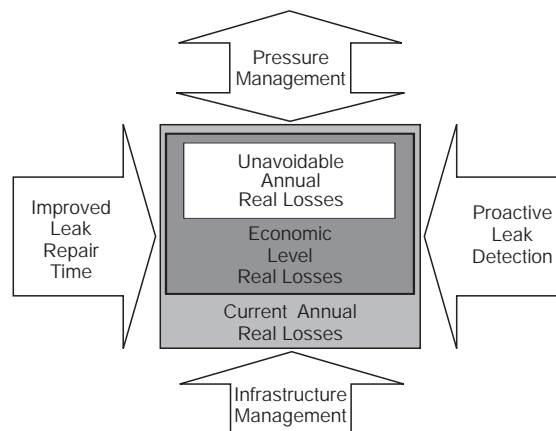


Figure 1: The four components of leakage according to IWA WLTF

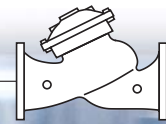
Pressure Management

Pressure Management is defined by the IWA as: “The practice of managing system pressure to the optimum level of service, ensuring sufficient and efficient supply to legitimate consumers, while eliminating or reducing pressure transients and variations, faulty level control and reducing unnecessary or excess pressure, all of which cause the distribution system to leak and break unnecessarily.”

Pressure influence is much greater and significant than the theoretical relationship between Pressure (P) and the discharge rate through an orifice (Q) known to be $P = K * Q^n$ when $n=0.5$. It has been established that $0.5 \leq n \leq 1.5$, hence the reduction of pressure to the minimum needed has even a bigger effect.

Not only active leakage rate is reduced by pressure reduction; the reduction of pressure has its secondary positive influence on the piping network. It will dramatically reduce new bursts and new reported and unreported leaks. This can bring along cost savings by reducing the frequency of intervention of the three other components.

This, together with the low yearly cost of operation of Bermad valves can ensure a very short payback period on investment (usually within a few months).



Dynamic Pressure-Reducing Control Valve

with Electronic Multi Level Setting (Pneumatically) Controlled by Technolog-Modulo Controller

Model: WD-720-ES-4T

The Model WD-720-ES-4T is a dynamic pressure reducing valve. Equipped with a unique Multi-Setting Pneumatic Controlled unit (MSPC) which responds to a Modulo controller by changing the pilot's set point according to a programmed time and flow function.



Features and Benefits

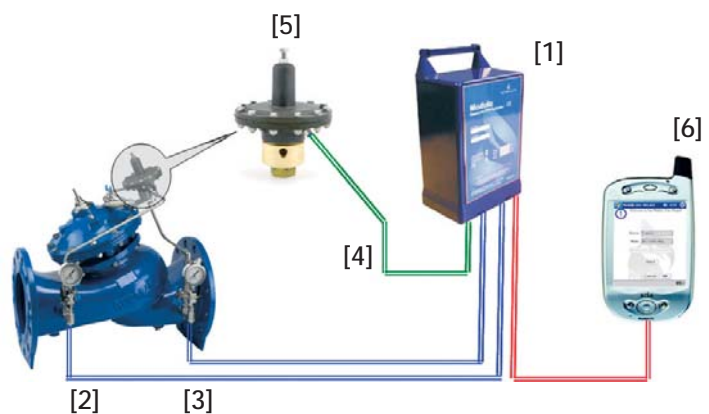
- **Hydraulic Pressure Control**
 - Line pressure driven
 - Protects downstream even during zero demand
- **User-Friendly Design**
 - Easy pressure setting
 - Simple in-line inspection and service
 - Easy addition of control features
- **Designed to stand up to the toughest conditions**
 - Excellent anti-cavitation properties
 - Silent operation suitable for urban areas
 - Wide flow range
 - High stability and accuracy
- **Double chamber design**
 - Moderated valve reaction
 - Protected diaphragm
- **Flexible design** – Easy addition of features
- **Obstacle free, full bore** – Free flow pass
- **V-Port Throttling Plug** – Very low flow stability
- **In-line serviceable** – Easy maintenance

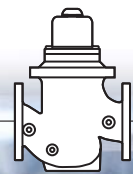
Applications Guide

- Pressure Reducing Systems
- Pressure Management and Leakage Control

Operation

The Modulo controller [1] receives continuous readings of flow and up-downstream pressure [2] [3] and provides pneumatic pressure to the MSPC unit [4], changing the pilot set point according to pressure & flow or pressure & time functions. The Pressure Reducing Pilot [5] commands the Hydrometer to throttle closed when downstream pressure rises above pilot setting, and modulate open when it drops below pilot setting. A standard PDA [6] allows programming and data downloading.





Pressure-Reducing Hydrometer

with Electronic Multi Level Setting (Pneumatically)
Controlled by Technolog-Modulo Controller

Model: WD-920-4T-MO

The Model WD-920-4T integrates a Woltman-type water meter, with a pressure reducing valve. A unique Multi-Setting Pneumatic Controlled unit (MSPC) responds to a Modulo controller changing the pilot's set point according to a programmed time and flow function.



