AquaMaster4 electromagnetic flowmeter

Accurate measurement for fire suppression systems



Be safe and make every drop count with AquaMaster4 electromagnetic flowmeters

Measurement made easy

Used for over 150 years, water sprinkler systems have provided a first line of defense against fire in industrial, commercial and, more recently, domestic buildings. By helping to localize and extinguish fires before they can spread, sprinkler systems have proven highly effective in limiting both damage to property and loss of life.

The way that these systems are kept supplied with water will vary according to the location of the building they are installed in and the supporting water infrastructure. In many cases, sprinkler systems will be fed from a mains water supply. Where this is not possible, other methods can include feeding from a storage cistern, pressure vessel or pumped water supply.

The application

Equipment used for fire service is highly regulated by the insurance providers to protect the investment and insure the workers' safety.

For sprinkler systems to be continuously ready requires a constant supply of water to be available. To achieve this the water supply must be maintained at a suitable pressure.

In the case of mains water, the water provider must be able to accurately measure the water to ensure that the supply is available in the right quantities and at the right pressure.

Metering the supply of water to sprinkler systems will help to enable any issues to be identified and pinpointed so that a sufficient supply of water at the correct pressure can be guaranteed. It will also help to make sure that users are correctly billed for the water they use for their sprinkler system.

To guarantee a meter will meet these requirements, they must be thoroughly tested for large flow ranges, pressure containment and preform throughout a wide temperature range before they are given approval for use as a meter in Fire Service Applications.

The challenge
Selecting the right flowmeter for a water flow measurement application is key to achieving the desired level of performance. While different flowmeter types have their merits for specific types of applications, they may not provide the best outcome for helping to measure and maintain the flow of water for fire suppression systems. Various types of flow measurement techniques can be used in closed pipe systems. These options include mechanical, ultrasonic and electromagnetic technologies.

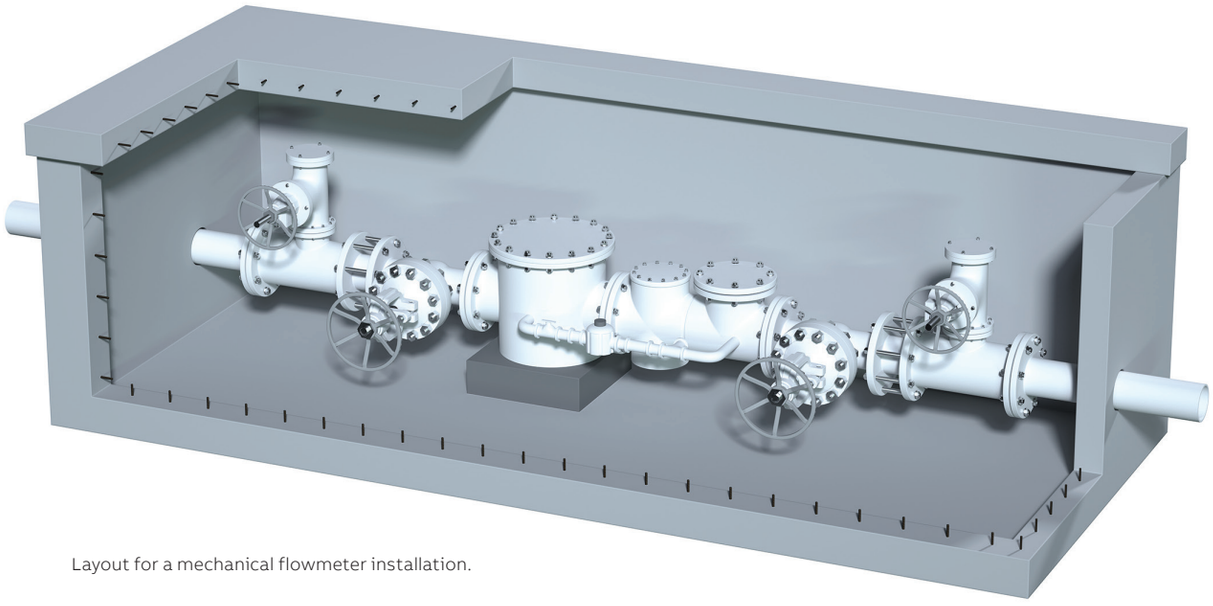
Historically, fire service applications were served with mechanical propeller flowmeters that consist of a small mechanical meter for the regular (low) flow and a large meter for the fire flow. The switch-over is regulated by a check valve. Since mechanical flowmeters cannot tolerate solids in the flow stream, there has to be a large strainer for the metering system. It is required that the sprinkler system will still operate under full pressure even if the strainer is 75% full. These compound meters are very expensive and maintenance dependent.

Furthermore, the need for mechanical meters to be tested periodically, recalibrated and repaired means that they have to be removed, requiring users either to replace the meter with a temporary device or cease measurement altogether until the meter is refitted back into the line.

Ultrasonic flowmeters including portable clamp-on types, are another option. They use ultrasonic beams to assess the velocity of the fluid, which can then be used to derive a flow measurement. Aside from their higher cost, ultrasonic flowmeters suffer various drawbacks.