Features and Benefits

- Integrated "All-in-One" Control Valve
 - Saves space, cost and maintenance
- Hydraulic Pressure Control
 - Line pressure driven
 - Protects downstream even during zero demand
- Magnetic Drive with Vacuum-Sealed Register
 - Water-free gear train mechanism
 - Reed-switch and Opto pulse-generating modes
 - Increased metering data
- Internal Inflow & Outflow Straighteners
 - Saves on straightening distances
 - Preserves accuracy when installed vertically
- Flow Metering Calibrator
 - Superior measurement precision
- User-Friendly Design
 - Easy pressure setting
 - Simple in-line inspection and service
 - Easy addition of control features

Applications Guide

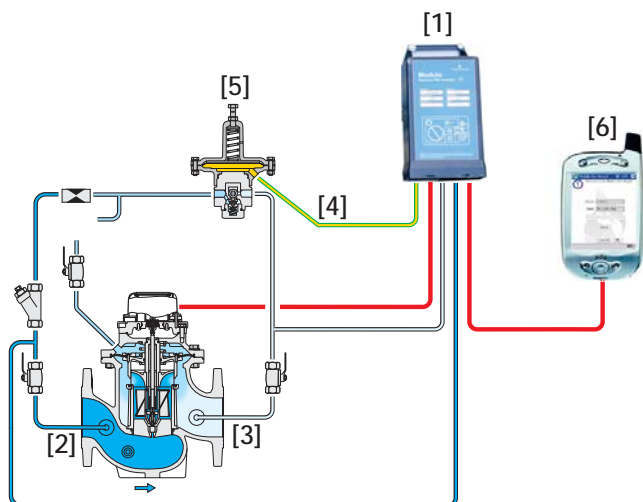
- Pressure Reducing Systems
- Pressure Management and Leakage Control
- Water & Flow Metering

Operation

The Modulo controller [1] receives continuous readings of flow and up-downstream pressure [2] [3] and provides pneumatic pressure to the MSPC unit [4], changing the pilot set point according to pressure & flow or pressure & time functions.

The Pressure Reducing Pilot [5] commands the Hydrometer to throttle closed when downstream pressure rises above pilot setting, and modulate open when it drops below pilot setting.

A standard PDA [6] allows programming and data downloading.

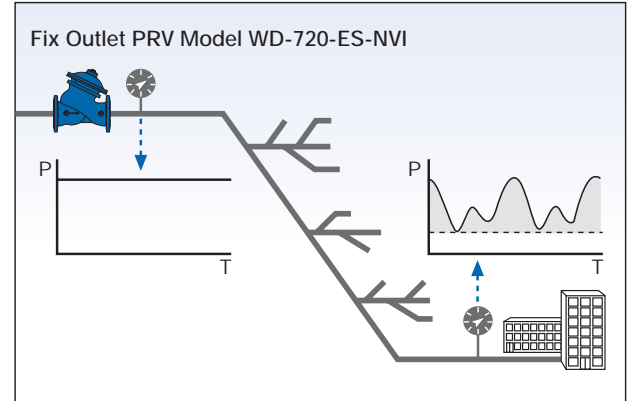


Pressure Management

A well planned Pressure Management program will not only significantly reduce real losses but also reduce bursts and leak detection expenses, asset management costs, energy costs, and extend the life of the system.

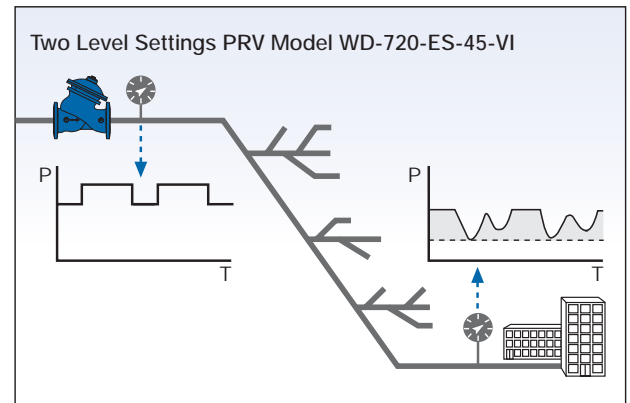
Pressure Management Level 1: Fixed Pressure Outlet Model: WD-720-NVI

Common PRV's are set to maintain a constant low downstream pressure, ensuring sufficient pressure at the systems critical point during peak demand (when line friction head loss is highest). The shaded area represents the hours and levels when pressure is higher than required.



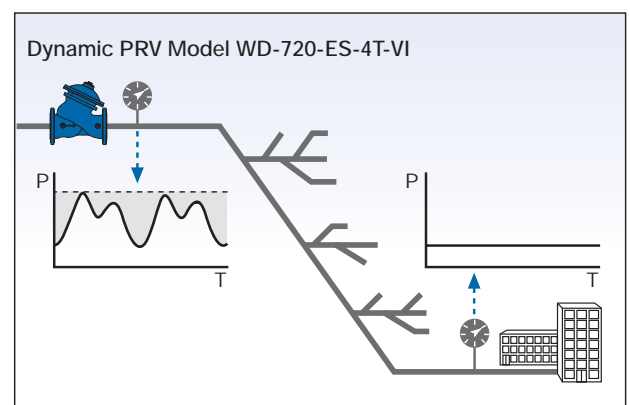
Pressure Management Level 2: Two Downstream Pressure Regimes Model: WD-720-45-VI

This model enables reducing the pressure to a lower set point during low demand hours (when line friction head loss is minimal). The selection between the two pressure regimes is done using an electric command usually through a dedicated controller.



Pressure Management Level 3: Dynamic Pressure Reducing Model: WD-720-4T-VI

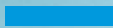
This model, integrated with a PR controller, is designed to continuously correct its set value based on the momentary demand and/or minimum required pressure at the systems critical point. It can react in real time or as statistically programmed. As a result, the average network pressure will decrease. The shaded area represents the hours and levels of reduced leakage.




Waterworks

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