Those operating on the transit time principle, for example, can struggle to handle flows with high levels of particulate matter, requiring a strainer to be fitted. Both transit time and Doppler meters can also be affected by velocity profile distortions, requiring from 10 to 40 upstream diameters, depending on the severity of the disturbance. The turndown of ultrasonic meters is also limited within an ideal range of 20:1 to 40:1.

Ultrasonic meters can also be difficult to install and set up, especially where high accuracy is required. The accuracy of flowmeters can be affected not just by design but also by their susceptibility to tampering. Particularly where metering is conducted at the point of use, users have been known to adjust readings to enable them to either pay less or use more water.



Layout for a mechanical flowmeter installation.

The solution

The technical and economic advantages offered by electromagnetic flowmeters compared to other flow metering technologies make them the preferred choice for water measurement applications. Key advantages of electromagnetic flowmeters include:

- Minimal obstruction with very low head loss
- No moving parts
- Availability for wide range of bore sizes
- No significant performance effects caused by temperature, pressure or fluid density changes
- No significant performance effects caused by profile distortion/swirl
- No straight pipe required upstream and downstream the flowmeter (0D/0D)
- Output directly and linearly related to flowrate
- Measures with same high accuracy in either forward or reverse direction
- High turndown ratio (1000:1) with long term stability of process value
- Small footprint, ideal for compound meter systems
- Annual calibration not required. In-situ verification assures users with traceable certificates

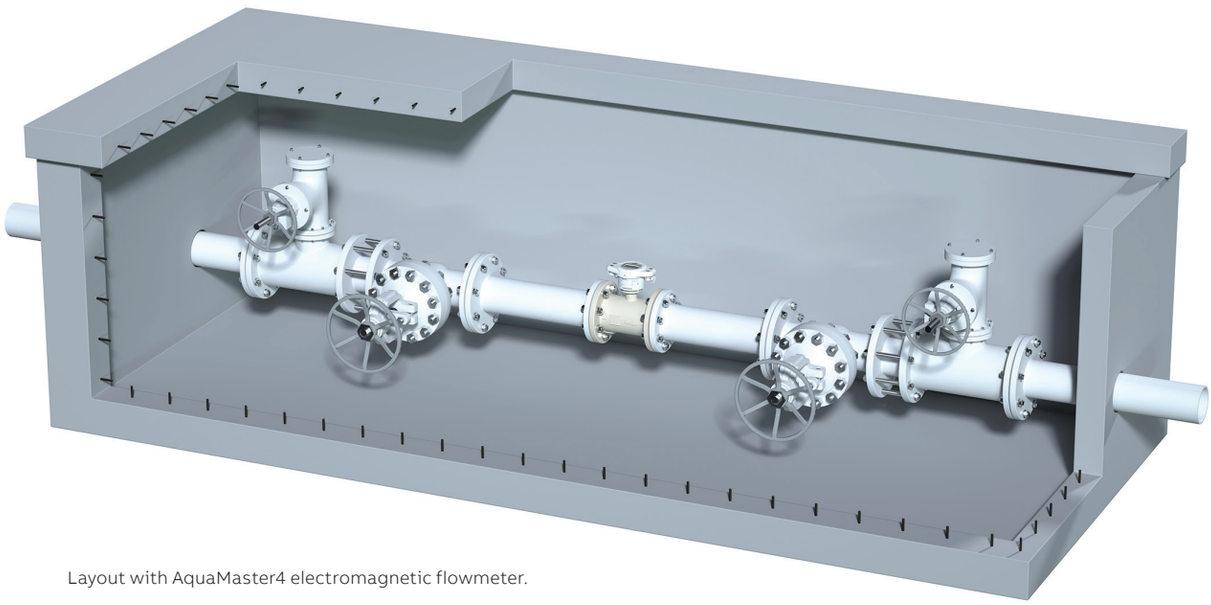
What can ABB offer?

ABB's AquaMaster4 electromagnetic flowmeter offers the ideal solution for measuring water in fire suppression system applications. Certified by UL in line sizes from DN50 (2 in.) to DN300 (12 in.), AquaMaster4 delivers an unrivalled accuracy of up to ±0.2 % of reading ±0.5 mm/s (whichever is greater), a turndown ratio of up to 1000:1 and long-term stability. Its reduced bore sensor is virtually insensitive to hydraulic disturbances as it conditions the upstream fluid flow profile within the sensor's central measuring zone; giving superior performance.

Now available with UL Standard 327b certification, the AquaMaster4 is ideal for monitoring water usage in buildings that are equipped with automated sprinkler systems. The standard demands that a flowmeter must be able to measure the water for ordinary water usage as well as the high flows that occur if the sprinkler system has been activated. An electromagnetic flowmeter is the perfect solution for this, as there is little pressure drop and a large flow range can be captured.

The UL Fire Service approval enables the AquaMaster4 to be used by water utilities or those working with water utilities for billing water into commercial buildings with fire suppressant systems in a completely wetted pipe section when:

- Domestic plumbing and residential sprinkler fire protection service.
- Fire suppression system such as low/medium/high expansion foam, installation of standpipe and hose systems, water spray fixed systems, foam-water sprinkler system and foam-water spray system.



Layout with AquaMaster4 electromagnetic flowmeter.

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